

SAFETY DATA SHEETS

According to the UN GHS revision 9

Version: 1.2
Creation Date: July 15, 2019
Revision Date: August 08, 2025

SECTION 1: Identification

1.1 GHS Product identifier

Product name Phorate

1.2 Other means of identification

Product number CCPD100661

Other names Geomet; Granutox; Thimet

1.3 Recommended use of the chemical and restrictions on use

Identified uses For laboratory and Industrial use only.

Uses advised against no data available

1.4 Supplier's details

Company CATO Research Chemicals Inc.

Address 3/F,Building B,No.179 BASIGO, Guangpu Rd East,Huangpu Dist,Guangzhou

Telephone +86-20-81960175

1.5 Emergency phone number

Emergency phone number +86-20-81960175

Service hours 'Monday to Friday, 9am-5pm (Standard time zone: UTC/GMT +8 hours).

SECTION 2: Hazard identification

2.1 Classification of the substance or mixture

Acute toxicity - Category 2, Oral

Acute toxicity - Category 1, Dermal

Hazardous to the aquatic environment, short-term (Acute) - Category Acute 1

Hazardous to the aquatic environment, long-term (Chronic) - Category Chronic 1

2.2 GHS label elements, including precautionary statements

Pictogram(s)



Signal word

Danger

Hazard statement(s)

H300 Fatal if swallowed

H310 Fatal in contact with skin

H410 Very 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.

P262 Do not get in eyes, on skin, or on clothing.

P280 Wear protective gloves/protective clothing/eye protection/face protection/hearing protection/...

P273 Avoid release to the environment.

Response

P301+P316 IF SWALLOWED: Get emergency medical help immediately.

P321 Specific treatment (see ... on this label).

P330 Rinse mouth.

P302+P352 IF ON SKIN: Wash with plenty of water/...

P316 Get emergency medical help immediately.

P361+P364 Take off immediately all contaminated clothing and wash it before reuse.

P391 Collect spillage.

Storage

P405 Store locked up.

Disposal

P501 Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

2.3 Other hazards which do not result in classification

no data available

SECTION 3: Composition/information on ingredients

3.1 Substances

Chemical name	Common names and synonyms	CAS number	EC number	Concentration
Phorate	Phorate	298-02-2	206-052-2	100%

SECTION 4: First-aid measures

4.1 Description of necessary first-aid measures

If inhaled

Fresh air, rest. Refer for medical attention.

Following skin contact

Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention .

Following eye contact

First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.

Following ingestion

Rinse mouth. Give one or two glasses of water to drink. Refer for medical attention .

4.2 Most important symptoms/effects, acute and delayed

This material is one of the more toxic organophosphorus insecticides. It is a cholinesterase inhibitor that acts on the nervous system, and produces toxicity similar to Parathion. The probable oral lethal dose for humans is less than 5 mg/kg, i.e. a taste (less than 7 drops) for a 70 kg (150 lb.) person. (EPA, 1998)

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

Airway protection. Ensure that a clear airway exists. Intubate the patients and aspirate the secretions with a large-bore suction device if necessary. Administer oxygen by mechanically assisted pulmonary ventilation if respiration is depressed. Improve tissue oxygenation as much as possible before administering atropine, so as to minimize the risk of ventricular fibrillation. In severe poisonings, it may be necessary to support pulmonary ventilation mechanically for several days. Organophosphate pesticides

SECTION 5: Fire-fighting measures

5.1 Suitable extinguishing media

If material on fire or involved in fire: Do not extinguish fire unless flow can be stopped. Use water in flooding quantities as fog. Solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water. Apply water from as far a distance as possible. Use "alcohol" foam, dry chemical or carbon dioxide. Organophosphorus pesticides, liquid, flammable, toxic; Organophosphorus pesticides, liquid, toxic

5.2 Specific hazards arising from the chemical

Shock can shatter containers, releasing the contents. When heated to decomposition, toxic fumes of sulfur oxides, phosphorus oxides, and nitrogen oxides are emitted. Hydrolyzed in water and alkalies. (EPA, 1998)

5.3 Special protective actions for fire-fighters

Use water spray, foam, powder, carbon dioxide.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Personal protection: gas-tight chemical protection suit including self-contained breathing apparatus. Do NOT let this chemical enter the environment. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent. Then store and dispose of according to local regulations.

6.2 Environmental precautions

Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent. Then store and dispose of according to local regulations. Do NOT let this chemical enter the environment. Personal protection: gas-tight chemical protection suit including self-contained breathing apparatus.

6.3 Methods and materials for containment and cleaning up

Environmental considerations: Air spill: Apply water spray or mist to knock down vapors. Organophosphorus pesticides, liquid, flammable, toxic; Organophosphorus pesticides, liquid, toxic; Organophosphorus pesticides, solid, toxic

SECTION 7: Handling and storage

7.1 Precautions for safe handling

NO open flames. Handling in a well ventilated place. Wear suitable protective clothing. Avoid contact with skin and eyes. Avoid

formation of dust and aerosols. Use non-sparking tools. Prevent fire caused by electrostatic discharge steam.

7.2 Conditions for safe storage, including any incompatibilities

Provision to contain effluent from fire extinguishing. Separated from food and feedstuffs. Keep in a well-ventilated room. Store in an area without drain or sewer access. Provision to contain effluent from fire extinguishing. Provision to contain effluent from fire extinguishing. Separated from food and feedstuffs. Keep in a well-ventilated room.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational Exposure limit values

TLV: 0.05 mg/m³, as TWA; (skin); A4 (not classifiable as a human carcinogen); BEI issued

Biological limit values

no data available

8.2 Appropriate engineering controls

Ensure adequate ventilation. Handle in accordance with good industrial hygiene and safety practice. Set up emergency exits and the risk-elimination area.

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

Eye/face protection

Wear safety goggles, face shield or eye protection in combination with breathing protection.

Skin protection

Protective gloves. Protective clothing.

Respiratory protection

Use ventilation, local exhaust or breathing protection.

Thermal hazards

no data available

SECTION 9: Physical and chemical properties and safety characteristics

Physical state	Phorate is a clear liquid with an objectionable odor. Used as an insecticide and acaricide; it is applied to plants and soil. (EPA, 1998)
Colour	Pale straw to light brown; colorless to very light yellow liquid.
Odour	Skunk-like odor
Melting point/freezing point	-43°C
Boiling point or initial boiling point and boiling range	125-127°C (2 mmHg)
Flammability	Class IIIB Combustible Liquid: Fl.P. at or above 200°F., but does not readily ignite.
Lower and upper explosion limit/flammability limit	no data available
Flash point	132.8°C
Auto-ignition temperature	no data available
Decomposition temperature	no data available
pH	no data available
Kinematic viscosity	no data available
Solubility	0.005 % (NIOSH, 2016)
Partition coefficient n-octanol/water	log Kow = 3.56
Vapour pressure	0.0026mmHg at 25°C
Density and/or relative density	1.201g/cm ³
Relative vapour density	no data available
Particle characteristics	no data available

SECTION 10: Stability and reactivity

10.1 Reactivity

Decomposes under the influence of heat. This produces fumes of phosphorus oxides and sulfur oxides.

10.2 Chemical stability

Stable at room temp.

10.3 Possibility of hazardous reactions

Organothiophosphates, such as PHORATE, are susceptible to formation of highly toxic and flammable phosphine gas in the presence of

strong reducing agents such as hydrides. Partial oxidation by oxidizing agents may result in the release of toxic phosphorus oxides.

10.4 Conditions to avoid

no data available

10.5 Incompatible materials

Incompatible with alkaline compounds and with water-containing preparations.

10.6 Hazardous decomposition products

When heated to decomposition it emits toxic fumes of /phosphorous and sulfur oxides/.

SECTION 11: Toxicological information

Acute toxicity

- Oral: LD50 Rat male oral 2 mg/kg
- Inhalation: LC50 Rat (male) inhalation 0.06 mg/cu L/1 hr Analytical grade phorate aerosol
- Dermal: LD50 Rabbit percutaneous male 93-245 mg active ingredient (as 5% granule)/kg, acute

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 E Evidence of Non-carcinogenicity for Humans

Reproductive toxicity

no data available

STOT-single exposure

The substance may cause effects on the central nervous system. This may result in cholinesterase inhibition. Exposure could cause death. Medical observation is indicated. The effects may be delayed.

STOT-repeated exposure

Cholinesterase inhibition. Cumulative effects are possible. See Acute Hazards/Symptoms.

Aspiration hazard

A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C; on spraying or dispersing, however, much faster.

SECTION 12: Ecological information

12.1 Toxicity

- Toxicity to fish: LC50 *Salmo gairdneri* (Rainbow trout) 13 ug/l/96 hr @ 12 deg C (95% confidence limit 11-16 ug/l), wt 1.2 g. Static bioassay without aeration, pH 7.2-7.5, water hardness 40-50 mg/l as calcium carbonate and alkalinity of 30-35 mg/l. /Technical, 100%
- Toxicity to daphnia and other aquatic invertebrates: no data available
- Toxicity to algae: no data available
- Toxicity to microorganisms: no data available

12.2 Persistence and degradability

Degradation half-lives of phorate in various soils were: sandy loam, 7 days; silty clay loam, 9 days; and clay loam, 8 days(1). One-half of the applied phorate dosage to silt loam soil could no longer be detected after 6 days when applied to the soil surface and after 30 days when mixed with the upper 4-5 inch soil layer(2). In silt loam soil, phorate persisted beyond 16 weeks at 25 deg C(3). The half-life of phorate in clay loam soil when applied as a granular formulation ranged from 5 to 10 days(4). In a field study, 67 and 70% of phorate was lost within 28 days from silty clay loam soil(5). Bioassays indicate the half-life of phorate, when applied to the top 4 inches of sandy loam soil at a concentration of 10 ppm, is about 68 days(6). In flooded agricultural loam soil, 1.7, 6.0, and 9.9% of the applied C14-phorate had been evolved as C14-CO2 after 3, 7, and 14 days incubation, respectively(7). In non-flooded soils, 1.3, 2.3, and 3.3% of the applied C14-phorate had been evolved as C14-CO2 after identical incubation periods(7). Half-lives of 1.2 days and 1.1 days were determined for phorate in active sediment and water, respectively(8). In a 1 week laboratory assay, phorate mineralization was not significantly greater in soils with a history of phorate use than in soils with no history of phorate use(9). The microbial degradation of phorate in loam soil, sandy soil, and muck soil led to the formation of phorate sulfone and phorate sulfoxide; formation was much less in sandy soil(10). Phorate, when applied at a rate of 1.25 kg AI/ha to black clay loam soils under flooded conditions, degraded quickly(11). In shake flask tests, phorate showed more degradation in the presence of non-sterile estuarine sediment, half-life of about 1 day, than in the presence of sterile sediment, half-life of about 1.5 days(12). The half-lives of phorate in shake flasks containing a non-sterile sediment-water slurry were less than 1 day(12). In studies where 32 farm soils were incubated with phorate, initial half-lives of freshly-applied phorate ranged from <1 to >16 weeks(13). Accelerated degradation was stimulated by a single application and occurred most readily at pH's >7.4(13).

12.3 Bioaccumulative potential

Juvenile sheepshead minnows, *Cyprinodon variegatus*, after 28 days exposure to phorate had a BCF of 90(1). According to a classification scheme(2), this BCF suggests the potential for bioconcentration in aquatic organisms is moderate(SRC). Bioconcentration of phorate from culture media by the blue green algae *Anabaena* sp. (ARM 310) and *Aulosira fertilissima* (ARM 68) was studied(1). Bioconcentration factors for phorate in *Anabaena* sp. were 3, 6 and 12 at 2.5, 5 and 10 ug/ml, respectively(3). In *Anabaena fertilissima*, at 2.5, 5 and 10 ug/ml of phorate, max bioconcentration of phorate was reached after 16, 16 and 32 hr, respectively, with bioconcentration factors of 8, 12 and 11 for the respective doses(3). *Elodea nuttallii* plants grown for 2 weeks in water with a deposit of C14-phorate in the bottom soil accumulated 30% of the originally soil-applied radiocarbon in their tissues; 56% of phorate accumulated in plant tissues when the insecticide was applied directly to the water(4).

12.4 Mobility in soil

In four different soils with percent organic carbon ranging from 0.087 to 0.65, phorate had an average Koc of 3200(1). Koc values of 543(2) and 2400(3) have also been reported for phorate. Phorate was found to be only slightly mobile in soil column studies(4). Phorate was less mobile in degraded chernozem and in black marsh soil, than in brown forest soil(4). According to a classification scheme(5), these Koc values suggest that phorate is expected to have low to slight mobility in soil. Phorate is most readily adsorbed to mineral solids and to silty loam and clay soils when the soils are dry(4). A soil mobility factor of 1.2 was calculated for phorate using soil column studies with Hagerstown silty clay loam (4.3% organic matter, 30% clay, pH 5.5) and Lakeland sandy loam(3.3% organic matter, 10% clay, pH 6.2)(6). A mobility factor of 1 represents no movement, while a mobility factor of 6 represents maximum movement(7). In a field study using watershed soils and their corresponding pond sediments, phorate was adsorbed more extensively by pond sediments (organic matter 1.4%, clay content 25%) than by Ca-saturated soils (organic matter 2.4%, clay content 16%)(7).

12.5 Other adverse effects

no data available

SECTION 13: Disposal considerations

13.1 Disposal 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.

SECTION 14: Transport information

14.1 UN Number

ADR/RID: UN3018 (For reference only, please check.) IMDG: UN3018 (For reference only, please check.) IATA: UN3018 (For reference only, please check.)

14.2 UN Proper Shipping Name

ADR/RID: ORGANOPHOSPHORUS PESTICIDE, LIQUID, TOXIC (For reference only, please check.) IMDG: ORGANOPHOSPHORUS PESTICIDE, LIQUID, TOXIC (For reference only, please check.) IATA: ORGANOPHOSPHORUS PESTICIDE, LIQUID, TOXIC (For reference only, please check.)

14.3 Transport hazard class(es)

ADR/RID: 6.1 (For reference only, please check.) IMDG: 6.1 (For reference only, please check.) IATA: 6.1 (For reference only, please check.)

14.4 Packing group, if applicable

ADR/RID: I (For reference only, please check.) IMDG: I (For reference only, please check.) IATA: I (For reference only, please check.)

14.5 Environmental hazards

ADR/RID: Yes IMDG: Yes IATA: Yes

14.6 Special precautions for user

no data available

14.7 Transport in bulk according to IMO instruments

no data available

SECTION 15: Regulatory information

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

Chemical name	Common names and synonyms	CAS number	EC number
Phorate	Phorate	298-02-2	206-052-2

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	Listed.
New Zealand Inventory of Chemicals (NZIoC)	Listed.
Philippines Inventory of Chemicals and Chemical Substances (PICCS)	Not Listed.
Vietnam National Chemical Inventory	Listed.
Chinese Chemical Inventory of Existing Chemical Substances (China IECSC)	Listed.
Korea Existing Chemicals List (KECL)	Listed.

SECTION 16: Other information

Information on revision

Creation Date July 15, 2019
Revision Date August 08, 2025

Abbreviations and acronyms

- CAS: Chemical Abstracts Service
- ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road
- RID: Regulation concerning the International Carriage of Dangerous Goods by Rail
- IMDG: International Maritime Dangerous Goods
- IATA: International Air Transportation Association
- TWA: Time Weighted Average
- STEL: Short term exposure limit
- LC50: Lethal Concentration 50%
- LD50: Lethal Dose 50%
- EC50: Effective Concentration 50%

References

- IPCS - The International Chemical Safety Cards (ICSC), website: <http://www.ilo.org/dyn/icsc/showcard.home>
- HSDB - Hazardous Substances Data Bank, website: <https://toxnet.nlm.nih.gov/newtoxnet/hsdb.htm>
- IARC - International Agency for Research on Cancer, website: <http://www.iarc.fr/>
- eChemPortal - The Global Portal to Information on Chemical Substances by OECD, website: http://www.echemportal.org/echemportal/index?pageID=0&request_locale=en
- CAMEO Chemicals, website: <http://cameochemicals.noaa.gov/search/simple>
- ChemIDplus, website: <http://chem.sis.nlm.nih.gov/chemidplus/chemidlite.jsp>
- ERG - Emergency Response Guidebook by U.S. Department of Transportation, website: <http://www.phmsa.dot.gov/hazmat/library/erg>
- Germany GESTIS-database on hazard substance, website: <http://www.dguv.de/ifa/gestis/gestis-stoffdatenbank/index-2.jsp>
- ECHA - European Chemicals Agency, website: <https://echa.europa.eu/>

Other Information

Do NOT take working clothes home. Depending on the degree of exposure, periodic medical examination is suggested. Specific treatment is necessary in case of poisoning with this substance; the appropriate means with instructions must be available.

Any questions regarding this SDS, Please send your inquiry to info@cato-chem.com

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