



C-8801

HOH WATER TECHNOLOGY, INC.

Part Number: 01880100

Version No: 5.5

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

Chemwatch Hazard Alert Code: 4

Issue Date: 05/25/2023

Print Date: 05/25/2023

S.GHS.USA.EN.RISK

SECTION 1 Identification

Product Identifier

Product name	C-8801
Synonyms	Not Available
Proper shipping name	Corrosive liquid, acidic, organic, n.o.s. (contains 2-phosphonobutane-1,2,4-tricarboxylic acid)
Other means of identification	Not Available

Recommended use of the chemical and restrictions on use

Relevant identified uses	COOLING TOWER TREATMENT
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Name, address, and telephone number of the chemical manufacturer, importer, or other responsible party

Registered company name	HOH WATER TECHNOLOGY, INC.
Address	500 SOUTH VERMONT STREET PALATINE, IL 60067 United States
Telephone	800-577-2211
Fax	Not Available
Website	WWW.HOHWATERTECHNOLOGY.COM
Email	Not Available

Emergency phone number

Association / Organisation	CHEMTREC
Emergency telephone numbers	800-424-9300
Other emergency telephone numbers	Not Available

SECTION 2 Hazard(s) identification

Classification of the substance or mixture



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 White = Special (Oxidizer or water reactive substances)

Classification	Skin Corrosion/Irritation Category 1B, Corrosive to Metals Category 1, Serious Eye Damage/Eye Irritation Category 1, Carcinogenicity Category 1A *LIMITED EVIDENCE
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Label elements

Hazard pictogram(s)	 
Signal word	Danger

Hazard statement(s)

H314	Causes severe skin burns and eye damage.
H290	May be corrosive to metals.
H350	May cause cancer.

**LIMITED EVIDENCE*

Hazard(s) not otherwise classified

Not Applicable

Precautionary statement(s) Prevention

P201	Obtain special instructions before use.
P260	Do not breathe mist/vapours/spray.
P264	Wash all exposed external body areas thoroughly after handling.
P280	Wear protective gloves, protective clothing, eye protection and face protection.
P234	Keep only in original container.
P202	Do not handle until all safety precautions have been read and understood.

Precautionary statement(s) Response

P301+P330+P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303+P361+P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308+P313	IF exposed or concerned: Get medical advice/ attention.
P310	Immediately call a POISON CENTER/doctor/physician/first aider.
P363	Wash contaminated clothing before reuse.
P390	Absorb spillage to prevent material damage.
P304+P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.

Precautionary statement(s) Storage

P405	Store locked up.
P406	Store in corrosive resistant/ container with a resistant inner liner.

Precautionary statement(s) Disposal

P501	Dispose of contents/container to authorised hazardous or special waste collection point in accordance with any local regulation.
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SECTION 3 Composition / information on Ingredients

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
9003-04-7	6.7-7.1	<u>sodium polyacrylate</u>
37971-36-1	5.4-6	<u>2-phosphonobutane-1,2,4-tricarboxylic acid</u>
13598-36-2	2.4-2.7	<u>ortho-phosphorous acid</u>
26099-09-2	1.9-2.2	<u>maleic acid homopolymer</u>
95-14-7	1.85-2.05	<u>1H-benzotriazole</u>

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

SECTION 4 First-aid measures

Description of first aid measures

Eye Contact	<p>If this product comes in contact with the eyes:</p> <ul style="list-style-type: none"> ▶ Immediately hold eyelids apart and flush the eye continuously with running water. ▶ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▶ Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes. ▶ Transport to hospital or doctor without delay. ▶ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	<p>If skin or hair contact occurs:</p> <ul style="list-style-type: none"> ▶ Immediately flush body and clothes with large amounts of water, using safety shower if available. ▶ Quickly remove all contaminated clothing, including footwear. ▶ Wash skin and hair with running water. Continue flushing with water until advised to stop by the Poisons Information Centre. ▶ Transport to hospital, or doctor.
Inhalation	<ul style="list-style-type: none"> ▶ If fumes or combustion products are inhaled remove from contaminated area. ▶ Lay patient down. Keep warm and rested. ▶ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. ▶ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. ▶ Transport to hospital, or doctor, without delay. ▶ Inhalation of vapours or aerosols (mists, fumes) may cause lung oedema. ▶ Corrosive substances may cause lung damage (e.g. lung oedema, fluid in the lungs). ▶ As this reaction may be delayed up to 24 hours after exposure, affected individuals need complete rest (preferably in semi-recumbent posture) and must be kept under medical observation even if no symptoms are (yet) manifested. ▶ Before any such manifestation, the administration of a spray containing a dexamethasone derivative or beclomethasone derivative may be considered. <p>This must definitely be left to a doctor or person authorised by him/her. (ICSC13719)</p>
Ingestion	<ul style="list-style-type: none"> ▶ For advice, contact a Poisons Information Centre or a doctor at once. ▶ Urgent hospital treatment is likely to be needed. ▶ If swallowed do NOT induce vomiting. ▶ If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. ▶ Observe the patient carefully. ▶ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious. ▶ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink. ▶ Transport to hospital or doctor without delay.

Most important symptoms and effects, both acute and delayed

See Section 11

Indication of any immediate medical attention and special treatment needed

The physicochemical properties of phosphonic acid compounds, notably their high polarity, charge and complexing power, suggests that they will not be readily absorbed from the gastrointestinal tract. This is supported by experimental data which confirm that absorption after oral exposure is low, averaging 2-7% in animals and 2-10% in humans. Faecal elimination of unabsorbed material predominates after ingestion (up to 90% of dose). Renal clearance of any material absorbed from the gut is rapid, with urinary half-lives of 5 hr and 70 hr reported. This second phase of excretion may represent mobilization of material. Initially sequestered by bone, since deposition studies have shown preferential accumulation of these substances in the epiphyseal plate and other regions of the long bones *in vivo*. Around 25% of material absorbed following an oral dose is excreted unchanged in urine, with the remainder converted to an N-methyl derivative or unidentified product(s). Inconsistent data indicate conversion to carbon dioxide is negligible. More pronounced accumulation is observed in bone after i.v. or i.p. injection, reflecting enhanced bioavailability following exposure by these non-physiological routes. Based on the available data, no major differences appear to exist between animals and humans with regard to the absorption, distribution and elimination of phosphonic acid compounds *in vivo*.

ATMP acid and ATMP salts are poorly absorbed from the gut and rapidly eliminated after oral and i.v. administration. Faeces represent the principal route of excretion after oral administration with trace amounts present in urine and carcass. Faeces elimination was, in contrast, comparatively insignificant after i.v. injection, with the majority of the dose present either in urine or carcass. Bone is the only tissue that exhibits deposition of test-substance derived radioactivity. Absorption after dermal exposure was very low and only trace amounts were found in urine, faeces and carcass. The main route of excretion was via the urine in the first 24 hours following application.

Gastro-intestinal absorption of HEDP acid and HEDP salts in rat, dog, rabbit and monkey is low, with the majority of the dose excreted in faeces and a substantial amount excreted via the urine. The remainder of the test substance derived radioactivity deposited mainly in the bones. After i.v. or i.p. injection, internal body burdens increased, presumably reflecting greater systemic availability.

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Very limited information is available on the absorption, distribution, metabolism and elimination of DTPMP acid and DTPMP salts.

For acute or short term repeated exposures to strong acids:

- ▶ Airway problems may arise from laryngeal edema and inhalation exposure. Treat with 100% oxygen initially.
- ▶ Respiratory distress may require cricothyroidotomy if endotracheal intubation is contraindicated by excessive swelling
- ▶ Intravenous lines should be established immediately in all cases where there is evidence of circulatory compromise.
- ▶ Strong acids produce a coagulation necrosis characterised by formation of a coagulum (eschar) as a result of the dessicating action of the acid on proteins in specific tissues.

INGESTION:

- ▶ Immediate dilution (milk or water) within 30 minutes post ingestion is recommended.
- ▶ **DO NOT attempt to neutralise the acid since exothermic reaction may extend the corrosive injury.**
- ▶ Be careful to avoid further vomit since re-exposure of the mucosa to the acid is harmful. Limit fluids to one or two glasses in an adult.
- ▶ Charcoal has no place in acid management.
- ▶ Some authors suggest the use of lavage within 1 hour of ingestion.

SKIN:

- ▶ Skin lesions require copious saline irrigation. Treat chemical burns as thermal burns with non-adherent gauze and wrapping.
- ▶ Deep second-degree burns may benefit from topical silver sulfadiazine.

EYE:

- ▶ Eye injuries require retraction of the eyelids to ensure thorough irrigation of the conjunctival cul-de-sacs. Irrigation should last at least 20-30 minutes. **DO NOT use neutralising agents or any other additives.** Several litres of saline are required.
- ▶ Cycloplegic drops, (1% cyclopentolate for short-term use or 5% homatropine for longer term use) antibiotic drops, vasoconstrictive agents or artificial tears may be indicated dependent on the severity of the injury.
- ▶ Steroid eye drops should only be administered with the approval of a consulting ophthalmologist).

[Ellenhorn and Barceloux: Medical Toxicology]

SECTION 5 Fire-fighting measures

Extinguishing media

- ▶ Water spray or fog.
- ▶ Foam.
- ▶ Dry chemical powder.
- ▶ BCF (where regulations permit).
- ▶ Carbon dioxide.

Special hazards arising from the substrate or mixture

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 full body protective clothing with breathing apparatus.
- ▶ Prevent, by any means available, spillage from entering drains or water course.
- ▶ Use fire fighting procedures suitable for surrounding 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.
 - ▶ Slight fire hazard when exposed to heat or flame.
 - ▶ Acids may react with metals to produce hydrogen, a highly flammable and explosive gas.
 - ▶ Heating may cause expansion or decomposition leading to violent rupture of containers.
 - ▶ May emit acrid smoke and corrosive fumes.
- Combustion products include:
carbon monoxide (CO)
carbon dioxide (CO₂)
other pyrolysis products typical of burning organic material.

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

Continued...

See section 12

Methods and material for containment and cleaning up

Minor Spills	<p>Environmental hazard - contain spillage.</p> <ul style="list-style-type: none"> Drains for storage or use areas should have retention basins for pH adjustments and dilution of spills before discharge or disposal of material. Check regularly for spills and leaks. Clean up all spills immediately. Avoid breathing vapours and contact with skin and eyes. Control personal contact with the substance, by using protective equipment. Contain and absorb spill with sand, earth, inert material or vermiculite. Wipe up. Place in a suitable, labelled container for waste disposal.
Major Spills	<p>Environmental hazard - contain spillage.</p> <ul style="list-style-type: none"> Clear area of personnel and move upwind. Alert Fire Brigade and tell them location and nature of hazard. Wear full body protective clothing with breathing apparatus. Prevent, by any means available, spillage from entering drains or water course. Consider evacuation (or protect in place). Stop leak if safe to do so. Contain spill with sand, earth or vermiculite. Collect recoverable product into labelled containers for recycling. Neutralise/decontaminate residue (see Section 13 for specific agent). Collect solid residues and seal in labelled drums for disposal. Wash area and prevent runoff into drains. After clean up operations, decontaminate and launder all protective clothing and equipment before storing and re-using. If contamination of drains or waterways occurs, advise emergency services.

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

SECTION 7 Handling and storage

Precautions for safe handling

Safe handling	<ul style="list-style-type: none"> Avoid all personal contact, including inhalation. Wear protective clothing when risk of exposure occurs. Use in a well-ventilated area. WARNING: To avoid violent reaction, ALWAYS add material to water and NEVER water to material. Avoid smoking, naked lights or ignition sources. Avoid contact with incompatible materials. When handling, DO NOT eat, drink or smoke. Keep containers securely sealed when not in use. Avoid physical damage to containers. Always wash hands with soap and water after handling. Work clothes should be laundered separately. 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.
Other information	<ul style="list-style-type: none"> Store in original containers. Keep containers securely sealed. Store in a cool, dry, well-ventilated area. Store away from incompatible materials and foodstuff containers. Protect containers against physical damage and check regularly for leaks. Observe manufacturer's storage and handling recommendations contained within this SDS.

Conditions for safe storage, including any incompatibilities

Suitable container	<ul style="list-style-type: none"> DO NOT use aluminium or galvanised containers Check regularly for spills and leaks Lined metal can, lined metal pail/ can. Plastic pail. Polyliner drum. Packing as recommended by manufacturer. Check all containers are clearly labelled and free from leaks.
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C-8801

	<p>For low viscosity materials</p> <ul style="list-style-type: none"> ▸ Drums and jerricans must be of the non-removable head type. ▸ Where a can is to be used as an inner package, the can must have a screwed enclosure. <p>For materials with a viscosity of at least 2680 cSt. (23 deg. C) and solids (between 15 C deg. and 40 deg C.):</p> <ul style="list-style-type: none"> ▸ Removable head packaging; ▸ Cans with friction closures and ▸ low pressure tubes and cartridges <p>may be used.</p> <p>-</p> <p>Where combination packages are used, and the inner packages are of glass, porcelain or stoneware, there must be sufficient inert cushioning material in contact with inner and outer packages unless the outer packaging is a close fitting moulded plastic box and the substances are not incompatible with the plastic.</p>
Storage incompatibility	<ul style="list-style-type: none"> ▸ Reacts with mild steel, galvanised steel / zinc producing hydrogen gas which may form an explosive mixture with air. ▸ Avoid strong bases. ▸ Segregate from alkalies, oxidising agents and chemicals readily decomposed by acids, i.e. cyanides, sulfides, carbonates.

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
ortho-phosphorous acid	3 mg/m3	30 mg/m3	150 mg/m3
ortho-phosphorous acid	1.2 mg/m3	13 mg/m3	380 mg/m3
maleic acid homopolymer	30 mg/m3	330 mg/m3	2,000 mg/m3
1H-benzotriazole	1.2 mg/m3	13 mg/m3	77 mg/m3

Ingredient	Original IDLH	Revised IDLH
sodium polyacrylate	Not Available	Not Available
2-phosphonobutane-1,2,4-tricarboxylic acid	Not Available	Not Available
ortho-phosphorous acid	Not Available	Not Available
maleic acid homopolymer	Not Available	Not Available
1H-benzotriazole	Not Available	Not Available

Occupational Exposure Banding

Ingredient	Occupational Exposure Band Rating	Occupational Exposure Band Limit
sodium polyacrylate	E	≤ 0.01 mg/m³
2-phosphonobutane-1,2,4-tricarboxylic acid	C	> 0.1 to ≤ milligrams per cubic meter of air (mg/m³)
ortho-phosphorous acid	E	≤ 0.01 mg/m³
maleic acid homopolymer	E	≤ 0.01 mg/m³
1H-benzotriazole	E	≤ 0.01 mg/m³

Notes:

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

Exposure controls

Appropriate engineering controls	<p>Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.</p> <p>The basic types of engineering controls are:</p> <p>Process controls which involve changing the way a job activity or process is done to reduce the risk.</p> <p>Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment. Ventilation can remove or dilute an air contaminant if designed properly. The design of a ventilation system must match the particular process and chemical or contaminant in use.</p>
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Employers may need to use multiple types of controls to prevent employee overexposure.

Local exhaust ventilation usually required. If risk of overexposure exists, wear approved respirator. Correct fit is essential to obtain adequate protection. Supplied-air type respirator may be required in special circumstances. Correct fit is essential to ensure adequate protection.

An approved self contained breathing apparatus (SCBA) may be required in some situations.

Provide adequate ventilation in warehouse or closed storage area. 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, degreasing 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, welding, spray drift, plating acid fumes, pickling (released at low velocity into zone of active generation)	0.5-1 m/s (100-200 f/min.)
direct spray, spray painting in shallow booths, 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.)
grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion).	2.5-10 m/s (500-2000 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 m/s (200-400 f/min) for extraction of solvents generated in a tank 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.

Individual protection measures, such as personal protective equipment



Eye and face protection

- Safety glasses with unperforated side shields may be used where continuous eye protection is desirable, as in laboratories; spectacles are not sufficient where complete eye protection is needed such as when handling bulk-quantities, where there is a danger of splashing, or if the material may be under pressure.
- Chemical goggles whenever there is a danger of the material coming in contact with the eyes; goggles must be properly fitted.
- Full face shield (20 cm, 8 in minimum) may be required for supplementary but never for primary protection of eyes; these afford face protection.
- Alternatively a gas mask may replace splash goggles and face shields.
- 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], [AS/NZS 1336 or national equivalent]

Skin protection

See Hand protection below

Hands/feet protection

- Elbow length PVC gloves
- When handling corrosive liquids, wear trousers or overalls outside of boots, to avoid spills entering boots.

Body protection

See Other protection below

Other protection

- Overalls.
- PVC Apron.
- PVC protective suit may be required if exposure severe.
- Eyewash unit.
- Ensure there is ready access to a safety shower.

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Recommended material(s)

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:

"Forsberg Clothing Performance Index".

The effect(s) of the following substance(s) are taken into account in the **computer-generated** selection:

C-8801

Material	CPI
BUTYL	A
NEOPRENE	A
VITON	A
NATURAL RUBBER	C
PVA	C

* CPI - Chemwatch Performance Index

A: Best Selection

B: Satisfactory; may degrade after 4 hours continuous immersion

C: Poor to Dangerous Choice for other than short term immersion

NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -

* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

Respiratory protection

Type AB-P Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

Selection of the Class and Type of respirator will depend upon the level of breathing zone contaminant and the chemical nature of the contaminant.

Protection Factors (defined as the ratio of contaminant outside and inside the mask) may also be important.

Required minimum protection factor	Maximum gas/vapour concentration present in air p.p.m. (by volume)	Half-face Respirator	Full-Face Respirator
up to 10	1000	AB-AUS / Class1 P2	-
up to 50	1000	-	AB-AUS / Class 1 P2
up to 50	5000	Airline *	-
up to 100	5000	-	AB-2 P2
up to 100	10000	-	AB-3 P2
100+			Airline**

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

A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO2), G = Agricultural chemicals, K = Ammonia(NH3), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

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SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

Appearance	CLEAR DARK AMBER LIQUID		
Physical state	Liquid	Relative density (Water = 1)	1.09-1.10
Odour	Not Available	Partition coefficient n-octanol / water	Not Available
Odour threshold	Not Available	Auto-ignition temperature (°C)	Not Available
pH (as supplied)	0.7-1.4	Decomposition temperature (°C)	Not Available
Melting point / freezing point (°C)	Not Available	Viscosity (cSt)	Not Available
Initial boiling point and boiling range (°C)	Not Available	Molecular weight (g/mol)	Not Available
Flash point (°C)	Not Available	Taste	Not Available
Evaporation rate	Not Available	Explosive properties	Not Available
Flammability	Not Available	Oxidising properties	Not Available
Upper Explosive Limit (%)	Not Available	Surface Tension (dyn/cm or mN/m)	Not Available
Lower Explosive Limit (%)	Not Available	Volatile Component (%vol)	Not Available
Vapour pressure (kPa)	Not Available	Gas group	Not Available
Solubility in water	Miscible	pH as a solution (1%)	Not Available
Vapour density (Air = 1)	Not Available	VOC g/L	Not Available

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SECTION 10 Stability and reactivity

Reactivity	See section 7
Chemical stability	<ul style="list-style-type: none"> ▶ Contact with alkaline material liberates heat ▶ Unstable in the presence of incompatible materials. ▶ Product is considered stable. ▶ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 Toxicological information

Information on toxicological effects

Inhaled	<p>The material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage.</p> <p>Corrosive acids can cause irritation of the respiratory tract, with coughing, choking and mucous membrane damage. There may be dizziness, headache, nausea and weakness.</p> <p>The material has NOT been classified by EC Directives or other classification systems as "harmful by inhalation". This is because of the lack of corroborating animal or human evidence.</p>
Ingestion	<p>Ingestion of acidic corrosives may produce burns around and in the mouth, the throat and oesophagus. Immediate pain and difficulties in swallowing and speaking may also be evident.</p> <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>The phosphonic acid compounds ATMP, HEDP, DTPMP and their salts can be considered to be of low to moderate toxicity when swallowed. Animal testing has shown ATMP acid to be of moderate toxicity, with an oral LD50 in rat of 2910 mg active acid/kg.</p>
Skin Contact	<p>Skin contact with acidic corrosives may result in pain and burns; these may be deep with distinct edges and may heal slowly with the formation of scar tissue.</p> <p>Skin contact is not thought to have harmful health effects (as classified under EC Directives); the material may still produce health damage following entry through wounds, lesions or abrasions.</p> <p>The acids and salts of ATMP, HEDP and DTPMP have a low level of acute skin toxicity. ATMP acid and its salts, in testing, were found to be practically non-toxic.</p> <p>Open cuts, abraded or irritated skin should not be exposed to this material</p> <p>Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.</p>
Eye	<p>Direct eye contact with acid corrosives may produce pain, tears, sensitivity to light and burns. Mild burns of the epithelia generally recover rapidly and completely.</p> <p>If applied to the eyes, this material causes severe eye damage.</p> <p>The phosphonic acid compounds, ATMP, HEDP, DTPMP and their salts vary in their potential to irritate the eye, from virtually non-irritating to severely irritating with irreversible effects.</p> <p>Animal testing showed that ATMP and its salts were at most moderate irritating, while HEDP acid was found to be severely irritating, its salts being less so.</p> <p>Irritation of the eyes may produce a heavy secretion of tears (lachrymation).</p>
Chronic	<p>Repeated or prolonged exposure to acids may result in the erosion of teeth, swelling and/or ulceration of mouth lining. Irritation of airways to lung, with cough, and inflammation of lung tissue often occurs.</p> <p>Studies show that inhaling this substance for over a long period (e.g. in an occupational setting) may increase the risk of cancer. Long-term exposure to respiratory irritants may result in airways disease, involving difficulty breathing and related whole-body problems.</p> <p>Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational exposure.</p> <p>Animal testing to date have not shown phosphonic acids or their salts to induce skin sensitisation. However, testing has been incomplete.</p> <p><</p> <p>Although the salt of the organophosphate has not been tested, animal testing on the free acid aminotris(methylenephosphonic) acid revealed loss in body weight and changes in the weight of the liver, spleen and kidney.</p> <p>There has been some concern that this material can cause cancer or mutations but there is not enough data to make an assessment.</p>

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C-8801	TOXICITY	IRRITATION
	Not Available	Not Available
sodium polyacrylate	TOXICITY	IRRITATION
	Oral (Rat) LD50: >8250 mg/kg ^[2]	Eye (rabbit): 2 mg - moderate * [Arakawa]
2-phosphonobutane-1,2,4-tricarboxylic acid	TOXICITY	IRRITATION
	dermal (rat) LD50: >1300 mg/kg ^[1]	Not Available
	Inhalation(Rat) LC50: >1.979 mg/L4h ^[1]	
	Oral (Rat) LD50: >1300 mg/kg ^[1]	
ortho-phosphorous acid	TOXICITY	IRRITATION
	dermal (rat) LD50: >5000 mg/kg ^[2]	Skin: adverse effect observed (corrosive) ^[1]
	Inhalation(Rat) LC50: >2.06 mg/L4h ^[2]	
	Oral (Rat) LD50: 1720 mg/kg ^[2]	
maleic acid homopolymer	TOXICITY	IRRITATION
	Oral (Rat) LD50: 1600 mg/kg ^[2]	Eye (rabbit): irritant
1H-benzotriazole	TOXICITY	IRRITATION
	Dermal (rabbit) LD50: >10000 mg/kg ^[2]	Eye (rabbit): moderate *
	Inhalation(Rat) LC50: 1.4 mg/L4h ^[2]	Eye: adverse effect observed (irritating) ^[1]
	Oral (Rat) LD50: ~500 mg/kg ^[1]	Skin (rabbit): slight *
		Skin: no adverse effect observed (not irritating) ^[1]
Legend:	1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances	

SODIUM POLYACRYLATE	Polycarboxylates are of low toxicity by all exposure routes examined. Homopolymers(P-AA) are of low acute toxicity to the rat (LD50 > 5 g/kg bw/d) and are not irritating to the rabbit s skin and, at the most, slightly irritating to the eye. Further P-AA has no sensitising potential. The adverse effect after repeated inhalation dosing (91-d/rat) was a mild, reversible pulmonary irritation. This effect is considered as not substance related owing to the physical property of the respirable dust, which caused local and not systemic lung effects. There was neither evidence for a genotoxic potential of PAA using a variety of genetic endpoints in-vitro and in-vivo,nor for developmental toxicity or reprotoxicity in the rat. Based upon the available data, it is considered that exposure to polycarboxylates does not imply any particular hazard to humans. The Cosmetic Ingredient Review (CIR) Expert Panel noted that these crosslinked alkyl acrylates are macromolecules that are not expected to pass through the stratum corneum of the skin, so significant dermal absorption is not expected. Therefore, topically applied cosmetics are not expected to result in systemic or reproductive and developmental toxicity or to have genotoxic or carcinogenic effects upon use. The Panel noted that cosmetic products containing these ingredients are reportedly used around the eyes, on the lips, and on other mucous membranes. Thus, crosslinked alkyl acrylates could be absorbed systemically through the relatively moist,n stratum cornea of the conjunctiva, lips,and other mucous membranes, and through ingestion when applied to the lips. However, the Panel noted that any absorption through healthy intact mucous membranes is likely to be not significant,primarily because of the relatively large molecular sizes. Furthermore, the chemically inert nature of the polymers precludes degradation to smaller absorbable species. Absorption of the polymers and their residual monomers in cosmetic products also would be limited after application to the lips or eye area based on the relatively small fractions of the applied products that might be inadvertently ingested or make direct contact with the conjunctiva. The Carbomers (Carbopols) are synthetic, high molecular weight, nonlinear polymers of acrylic acid, cross-linked with a polyalkenyl polyether. The Carbomer polymers are used in cosmetics and emulsifying agents at concentrations up to 50%. Acute oral animal studies showed that Carbomers-910, -934, -934P, -940, and -941 have low toxicities when ingested. Rabbits showed minimal skin irritation and zero to moderate eye irritation when tested with Carbomers-910 and -934. Subchronic feeding of rats and dogs with Carbomer-934 in the diet resulted in lower than normal body weights, but no pathological changes were observed. Dogs chronically fed Carbomer-934P manifested gastrointestinal irritation and marked pigment deposition within Kupffer cells of the liver. Clinical studies with Carbomers showed that these polymers have low potential for skin irritation and sensitization at concentrations up to 100%. Carbomer-934 demonstrated low potential for phototoxicity and photo-contact allergenicity. On the basis of the available information presented and as qualified in the report, it is concluded that the Carbomers are safe as cosmetic ingredients. Little toxicity data is available for acrylic crosspolymers; the acute dermal and oral toxicity data that were found indicated that these ingredients are not very toxic. The little genotoxicity data that were available reported negative results in Ames tests. Carcinogenicity data were not found in the published literature for the polymers, but data were available for the monomers. In an alternative method study, acrylates/vinyl neodecanoate crosspolymer was predicted to be a non-irritant. The non-human

studies reported no to slight irritation with undiluted and weak sensitization with 2% aq., acrylates/C10-30 alkyl acrylate crosspolymer, no irritation with acrylates crosspolymer at 30% in olive oil, and no irritation or sensitization with sodium acrylates crosspolymer-2 (concentration not specified). Mostly, human testing with undiluted acrylates/C10-30 alkyl acrylate crosspolymer, acrylates crosspolymer, and acrylates/ethylhexyl acrylate crosspolymer, up to 2.5% aq. acrylates/vinyl isodecanoate crosspolymer, 1% aq. dilutions of formulations containing 2% acrylates/vinyl neodecanoate crosspolymer, and formulations containing up to 2.6% lauryl methacrylate/glycol dimethacrylate crosspolymers do not indicate any dermal irritation or sensitization. The only exception was a weak irritant response noted during an intensified Shelanski human repeated insult patch test (HR IPT) with undiluted acrylates/C10-30 alkyl acrylate crosspolymer.

Alternative test methods for ocular irritation indicated that acrylates/vinyl isodecanoate crosspolymer and a formulation containing 1% lauryl methacrylate/glycol dimethacrylate crosspolymer are not likely ocular irritants. In studies using rabbits, undiluted acrylates/C10-30 alkyl acrylate crosspolymer produced minimal to moderate irritation, and it was considered a borderline irritant in unrinsed rabbit eyes. Acrylates crosspolymer, at 50% in olive oil, and sodium acrylates crosspolymer-2 did not appear to be ocular irritants in rabbit eyes. Two different risk assessments evaluating the carcinogenic endpoint for benzene that may be present in acrylates/ C10-30 alkyl acrylates crosspolymer resulted in different lifetime risk. One found that the risk was within the range associated with a 10exp 6 cancer risk, while the other reported a 20-fold greater risk.

Final Safety Assessment: Crosslinked Alkyl Acrylates as Used in Cosmetics. Nov 2011

Cosmetic Ingredient Review (CIR) Expert Panel

http://ntp.niehs.nih.gov/ntp/roc/nominations/2013/publiccomm/attachmentcir_508.pdf

The material may cause severe skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin. Repeated exposures may produce severe ulceration.

* Van Waters and Rogers Ten male rats each received a single dose of 10 - 30 ml of the potassium salt per gavage. The animals were observed for mortality and clinical signs through day 14. A gross pathological examination was performed on animals which died during the observation period or were killed after termination of the study. Signs of intoxication were ruffle fur, decreased motility, prone position, accelerated and irregular breathing, cyanosis and after 24 hours diarrhoea. The section of the animals which died revealed a diffuse reddening of the mucosa of the stomach and intestine. For male and female rats a LD50 = 20.1 ml/kg bw (ca. 8300 mg/kg bw) was found. Five male and female rats were exposed for 4 hours to the test substance in analysed concentrations of 800, 1479, 1979 mg/m3 air. After 7 days of observations, no mortality occurred, no clinical symptoms were observed and no significant difference was found in haematological parameters which were examined before and after exposure. The LC50 can be estimated as >1979 mg/m3. 1979 mg/m3 was the highest concentration that could technically be achieved. Following the mentioned results, the tetrasodium hydrogen 2-phosphonatobutane-1,2,4-tricarboxylate is not to be classified as harmful via inhalation as at the highest achievable concentration (1979 mg/m3) no clinical symptoms were observed and no significant difference was found in haematological parameters which were examined before and after exposure. A 32.6 % aqueous solution (4000 mg/kg bw) of tetrasodium hydrogen 2-phosphonatobutane-1,2,4-tricarboxylate was examined for acute dermal toxicity. 5 male rats and 5 female rats were observed for 14 days after dermal application of the test substance. No mortality occurred during the study time. The LD50 (rat, oral) was therefore estimated as > 1300 mg/kg based on active ingredient of a 32.6 % aqueous solution of tetrasodium hydrogen 2-phosphonatobutane-1,2,4-tricarboxylate. No systemic clinical symptoms or local skin changes were observed. Minor changes were observed in body weight of female rats and no influence was observed in the growing development of the male rats. In a pathological examination of the study- rats at the end of the study, it was found that one male rat had a brighter (paler) liver with stains and another male rat had in addition a brighter kidney, two female rats, had also a brighter liver. Following the mentioned results, tetrasodium hydrogen 2-phosphonatobutane-1,2,4-tricarboxylate is not to be classified as an acute toxic substance. Irritation:

Skin

**2-PHOSPHONOBUTANE-
1,2,4-TRICARBOXYLIC
ACID**

The test item was applied at a 100% concentration, i.e. 25 mg per insert. (plus 50 µl 0.9% NaCl to moisten and ensure good contact with the skin). The results show that no corrosive property of the test item was determined by the assay used. Eye: An in vitro study for assessing ocular irritation of compounds using a human epithelial corneal cell model was performed. The results show that tetrasodium hydrogen 2-phosphonatobutane-1,2,4-tricarboxylate is predicted as non-irritant under the conditions of this test method. Sensitisation: The skin sensitisation effect of tetrasodium hydrogen 2-phosphonatobutane-1,2,4-tricarboxylate was examined in guinea pigs by a Guinea Pig Maximisation Test (GPMT) according to Magnusson and Kligman. No skin reaction was observed in the treated group after the challenge test compared to the controls. Moreover, the test animals body weight development was examined and they were observed for clinical symptoms. No difference was exhibited between the treated and the control groups. Therefore, it can be concluded that under the test conditions, the test substance tetrasodium hydrogen 2-phosphonatobutane-1,2,4-tricarboxylate, is not a potential skin sensitiser. Repeat dose toxicity: oral Doses of up to 5000 ppm tetrasodium hydrogen 2-phosphonatobutane-1,2,4-tricarboxylate applied over 3 months were tolerated without any effects. The NOAEL of the tetrasodium hydrogen 2-phosphonatobutane-1,2,4-tricarboxylate is equal or higher than 5000 ppm (equivalent to about 424 mg/kg bw for male rats and 632 mg/kg bw for female rats). Genetic toxicity: in vitro A 45-50% (w/w) solution of 2-phosphonobutane-1,2,4-tricarboxylic acid in water was found to be non-mutagenic under test conditions. Toxicity to reproduction: The available information on toxicity gave no evidence of damage in doses up to 375 mg/kg body weight. There is no evidence of embryo-toxicity, teratogenicity or genotoxicity. Based on the available data on toxicity and the data on occupational exposure and exposure of the general population, 2-phosphonobutane-1,2,4-tricarboxylic acid is of low concern." Development toxicity/ teratogenicity After oral application of 2-phosphonobutane-1,2,4-tricarboxylic acid up to maximal dosage of 1000 mg/kg no signs of maternal toxicity were found (by means of death, weight loss, changes in appearance and behaviour). Moreover, female mother rats were proved later to be fertile. No influence was observed in embryo and foetus development (resorption, placenta weight, any skeletal and internal malformation). The NOEL value for these effects is therefore determined as 1000 mg/kg bw/day. Under the experimental conditions, the test item is considered to have no maternal and embryonic toxic effects and no teratogenicity effects in rats. REACH Dossier

The material may be irritating to the eye, with prolonged contact causing inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.

**ORTHO-PHOSPHOROUS
ACID**

No significant acute toxicological data identified in literature search.

The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.

C-8801

MALEIC ACID HOMOPOLYMER	* (calculated) Data for 50% aqueous solution only
1H-BENZOTRIAZOLE	Bacterial mutagenicity: E. coli positive. Ames positive; HGPRT negative; micronucleus test (mouse) negative **** * [Ciba Geigy] ** [Bayer] *** Merck **** Benzotriazoles Coalition Synthetic Organic Chemical Manufacturers Association December, 2001
C-8801 & 2-PHOSPHONOBUTANE-1,2,4-TRICARBOXYLIC ACID & ORTHO-PHOSPHOROUS ACID & 1H-BENZOTRIAZOLE	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.
C-8801 & 2-PHOSPHONOBUTANE-1,2,4-TRICARBOXYLIC ACID & ORTHO-PHOSPHOROUS ACID	For acid mists, aerosols, vapours Test results suggest that eukaryotic cells are susceptible to genetic damage when the pH falls to about 6.5. Cells from the respiratory tract have not been examined in this respect. Mucous secretion may protect the cells of the airway from direct exposure to inhaled acidic mists (which also protects the stomach lining from the hydrochloric acid secreted there).
C-8801 & 2-PHOSPHONOBUTANE-1,2,4-TRICARBOXYLIC ACID	For ATMP (aminotris(methylenephosphonic acid)) and its salts: ATMP acid, the monosodium salt and hexasodium salts cause serious eye irritation, while the disodium to pentasodium salts do not cause eye irritation. The low pH would predict that ATMP acid should be severely irritant or corrosive to skin as well as eyes. Acute toxicity: In animals, ATMP has low acute toxicity. Sensitisation: Based on animal data and human exposure reports, ATMP is not classified with respect to skin sensitization. Toxicity after repeated exposure: Not classified. Genetic toxicity / mutation-causing potential: ATMP and its salts do not cause genetic toxicity or mutations. Cancer-causing potential: ATMP sodium salts and the acid are not expected to cause cancer. Reproductive toxicity: Based on animal testing, ATMP and its salts do not cause reproductive toxicity. Animal testing to date have not shown phosphonic acids or their salts to induce skin sensitisation. However, testing has been incomplete. < for 2-phosphonobutane-1,2,4-tricarboxylic acid (PBTC) The substance has low acute toxicity. It produced negative results in two Ames tests one in vitro chromosomal aberration test. The NOAEL for repeated dose toxicity is 375 mg/kg body weight and no embryotoxicity or teratogenicity was recorded up to a dose of 1000 mg/kg. An estimated dose of low concern (EDLC) of 3.75 mg/kg was derived. The highest aquatic local PEC due to its use as additive in cooling waters was estimated to be 10 - 100 ug/L.
SODIUM POLYACRYLATE & MALEIC ACID HOMOPOLYMER & 1H-BENZOTRIAZOLE	The material may produce moderate eye irritation leading to inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.
2-PHOSPHONOBUTANE-1,2,4-TRICARBOXYLIC ACID & ORTHO-PHOSPHOROUS ACID	The material may produce respiratory tract irritation, and result in damage to the lung including reduced lung function. The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.

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
C-8801	Not Available	Not Available	Not Available	Not Available	Not Available

Continued...

sodium polyacrylate	Endpoint	Test Duration (hr)	Species	Value	Source
	Not Available	Not Available	Not Available	Not Available	Not Available
2-phosphonobutane-1,2,4-tricarboxylic acid	Endpoint	Test Duration (hr)	Species	Value	Source
	LC50	96h	Fish	>1042mg/l	Not Available
	EC10(ECx)	72h	Algae or other aquatic plants	8mg/l	1
	EC50	72h	Algae or other aquatic plants	140mg/l	1
ortho-phosphorous acid	Endpoint	Test Duration (hr)	Species	Value	Source
	LC50	96h	Fish	>100mg/l	2
	EC50	72h	Algae or other aquatic plants	13.5mg/l	2
	EC50	48h	Crustacea	>1000mg/l	2
	NOEC(ECx)	72h	Algae or other aquatic plants	0.32mg/l	2
maleic acid homopolymer	Endpoint	Test Duration (hr)	Species	Value	Source
	Not Available	Not Available	Not Available	Not Available	Not Available
1H-benzotriazole	Endpoint	Test Duration (hr)	Species	Value	Source
	BCF	1008h	Fish	1.1-3	7
	EC50(ECx)	48h	Crustacea	20mg/l	Not Available
	EC50	72h	Algae or other aquatic plants	29mg/l	2
	EC50	48h	Crustacea	20mg/l	Not Available
	LC50	96h	Fish	25mg/l	Not Available
Legend:	Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data				

On the basis of available evidence concerning either toxicity, persistence, potential to accumulate and or observed environmental fate and behaviour, the material may present a danger, immediate or long-term and /or delayed, to the structure and/ or functioning of natural ecosystems.

Toxic to soil organisms.

For Phosphonates: log Kow Values - ATMP: -3.53; HEDP: -3.49; EDTMP: -4.10; HDTMP: -4.43; DTMP: -3.40.

Environmental Fate: Phosphonates are water soluble and non-volatile with moderate to high sorption coefficients, multi-protic acidity and strong (transition) metal complexation. Orthophosphate has been found to suppress phosphonate utilization in many microorganisms, thus, many organisms preferentially use inorganic phosphate, which may explain the low biodegradability of phosphonates in synthetic test media and natural sewage systems. Phosphonate degrading bacteria can be found in almost any environment whether soil, activated sludge or river water. Phosphonate degradation occurs in limited phosphate environments; however, this is not likely to occur in most environments. If phosphate is the growth-limiting factor, 94% of 1-hydroxy ethylidene-1,1-diphosphonic acid (HEDP) is broken down. Methylene phosphonic acid (ATMP) showed 60 % degradation under similar conditions. Standard biodegradation tests show a low degree of biodegradation. It is assumed that biodegradation does not occur in sewage treatment plants.

Aquatic Fate: Degradation occurs in river sediment because phosphonates become tightly, and for the most part, irreversibly bound onto the sediment. Anaerobic degradation has not been studied extensively.

Terrestrial Fate: Biodegradation of ATMP, HEDP and DTPMP occurs in soil.

Aquatic Fate: Phosphonates are quite stable in water; however, methylene phosphonic acid will hydrolyze fairly easily at low concentrations (70 ppb) with complete primary degradation in a few days. Hydrolysis of phosphonates is strongly dependent on the presence of metal ions, oxygen and light. Hydrolysis half-lives in the range of 50 -200 days have been calculated. In colder environments, the half-life for hydrolysis might be of the same order as biodegradation.

Ecotoxicity: The potential for bioaccumulation of phosphonates in aquatic organisms is expected to be low. Phosphonates only remobilize metals at concentrations of at least 100 to 300 ppb. Chelating agents can inhibit algae growth; however, very large differences in response have been observed between species.

Phosphonates show low toxicity to Chironomus sp. midges, Daphnia sp. water fleas, bluegill sunfish, channel catfish, rainbow trout, sheephead minnow, earthworms and grass shrimp. The most sensitive species is Daphnia magna water fleas. Phosphonates can effect shell building in eastern oysters. Bacteria can metabolize phosphonates as a nutrient source.

Ecotoxicity:

The tolerance of water organisms towards pH margin and variation is diverse. Recommended pH values for test species listed in OECD guidelines are between 6.0 and almost 9. Acute testing with fish showed 96h-LC50 at about pH 3.5

Environmental Fate: 2-phosphonobutane-1,2,4-tricarboxylic acid (PBTC), used as additive for cooling water and industrial cleaning agents, is completely miscible in water and is not readily biodegradable based on OECD criteria. PBTC has chelating properties that enables the compound to possibly form a complex with suspended matter in surface water and sediment. The physico-chemical properties of the compound indicate that hydrosphere is likely to be the main environmental target-compartment of PBTC with no significant possibility of entering the atmosphere. Hydrolysis is not a possible degradation pathway of PBTC. However, it can possibly undergo photooxidative transformation despite that PBTC as a free acid does not absorb visible light but in the presence of photochemically induced sensitizers, photooxidative transformation was observed. Therefore, photooxidative transformation is the most relevant degradation pathway for PBTC in the hydrosphere.

Continued...

As chelating agent, PBTC has the potential to reduce the elimination of heavy metals by adsorption on activated sludge thus remobilization of heavy metals out of river sediment may occur.

Aquatic Fate: The highest possible local exposure to the aquatic compartment is through its occurrence in cooling water, which are not usually treated in wastewater treatment plant but is directly disposed into surface water.

Terrestrial Fate: The possible exposure to the terrestrial compartment is through land spreading of sewage sludge from domestic waste water treatment plants.

Ecotoxicity:

Fish LC50 (48h): rainbow trout >3.44 mg/l; golden orfe 500 mg/l

Daphnia magna EC50 (24h): water flea >265 mg/l

Algal EC50 (72h): Scenedesmus subspicatus 140 mg/l

Algal EC50 (96h): 860 mg/l

For Phosphate: The principal problems of phosphate contamination of the environment relates to eutrophication processes in lakes and ponds. Phosphorus is an essential plant nutrient and is usually the limiting nutrient for blue-green algae.

Aquatic Fate: Lakes overloaded with phosphates is the primary catalyst for the rapid growth of algae in surface waters. Planktonic algae cause turbidity and flotation films. Shore algae cause ugly muddying, films and damage to reeds. Decay of these algae causes oxygen depletion in the deep water and shallow water near the shore. The process is self-perpetuating because an anoxic condition at the sediment/water interface causes the release of more adsorbed phosphates from the sediment. The growth of algae produces undesirable effects on the treatment of water for drinking purposes, on fisheries, and on the use of lakes for recreational purposes.

Prevent, by any means available, spillage from entering drains or water courses.

DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
2-phosphonobutane-1,2,4-tricarboxylic acid	LOW	LOW
1H-benzotriazole	HIGH	HIGH

Bioaccumulative potential

Ingredient	Bioaccumulation
2-phosphonobutane-1,2,4-tricarboxylic acid	LOW (LogKOW = -1.359)
1H-benzotriazole	LOW (BCF = 15)

Mobility in soil

Ingredient	Mobility
2-phosphonobutane-1,2,4-tricarboxylic acid	LOW (KOC = 846)
1H-benzotriazole	LOW (KOC = 996.2)

SECTION 13 Disposal considerations

Waste treatment methods

Product / Packaging disposal	<ul style="list-style-type: none"> Recycle wherever possible. Consult manufacturer for recycling options or consult local or regional waste management authority for disposal if no suitable treatment or disposal facility can be identified. Treat and neutralise at an approved treatment plant. Treatment should involve: Neutralisation with soda-ash or soda-lime followed by: burial in a land-fill specifically licensed to accept chemical and / or pharmaceutical wastes or Incineration in a licensed apparatus Decontaminate empty containers with 5% aqueous sodium hydroxide or soda ash, followed by water. Observe all label safeguards until containers are cleaned and destroyed.
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SECTION 14 Transport information

Labels Required

	
Marine Pollutant	NO

Continued...

Shipping container and transport vehicle placarding and labeling may vary from the below information. Products that are regulated for transport will be packaged and marked as Dangerous Goods in Excepted Quantities according to US DOT, IATA and IMDG regulations. In case of reshipment, it is the responsibility of the shipper to determine the appropriate labels and markings in accordance with applicable transport regulations.

Land transport (DOT)

UN number or ID number	3265
UN proper shipping name	Corrosive liquid, acidic, organic, n.o.s. (contains 2-phosphonobutane-1,2,4-tricarboxylic acid)
Transport hazard class(es)	Class 8 Subsidiary risk Not Applicable
Packing group	III
Environmental hazard	Not Applicable
Special precautions for user	Hazard Label 8 Special provisions 386, IB3, T7, TP1, TP28

Air transport (ICAO-IATA / DGR)

UN number	3265
UN proper shipping name	Corrosive liquid, acidic, organic, n.o.s. * (contains 2-phosphonobutane-1,2,4-tricarboxylic acid)
Transport hazard class(es)	ICAO/IATA Class 8 ICAO / IATA Subrisk Not Applicable ERG Code 8L
Packing group	III
Environmental hazard	Not Applicable
Special precautions for user	Special provisions A3 A803 Cargo Only Packing Instructions 856 Cargo Only Maximum Qty / Pack 60 L Passenger and Cargo Packing Instructions 852 Passenger and Cargo Maximum Qty / Pack 5 L Passenger and Cargo Limited Quantity Packing Instructions Y841 Passenger and Cargo Limited Maximum Qty / Pack 1 L

Sea transport (IMDG-Code / GGVSee)

UN number	3265
UN proper shipping name	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. (contains 2-phosphonobutane-1,2,4-tricarboxylic acid)
Transport hazard class(es)	IMDG Class 8 IMDG Subrisk Not Applicable
Packing group	III
Environmental hazard	Not Applicable
Special precautions for user	EMS Number F-A, S-B Special provisions 223 274 Limited Quantities 5 L

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

Not Applicable

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

Product name	Group
sodium polyacrylate	Not Available
2-phosphonobutane-1,2,4-tricarboxylic acid	Not Available

Continued...

Product name	Group
ortho-phosphorous acid	Not Available
maleic acid homopolymer	Not Available
1H-benzotriazole	Not Available

Transport in bulk in accordance with the IGC Code

Product name	Ship Type
sodium polyacrylate	Not Available
2-phosphonobutane-1,2,4-tricarboxylic acid	Not Available
ortho-phosphorous acid	Not Available
maleic acid homopolymer	Not Available
1H-benzotriazole	Not Available

SECTION 15 Regulatory information

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

sodium polyacrylate is found on the following regulatory lists

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

2-phosphonobutane-1,2,4-tricarboxylic acid is found on the following regulatory lists

US AIHA Workplace Environmental Exposure Levels (WEELs)

US Toxicology Excellence for Risk Assessment (TERA) Workplace Environmental Exposure Levels (WEEL)

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

ortho-phosphorous acid is found on the following regulatory lists

US DOE Temporary Emergency Exposure Limits (TEELs)

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

maleic acid homopolymer is found on the following regulatory lists

US DOE Temporary Emergency Exposure Limits (TEELs)

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

1H-benzotriazole is found on the following regulatory lists

US - Massachusetts - Right To Know Listed Chemicals

US DOE Temporary Emergency Exposure Limits (TEELs)

US Clean Air Act - Hazardous Air Pollutants

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

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	Yes
Oxidizer (Liquid, Solid or Gas)	No
Organic Peroxide	No
Self-reactive	No
In contact with water emits flammable gas	No
Combustible Dust	No
Carcinogenicity	Yes
Acute toxicity (any route of exposure)	No
Reproductive toxicity	No
Skin Corrosion or Irritation	Yes
Respiratory or Skin Sensitization	No

Continued...

Serious eye damage or eye irritation	Yes
Specific target organ toxicity (single or repeated exposure)	No
Aspiration Hazard	No
Germ cell mutagenicity	No
Simple Asphyxiant	No
Hazards Not Otherwise Classified	No

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

None Reported

State Regulations

US, California Proposition 65

None listed

National Inventory Status

National Inventory	Status
Australia - AIC / Australia Non-Industrial Use	Yes
Canada - DSL	Yes
Canada - NDSL	No (sodium polyacrylate; 2-phosphonobutane-1,2,4-tricarboxylic acid; ortho-phosphorous acid; maleic acid homopolymer)
China - IECSC	No (sodium polyacrylate)
Europe - EINEC / ELINCS / NLP	No (sodium polyacrylate; maleic acid homopolymer)
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. These ingredients may be exempt or will require registration.

SECTION 16 Other information

Revision Date	05/25/2023
Initial Date	02/01/2023

SDS Version Summary

Version	Date of Update	Sections Updated
4.5	05/24/2023	Firefighting measures - Fire Fighter (fire/explosion hazard)

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

Continued...

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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