



SAFETY DATA SHEETS

According to the UN GHS revision 9

Version: 1.0
Creation Date: July 15, 2019
Revision Date: July 15, 2019

SECTION 1: Identification

1.1 GHS Product identifier

Product name 2,3,4,6-tetrachlorophenol

1.2 Other means of identification

Product number -
Other names 2,3,4,6-TETRACHLOROPHENOL; Phenol, 2,3,4,6-tetrachloro-

1.3 Recommended use of the chemical and restrictions on use

Identified uses Industrial and scientific research use.
Uses advised against no data available

1.4 Supplier's details

Company Shanghai Yien Chemical Technology Co., Ltd
Address Building 6, 28 Yingong Road, Fengxian District, Shanghai
Chemical Industry Zone, Shanghai, 201400, China
Telephone +86-400-133-2688

1.5 Emergency phone number

Emergency phone number +86-400-133-2688
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 3, Oral
Skin irritation, Category 2
Eye irritation, Category 2
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) H301 Toxic if swallowed

| | |
|-----------------------------------|--|
| | H315 Causes skin irritation H319 Causes serious eye irritation 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. 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/... P332+P317 If skin irritation occurs: Get medical help. P362+P364 Take off contaminated clothing and wash it before reuse. 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 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 |
|---------------------------|---------------------------|------------|-----------|---------------|
| 2,3,4,6-tetrachlorophenol | 2,3,4,6-tetrachlorophenol | 58-90-2 | 200-402-8 | 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

Give a slurry of activated charcoal in water to drink. Refer for medical attention .

4.2 Most important symptoms/effects, acute and delayed

SYMPTOMS: Symptoms of exposure to this compound may include irritation of the skin, eyes, nose, and pharynx; conjunctivitis, corneal injuries, and dermatitis with repeated skin contact. Symptoms of exposure to phenols (through ingestion or contact with the skin or mucous membranes) may include painless blanching or erythema, possible corrosion, profuse sweating, intense thirst, nausea and vomiting, diarrhea, cyanosis from methemoglobinemia, hyperactivity; stupor; blood pressure fall; hyperpnea; abdominal pain; hemolysis; convulsions; coma; and pulmonary edema followed by pneumonia. If

death from respiratory failure is not immediate, jaundice and oliguria or anuria may occur. Skin sensitivity occasionally occurs. ACUTE/CHRONIC HAZARDS: This compound is toxic by ingestion and inhalation. It is an irritant of the skin, eyes, nose and pharynx. When heated to decomposition it emits toxic fumes of chloride ion. It is an experimental carcinogen. (NTP, 1992)

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

Absorption, Distribution and Excretion

The compounds are readily absorbed from the gastroenteric tract and from parenteral sites of injection. Chlorophenols

SECTION 5: Fire-fighting measures

5.1 Suitable extinguishing media

Fires involving this material can be controlled with a dry chemical, carbon dioxide or Halon extinguisher. (NTP, 1992)

5.2 Specific hazards arising from the chemical

Literature sources indicate that this compound is nonflammable. (NTP, 1992)

5.3 Special protective actions for fire-fighters

Use water spray, alcohol-resistant foam, dry powder, carbon dioxide.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Personal protection: chemical protection suit and particulate filter respirator adapted to the airborne concentration of the substance. Do NOT let this chemical enter the environment. Sweep spilled substance into covered containers.

6.2 Environmental precautions

Personal protection: chemical protection suit and particulate filter respirator adapted to the airborne concentration of the substance. Do NOT let this chemical enter the environment. Sweep spilled substance into covered containers.

6.3 Methods and materials for containment and cleaning up

Collect and arrange disposal. Keep the chemical in suitable and closed containers for disposal. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment. Adhered or collected material should be promptly disposed of, in accordance with appropriate laws and regulations.

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. Store in an area without drain or sewer access. MATERIALS WHICH ARE TOXIC AS STORED OR WHICH CAN DECOMPOSE INTO TOXIC COMPONENTS ... SHOULD BE STORED IN A COOL WELL VENTILATED PLACE, OUT THE DIRECT RAYS OF THE SUN, AWAY FROM AREAS OF HIGH FIRE HAZARD, AND SHOULD BE PERIODICALLY INSPECTED ... INCOMPATIBLE MATERIALS SHOULD BE ISOLATED ...

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational Exposure limit values

| | | | | |
|-----------|------------------------------|-------------------|--------------------------|-------------------|
| Component | 2,3,4,6-tetrachlorophenol | | | |
| CAS No. | 58-90-2 | | | |
| | Limit value - Eight hours | | Limit value - Short term | |
| | ppm | mg/m ³ | ppm | mg/m ³ |
| Finland | | 0,5 | | 1,5 (1) |
| | Remarks | | | |
| Finland | (1) 15 minutes average value | | | |

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.

Skin protection

Protective gloves. Protective clothing.

Respiratory protection

Use local exhaust or breathing protection.

Thermal hazards

no data available

SECTION 9: Physical and chemical properties and safety characteristics

| | |
|--|--|
| Physical state | PHYSICAL DESCRIPTION: Brown flakes or beige solid. Strong odor. (NTP, 1992) |
| Colour | NEEDLES FROM LIGROIN, ACETIC ACID |
| Odour | STRONG ODOR |
| Melting point/freezing point | 63-66°C |
| Boiling point or initial boiling point and boiling range | 164°C 23mm |
| Flammability | Combustible. Gives off irritating or toxic fumes (or gases) in a fire. |
| Lower and upper explosion limit/flammability limit | no data available |
| Flash point | 11°C |
| Auto-ignition temperature | no data available |
| Decomposition temperature | no data available |
| pH | no data available |
| Kinematic viscosity | no data available |
| Solubility | less than 1 mg/mL at 68° F (NTP, 1992) |
| Partition coefficient n- | log Kow= 4.45 |

| | |
|---------------------------------|---|
| octanol/water | |
| Vapour pressure | 1 mm Hg at 212° F ; 60 mm Hg at 374° F; 400 mm Hg at 482° F (NTP, 1992) |
| Density and/or relative density | 1.839 g/cm ³ |
| Relative vapour density | no data available |
| Particle characteristics | no data available |

SECTION 10: Stability and reactivity

10.1 Reactivity

Decomposes on heating. This produces corrosive fumes including hydrogen chloride.

10.2 Chemical stability

no data available

10.3 Possibility of hazardous reactions

2,3,4,6-TETRACHLOROPHENOL reacts as a weak organic acid and is incompatible with strong reducing substances such as hydrides, nitrides, alkali metals, and sulfides.

Flammable gas (H₂) is often generated, and the heat of the reaction may ignite the gas.

May generate heat with bases. Such heating may initiate polymerization.

10.4 Conditions to avoid

no data available

10.5 Incompatible materials

no data available

10.6 Hazardous decomposition products

When heated to decomp, it emits highly toxic fumes of /hydrogen chloride/.

SECTION 11: Toxicological information

Acute toxicity

- Oral: LD₅₀ Mouse (C57, female) oral 150 mg/kg (solvent: propylene glycol)
- Inhalation: no data available
- Dermal: no data available

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

Evaluation: There is limited evidence in humans for the carcinogenicity of combined exposures to polychlorophenols or to their sodium salts. ... Overall evaluation: Combined exposures to polychlorophenols or to their sodium salts are possibly carcinogenic to humans (Group 2B). Polychlorophenols

Reproductive toxicity

no data available

STOT-single exposure

The substance is irritating to the eyes, skin and respiratory tract. See Notes.

STOT-repeated exposure

The substance may have effects on the liver. The substance may have effects on the skin. This may result in chloracne. See Notes.

Aspiration hazard

A harmful concentration of airborne particles can be reached quickly when dispersed.

SECTION 12: Ecological information

12.1 Toxicity

- Toxicity to fish: no data available
- 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

2,3,4,6-Tetrachlorophenol persisted for >72 days in a laboratory test with a soil inoculum; halophenols which had substituents meta to the phenol group were resistant to biodegradation(1). Another study reported that 2,3,4,6-tetrachlorophenol disappeared from soil to a large degree in 4 weeks(6). Fungi that attack conifer heartwood(2) as well as those found in litter shavings in chicken houses(3) have been reported to degrade 2,3,4,6-tetrachlorophenol. A bacterium acclimated to pentachlorophenol was able to also utilize 2,3,4,6-tetrachlorophenol as a growth substrate(4). The removal of 2,3,4,6-tetrachlorophenol in kraft pulp mill/bleach plant effluent was far superior in an anaerobic reactor (83% with a 12 hr retention time) than in an aerated lagoon (33%, retention time 14 days) or an activated sludge plant (25%)(5). 2,3,4,6-Tetrachlorophenol, concn 100 mg/l, reached 7% of its theoretical BOD over 4 weeks using an activated sludge inoculum(7). High-rate operation (5h; 350 to 480 mg chlorophenol/l/d) of an aerobic fluidized-bed reactor resulted in a 99.6% mean removal of 2,3,4,6-tetrachlorophenol over a period of 235 days(8). 100% removal of 2,3,4,6-tetrachlorophenol was observed in aerobic enrichment cultures following 8 days incubation(8). Over a 407-day study period, 2,3,4,6-tetrachlorophenol was detected in the effluent of a sewage treatment plant in Karkola, Finland employing activated sludge at a mean concn of 6.4 ug/l; mean concns of 13,000 and 1.4 ug/l were detected in the fed groundwater and dewatered sludge, respectively(9).

12.3 Bioaccumulative potential

In static bioconcentration tests, the log BCF for 2,3,4,6-tetrachlorophenol in guppies was 2.30 after 24 hr(1) while for goldfish it was 1.95 after 12 hr(2). These correspond to BCFs of 200 and 89, respectively(SRC). BCFs of 25 to 62 and 36 to 95 were measured in carp for 2,3,4,6-tetrachlorophenol at 10 and 1 ug/l, respectively(3). BCFs measured in the soft tissue of freshwater mussel, *Anodonta anatina*, ranged from 49 to 156; depuration half-lives in the soft tissue were generally less than 24 hours(4). According to a classification scheme(5), these BCFs suggest that bioconcentration in aquatic organisms is low to high(SRC). The mean concn of free 2,3,4,6-tetrachlorophenol in the bile of rainbow trout exposed to a 2% v/v solution of biologically treated kraft mill pulp effluent for 30 days was 0.15 ug/ml; glucuronide acid conjugated 2,3,4,6-tetrachlorophenol was 19.4 ug/ml(6). The mean concn of free 2,3,4,6-tetrachlorophenol in the bile (plasma) of rainbow trout exposed to a 7:10:4 (w/v) mixture of 2,4,6-trichlorophenol, 2,3,4,6-tetrachlorophenol and pentachlorophenol for 6 days was 14.8 (9.7) ug/ml; 1795 (16.3) ug/ml was in the conjugated form(6).

12.4 Mobility in soil

Koc values for 2,3,4,6-tetrachlorophenol in river sediment, lake sediment and aquifer material ranged from 6040 to 7690; average value of 6640(1). The Koc of 2,3,4,6-tetrachlorophenol is estimated as approximately 6300(SRC), using a log Kow of 4.45(2) and a regression-derived equation(3,SRC). According to a classification scheme(4), these Koc values suggest that 2,3,4,6-tetrachlorophenol is expected to be immobile in soil(SRC). In natural waters of low ionic strength and pH below approximately 6.4, the adsorption is dominated by the partitioning of the undissociated phenol between the aqueous phase and

the organic phase contained in the sediment. However, at higher pH's, the contribution of the phenolate ion cannot be neglected(1). There is strong evidence that the adsorption of the phenolate species is also predominately a partitioning between the aqueous phase and organic matter in the sorbent and is dependent on the ionic strength of the aqueous phase(1). An equilibrium partition coefficient (Kp) of 1.8 was determined in batch equilibrium experiments using soil and groundwater (pH 10) from Alkali Lake, OR(7). In a laboratory experiment, 40% of 2,3,4,6-tetrachlorophenol sorbed to Weser estuary (Germany) sediment after 21 hr incubation at 14.5 deg C; 65% was desorbed from the loaded sediment after another 21 hr(5). In contrast the partition ratios of 2,3,4,6- and/or 2,3,5,6-tetrachlorophenol between sediment/water and suspended matter/water from the Weser estuary were 38 and 6.3, respectively(5). In the Rhine River (The Netherlands) the median sediment to water ratio of tetrachlorophenol was 24(6). Log Kom values ranging from 1.275 to 2.750 were measured for 2,3,4,6-tetrachlorophenol in 14 different soil and sediment samples; mean log Kom for anionic 2,3,4,6-tetrachlorophenol was 2.431(8). Freundlich sorption coefficients of 2.173, 6.373, 2.203, and 6.392 were measured in quartz (pH 7.5), calcite (pH 7.2), kaolinite (pH 7.0), and montmorillonite (pH 5.3), respectively(9). Sorption of 2,3,4,6-tetrachlorophenol was negligible to two surface soils containing 2.8 and 2.1% organic matter, and in samples of deeper sediment layers, consisting of 92 to 98% clay and silt and 0.5 to 8.4% organic matter; a Kd value of 16.7 was measured in a surface soil sample containing 12.2% organic matter(10). Kf values of 95 and 85 were determined in Holten soil (6.1% organic matter and 2.4% clay) and Kooyenburg soil (3.7% organic matter and 1.4% clay), respectively(11).

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: UN2020 (For reference only, please check.)

IMDG: UN2020 (For reference only, please check.)

IATA: UN2020 (For reference only, please check.)

14.2 UN Proper Shipping Name

ADR/RID: CHLOROPHENOLS, SOLID (For reference only, please check.)

IMDG: CHLOROPHENOLS, SOLID (For reference only, please check.)

IATA: CHLOROPHENOLS, SOLID (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: III (For reference only, please check.)

IMDG: III (For reference only, please check.)

IATA: III (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 |
|--|---------------------------|------------|-------------|
| 2,3,4,6-tetrachlorophenol | 2,3,4,6-tetrachlorophenol | 58-90-2 | 200-402-8 |
| European Inventory of Existing Commercial Chemical Substances (EINECS) | | | Listed. |
| EC Inventory | | | Listed. |
| United States Toxic Substances Control Act (TSCA) Inventory | | | Listed. |
| China Catalog of Hazardous chemicals 2015 | | | Listed. |
| New Zealand Inventory of Chemicals (NZIoC) | | | Not 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 July 15, 2019

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

2,3,4,6-Tetrachlorophenol is a polychlorophenol which, as a group, has been classified by IARC (1999) as possibly carcinogenic to humans, but the data on this specific substance are inconclusive. No data are available on this isomer but a mixture of tetrachlorophenols may cause irritation of the skin, eyes and respiratory tract. These substances may cause acute metabolic effects resulting in damage in several organs notably in central nervous system. Some technical products may contain highly toxic impurities including polychlorinated dibenzo-p-dioxins and furans. Depending on the degree of exposure, periodic medical examination is suggested.

Any questions regarding this SDS, Please send your inquiry to sds@xixisys.com

Disclaimer: The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. We as supplier shall not be held liable for any damage resulting from handling or from contact with the above product.