SAFETY DATA SHEETS

According to Globally Harmonized System of Classification and Labelling of Chemicals (GHS) - Sixth revised edition

Version: 1.0

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1.Identification

1.1GHS Product identifier

Product name	(2-chloroethyl)phosphonic acid

1.2Other means of identification

Product number	-
Other names	2-Chloroethylphosphonic acid,Ethephon

1.3Recommended use of the chemical and restrictions on use

Identified uses	For industry use only.
Uses advised against	no data available

2.Hazard identification

2.1Classification of the substance or mixture

Acute toxicity - Oral, Category 4

Acute toxicity - Dermal, Category 3

Skin corrosion, Category 1C

Acute toxicity - Inhalation, Category 4

Hazardous to the aquatic environment, long-term (Chronic) - Category Chronic 2

2.2GHS label elements, including precautionary statements

Pictogram(s)

Signal word: Danger

Hazard statement(s):

H302 Harmful if swallowed

H311 Toxic in contact with skin

H314 Causes severe skin burns and eye damage

H332 Harmful if inhaled

H411 Toxic to aquatic life with long lasting effects

Precautionary statement(s)

Prevention	P264 Wash ... thoroughly after handling.
	P270 Do not eat, drink or smoke when using this product.
	P280 Wear protective gloves/protective clothing/eye protection/face protection.
	P260 Do not breathe dust/fume/gas/mist/vapours/spray.
	P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
	P271 Use only outdoors or in a well-ventilated area.
	P273 Avoid release to the environment.
Response	P301+P312 IF SWALLOWED: Call a POISON CENTER/doctor/…if you feel unwell.
	P330 Rinse mouth.
	P302+P352 IF ON SKIN: Wash with plenty of water/...
	P312 Call a POISON CENTER/doctor/…if you feel unwell.
	P321 Specific treatment (see ... on this label).
	P361+P364 Take off immediately all contaminated clothing and wash it before reuse.
	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 [or shower].
	P363 Wash contaminated clothing before reuse.
	P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
	P310 Immediately call a POISON CENTER/doctor/…
	P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
	P391 Collect spillage.
Storage	P405 Store locked up.
Disposal	P501 Dispose of contents/container to ...

2.3Other hazards which do not result in classification

none

3.Composition/information on ingredients

3.1Substances

Chemical name	Common names and synonyms	CAS number	EC number	Concentration
(2-chloroethyl)phosphonic acid	(2-chloroethyl)phosphonic acid	16672-87-0	none	100%

4.First-aid measures

4.1Description of necessary first-aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2Most important symptoms/effects, acute and delayed

no data available

4.3Indication of immediate medical attention and special treatment needed, if necessary

/SRP:/ Immediate first aid: Ensure that adequate decontamination has been carried out. If patient is not breathing, start artificial respiration, preferably with a demand-valve resuscitator, bag-valve-mask device, or pocket mask, as trained. Perform CPR as necessary. Immediately flush contaminated eyes with gently flowing water. Do not induce vomiting. If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain an open airway and prevent aspiration. Keep patient quiet and maintain normal body temperature. Obtain medical attention. /Organophosphates and related compounds/

5.Fire-fighting measures

5.1Extinguishing media

Suitable extinguishing media

Extinguishing Media: Considered non-combustible. Use medium appropriate to surrounding fire. Foam, dry chemical, carbon dioxide, water, or fog. /Boll Buster/

5.2Specific hazards arising from the chemical

no data available

5.3Special protective actions for fire-fighters

Wear self-contained breathing apparatus for firefighting if necessary.

6.Accidental release measures

6.1Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust. For personal protection see section 8.

6.2Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3Methods and materials for containment and cleaning up

Small spill or leak: Avoid bodily contact. Confine spill by diking with suitable absorbent material and recover as much free lquid as possible. If spilled on the ground, the affected soil whould be removed to a depth of one or two inches and placed in an appropriate container for proper disposal in accordance with all Federal, State and Local regulations. /Boll Buster/

7.Handling and storage

7.1Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Avoid exposure - obtain special instructions before use.Provide appropriate exhaust ventilation at places where dust is formed. For precautions see section 2.2.

7.2Conditions for safe storage, including any incompatibilities

Keep out of reach of children and animals. Store in original containers only. Store in a cool, dry place. Carefully open containers. After partial use, replace lids and close tightly. Do not put concentrate or dilute material into food or drink containers. Do not contaminate water, food, or feed by storage or disposal. /Boll Buster/

8.Exposure controls/personal protection

8.1Control parameters

Occupational Exposure limit values

no data available

Biological limit values

no data available

8.2Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

8.3Individual protection measures, such as personal protective equipment (PPE)

Eye/face protection

Safety glasses with side-shields conforming to EN166. Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Wear impervious clothing. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace. Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique(without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands. The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Respiratory protection

Wear dust mask when handling large quantities.

Thermal hazards

no data available

9.Physical and chemical properties

Physical state	white to beige powder
Colour	Needles from benzene
Odour	no data available
Melting point/ freezing point	70-72ºC
Boiling point or initial boiling point and boiling range	333.4ºC at 760 mmHg
Flammability	no data available
Lower and upper explosion limit / flammability limit	no data available
Flash point	155.4ºC
Auto-ignition temperature	no data available
Decomposition temperature	no data available
pH	no data available
Kinematic viscosity	no data available
Solubility	Freely soluble in ethylene glycol, propylene glycol; practically insoluble in petroleum ether
Partition coefficient n-octanol/water (log value)	log Kow = -0.22
Vapour pressure	2.62E-05mmHg at 25°C
Density and/or relative density	1.568 g/cm3
Relative vapour density	no data available
Particle characteristics	no data available

10.Stability and reactivity

10.1Reactivity

no data available

10.2Chemical stability

Aqueous soln are stable below pH 3.5. Above pH 3.5 hydrolysis begins with the release of free ethylene.

10.3Possibility of hazardous reactions

NONFLAMMABLE

10.4Conditions to avoid

no data available

10.5Incompatible materials

Incompatibility: Oxidizing agents ans alkaline materials. Corrosive to iron, mild steel, aluminum, and copper. /Boll Buster/

10.6Hazardous decomposition products

Hazardous Decomposition Products: Carbon monoxide, carbon dioxide, and hydrogen chloride. Reaction to alkaline materials causes evolution of ethylene gas. /Boll Buster/

11.Toxicological information

Acute toxicity

- Oral: LD50 Rat oral 4000 mg/kg
- Inhalation: no data available
- Dermal: LD50 Rabbit percutaneous 5730 mg/kg

Skin corrosion/irritation

no data available

Serious eye damage/irritation

no data available

Respiratory or skin sensitization

no data available

Germ cell mutagenicity

no data available

Carcinogenicity

Cancer Classification: Group D Not Classifiable as to Human Carcinogenicity

Reproductive toxicity

no data available

STOT-single exposure

no data available

STOT-repeated exposure

no data available

Aspiration hazard

no data available

12.Ecological information

12.1Toxicity

- Toxicity to fish: LC50; Species: Lepomis macrochirus (Bluegill); Concentration: 300 mg/L for 96 hr /Conditions of bioassay not specified in source examined
- Toxicity to daphnia and other aquatic invertebrates: EC50; Species: Daphnia magna (Water Flea) 1st instar larvae; Conditions: freshwater, static; Concentration: 31700 ug/L for 48 hr (95% confidence interval: 17000-58000 ug/L); Effect: intoxication, immobilization /88.3% purity
- Toxicity to algae: EC50; Species: Pseudokirchneriella subcapitata (Green algae); Conditions: freshwater, static; Concentration: >1400 ug/L for 5 days; Effect: population abundance /71.9% purity
- Toxicity to microorganisms: no data available

12.2Persistence and degradability

AEROBIC: Degradation of ethephon occurs with a half-life of 7.5 days in sandy loam soil when incubated in the dark at 25°C. The major degradates were ethylene gas and soil bound 2-hydroxy ethyl phosphonic acid. Only 4.7 percent of 14C-radiolabeled ethephon was remaining after 30 days(1).

12.3Bioaccumulative potential

An estimated BCF of 3.2 was calculated for ethephon(SRC), using a measured log Kow of -0.22(1) and a regression-derived equation(2). According to a classification scheme(3), this BCF suggests the potential for bioconcentration in aquatic organisms is low(SRC).

12.4Mobility in soil

The Koc of ethephon ranges from 608 to 8547 determined from adsorption/desorption experiments(1). 14C-Ethephon in solution at 0.4, 1.3, 5.1, and 10.1 ppm and applied to loamy sand, silt loam soil, sandy loam and clay soils as well as in sandy loam pond sediments was equilibrated in the dark for 24 hours at 25°C. Freundlich adsorption values were 2.4 for the silt loam soil, 7.2 for the loamy sand soil, 29.8 for sandy loam soil, 53.1 for the clay soil, and 57.3 for the sandy loam pond sediment; respective K values were 608, 3117, 4078, 3220, and 1676. Freundlich desorption values were 3.9

for the silt loam soil, 17.5 for the loamy sand soil, 62.4 for sandy loam soil, 69.0 for the clay soil, and 87.9 for the sandy loam pond sediment; respective K values were 992, 7600, 8547, 4181, and 2570(1). According to a classification scheme(2), this range of Koc values suggests that ethephon is expected to have a low to slight mobility in most soil types but also suggest that it could be immobile in a few soil types. The pKa1of 2.5 and pKa2 of 7.2 indicates that this compound will exist entirely in anion form in the environment and anions generally do not adsorb more strongly to soils containing organic carbon and clay than their neutral counterparts(3).

12.5Other adverse effects

no data available

13.Disposal considerations

13.1Disposal methods

Product

The material can be disposed of by removal to a licensed chemical destruction plant or by controlled incineration with flue gas scrubbing. Do not contaminate water, foodstuffs, feed or seed by storage or disposal. Do not discharge to sewer systems.

Contaminated packaging

Containers can be triply rinsed (or equivalent) and offered for recycling or reconditioning. Alternatively, the packaging can be punctured to make it unusable for other purposes and then be disposed of in a sanitary landfill. Controlled incineration with flue gas scrubbing is possible for combustible packaging materials.

14.Transport information

14.1UN Number

ADR/RID: UN2928 IMDG: UN2928 IATA: UN2928

14.2UN Proper Shipping Name

ADR/RID: TOXIC SOLID, CORROSIVE, ORGANIC, N.O.S.
IMDG: TOXIC SOLID, CORROSIVE, ORGANIC, N.O.S.
IATA: TOXIC SOLID, CORROSIVE, ORGANIC, N.O.S.

14.3Transport hazard class(es)

ADR/RID: 6.1 IMDG: 6.1 IATA: 6.1

14.4Packing group, if applicable

ADR/RID: II IMDG: II IATA: II

14.5Environmental hazards

ADR/RID: yes IMDG: yes IATA: yes

14.6Special precautions for user

no data available

14.7Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

no data available

15.Regulatory information

15.1Safety, health and environmental regulations specific for the product in question

Chemical name	Common names and synonyms	CAS number	EC number
(2-chloroethyl)phosphonic acid	(2-chloroethyl)phosphonic acid	16672-87-0	none
European Inventory of Existing Commercial Chemical Substances (EINECS)			Listed.
EC Inventory			Listed.
United States Toxic Substances Control Act (TSCA) Inventory			Not Listed.
China Catalog of Hazardous chemicals 2015			Not Listed.
New Zealand Inventory of Chemicals (NZIoC)			Listed.
Philippines Inventory of Chemicals and Chemical Substances (PICCS)			Listed.
Vietnam National Chemical Inventory			Not Listed.
Chinese Chemical Inventory of Existing Chemical Substances (China IECSC)			Listed.