Section 1 - Product and Company Information

Product Name                     PENTACHLOROPHENOL
Product Number                   P1045
Brand                            SIGMA
Company                          Sigma-Aldrich
Address                          3050 Spruce Street
                                 SAINT LOUIS MO 63103 US
Technical Phone:                 800-325-5832
Fax:                             800-325-5052
Emergency Phone:                314-776-6555

Section 2 - Composition/Information on Ingredient

<table>
<thead>
<tr>
<th>Substance Name</th>
<th>CAS #</th>
<th>SARA 313</th>
</tr>
</thead>
<tbody>
<tr>
<td>PENTACHLOROPHENOL</td>
<td>87-86-5</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Formula: C6HCl5O
Synonyms: AD 73 * Chem-Penta * Chem-Tol * Chlon *
* Chlorophen * CM 613 * CP 1309 * Dowicide 7 *
* Dowicide EC-7 * Dow pentachlorophenol DP-2 *
* antimicrobial * Durotox * EP 30 * Fungifen *
* Grundier arbezol * 1-Hydroxypentachlorobenzene *
* Lauxtol * Lauxtol A * Liroprem * MB 333 *
* NCI-C54933 * NCI-C55378 * NCI-C56655 * PCP *
* (pesticide) * Penchlorol * Penta *
* Pentachloorfenol (Dutch) * Pentachlorofenol *
* Pentaclorofenolo (Italian) * Pentachlorophenol *
* 2,3,4,5,6-Pentachlorophenol * Pentachlorophenol *
* (ACGIH:OSHA) * Pentachlorophenol, DP-2 *
* Pentachlorphenol (German) * Pentacon * Penta-kil *
* Penta ready * Penta WR * Penwar * Peratox *
* Permacide * Permagard * Permasan * Permatox DP-2 *
* Permatox penta * Permite * Pole topper fluid *
* Pol Nu * Preventol P * RCRA waste number U242 *
* Santophen 20 * Thompson's wood fix * Weedone *
* Witophen P * Woodtreat A

RTECS Number: SM6300000

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Highly Toxic (USA) Toxic (EU).
Very toxic by inhalation. Toxic in contact with skin and if swallowed. Irritating to eyes, respiratory system and skin.
Limited evidence of a carcinogenic effect. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

HMIS RATING
NFPA RATING
HEALTH: 3
FLAMMABILITY: 0
REACTIVITY: 1

*additional chronic hazards present.

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

ORAL EXPOSURE
If swallowed, wash out mouth with water provided person is conscious. Call a physician immediately.

INHALATION EXPOSURE
If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

DERMAL EXPOSURE
In case of skin contact, flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. Call a physician.

EYE EXPOSURE
In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

Section 5 - Fire Fighting Measures

FLASH POINT
N/A

AUTOIGNITION TEMP
N/A

FLAMMABILITY
N/A

EXTINGUISHING MEDIA
Suitable: Carbon dioxide, dry chemical powder, or appropriate foam.

FIREFIGHTING
Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes. Specific Hazard(s): Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

PROCEDURE TO BE FOLLOWED IN CASE OF LEAK OR SPILL
Evacuate area.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)
Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.
METHODS FOR CLEANING UP

Sweep up, place in a bag and hold for waste disposal. Avoid raising dust. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

HANDLING
User Exposure: Do not breathe dust. Do not get in eyes, on skin, on clothing. Avoid prolonged or repeated exposure.

STORAGE
Suitable: Keep tightly closed.

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS
Use only in a chemical fume hood. Safety shower and eye bath.

PERSONAL PROTECTIVE EQUIPMENT
Respiratory: Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N99 (US) or type P2 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator.
Hand: Compatible chemical-resistant gloves.
Eye: Chemical safety goggles.

GENERAL HYGIENE MEASURES
Wash contaminated clothing before reuse. Wash thoroughly after handling.

EXPOSURE LIMITS, RTECS

<table>
<thead>
<tr>
<th>Country</th>
<th>Source</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>ACGIH</td>
<td>TWA</td>
<td>0.5 MG/M3</td>
</tr>
<tr>
<td>Remarks: Skin</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>USA</td>
<td>MSHA Standard-air TWA</td>
<td>0.5 MG/M3 (SKIN)</td>
<td></td>
</tr>
<tr>
<td>USA</td>
<td>OSHA.</td>
<td>PEL</td>
<td>8H TWA 0.5 MG/M3 (SKIN)</td>
</tr>
<tr>
<td>New Zealand OEL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Remarks: check ACGIH TLV</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>USA</td>
<td>NIOSH</td>
<td>TWA</td>
<td>0.5 MG/M3 (SK)</td>
</tr>
</tbody>
</table>

EXPOSURE LIMITS

<table>
<thead>
<tr>
<th>Country</th>
<th>Source</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poland</td>
<td>NDS</td>
<td></td>
<td>0.5 MG/M3</td>
</tr>
<tr>
<td>Poland</td>
<td>NDSCh</td>
<td></td>
<td>1.5 MG/M3</td>
</tr>
<tr>
<td>Poland</td>
<td>NDSP</td>
<td></td>
<td>-</td>
</tr>
</tbody>
</table>

Section 9 - Physical/Chemical Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
<th>At Temperature or Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Molecular Weight</td>
<td>266.34 AMU</td>
<td></td>
</tr>
<tr>
<td>pH</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>BP/BP Range</td>
<td>310 °C</td>
<td>760 mmHg</td>
</tr>
<tr>
<td>MP/MP Range</td>
<td>187 °C</td>
<td></td>
</tr>
</tbody>
</table>

SIGMA - P1045 www.sigma-aldrich.com
Freezing Point          N/A
Vapor Pressure          40 mmHg             211.2 °C
Vapor Density          9.2 g/l
Saturated Vapor Conc.  N/A
SG/Density             1.978 g/cm3
Bulk Density           N/A
Odor Threshold         N/A
Volatile%              N/A
VOC Content            N/A
Water Content          N/A
Solvent Content        N/A
Evaporation Rate       N/A
Viscosity              N/A
Surface Tension        N/A
Partition Coefficient  Log Kow: 5.12
Decomposition Temp.    N/A
Flash Point            N/A
Explosion Limits       N/A
Flammability           N/A
Autoignition Temp      N/A
Refractive Index       N/A
Optical Rotation       N/A
Miscellaneous Data     N/A
Solubility             Other Solvents: MOSTORGANIC SOLVENTS

N/A = not available

Section 10 - Stability and Reactivity

STABILITY
Stable: Stable.
Materials to Avoid: Strong oxidizing agents, Strong bases.

HAZARDOUS DECOMPOSITION PRODUCTS
Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide, Hydrogen chloride gas.

HAZARDOUS POLYMERIZATION
Hazardous Polymerization: Will not occur

Section 11 - Toxicological Information

ROUTE OF EXPOSURE
Skin Contact: Causes skin irritation.
Skin Absorption: Toxic if absorbed through skin.
Eye Contact: Causes eye irritation.
Inhalation: May be fatal if inhaled. Material is irritating to mucous membranes and upper respiratory tract.
Ingestion: Toxic if swallowed.

TARGET ORGAN(S) OR SYSTEM(S)
Kidneys. Liver.

SIGNS AND SYMPTOMS OF EXPOSURE
Convulsions. Exposure can cause:

TOXICITY DATA

Oral
Man
401 mg/kg
LDLO
Remarks: Behavioral: Change in motor activity (specific assay).

Oral
Rat
27 mg/kg
LD50

Inhalation
Rat
355 mg/m3
LC50

Skin
Rat
96 mg/kg
LD50

Intraperitoneal
Rat
56 MG/KG
LD50

Oral
Mouse
36 mg/kg
LD50

Inhalation
Mouse
225 mg/m3
LC50

Intraperitoneal
Mouse
32 MG/KG
LD50

Oral
Hamster
168 mg/kg
LD50

Oral
Gerbil
294 mg/kg
LD50
Oral
Duck
380 mg/kg
LD50

IRRITATION DATA

Skin
Rabbit
10 mg
24H
Remarks: Open irritation test

Eyes
Rabbit
0.1 ml
24
Remarks: Mild irritation effect

CHRONIC EXPOSURE - CARCINOGEN

Result: This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification. The evidence for carcinogenicity of pentachlorophenol (PCP) is based on assays that utilized less than pure PCP. Contaminants of PCP include: tri- or tetra-chlorophenol, hexachlorobenzene, polychlorinated dibenzo-p-dioxins, or polychlorinated dibenzofurans. Indications are that positive evidence for carcinogenicity is from the contaminant(s) and not the PCP.

Species: Mouse
Route of Application: Oral
Dose: 8736 MG/KG
Exposure Time: 2Y
Frequency: C
Result: Endocrine:Tumors. Tumorigenic:Carcinogenic by RTECS criteria.

Species: Mouse
Route of Application: Subcutaneous
Dose: 46 MG/KG

IARC CARCINOGEN LIST

Rating: Group 2B

NTP CARCINOGEN LIST

Route: Feed

CHRONIC EXPOSURE - TERATOGEN

Species: Rat
Dose: 60 MG/KG
Route of Application: Oral
Exposure Time: (9D PREG)
Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).
Species: Rat
Dose: 50 MG/KG
Route of Application: Oral
Exposure Time: (6-15D PREG)
Result: Specific Developmental Abnormalities: Musculoskeletal system.

Species: Rat
Dose: 120 MG/KG
Route of Application: Oral
Exposure Time: (8-11D PREG)
Result: Specific Developmental Abnormalities: Homeostasis

Species: Mouse
Dose: 450 MG/KG
Route of Application: Subcutaneous
Exposure Time: (6-14D PREG)
Result: Effects on Embryo or Fetus: Fetal death.

CHRONIC EXPOSURE - MUTAGEN

Species: Mouse
Route: Intraperitoneal
Dose: 50 MG/KG
Mutation test: specific locus test

Species: Mouse
Route: Oral
Dose: 30 MG/KG
Mutation test: Other mutation test systems

Species: Hamster
Dose: 100 MG/L
Cell Type: Embryo
Mutation test: Morphological transformation.

Species: Hamster
Dose: 80 MG/L
Cell Type: ovary
Mutation test: Cytogenetic analysis

Species: Hamster
Dose: 3 MG/L
Cell Type: ovary
Mutation test: Sister chromatid exchange

CHRONIC EXPOSURE - REPRODUCTIVE HAZARD
Result: Overexposure may cause reproductive disorder(s) based on tests with laboratory animals.

Species: Rat
Dose: 4 GM/KG
Route of Application: Oral
Exposure Time: (77D PRE-28D POST)
Result: Effects on Newborn: Growth statistics (e.g., reduced weight gain). Effects on Newborn: Weaning or lactation index (e.g., # alive at weaning per # alive at day 4).

Species: Man
Dose: 124 MG/KG
Route of Application: Oral
Exposure Time: (MULTIGENERATION)
Result: Effects on Newborn: Delayed effects.

Section 12 - Ecological Information

ACUTE ECOTOXICITY TESTS

Test Type: EC50 Algae  
Time: 10 d  
Value: 0.36 mg/l

Test Type: EC50 Algae  
Species: Chlorella vulgaris  
Time: 96 h  
Value: 10.3 mg/l

Test Type: EC50 Daphnia  
Species: Daphnia magna  
Time: 48 h  
Value: 0.3 - 1.3 mg/l

Test Type: LC50 Fish  
Species: Cyprinodon variegatus (Sheepshead minnow)  
Time: 96 h  
Value: 0.160 - 0.5 mg/l

Test Type: LC50 Fish  
Species: Carassius auratus (Goldfish)  
Time: 96 h  
Value: 0.160 - 0.380 mg/l

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION

Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT

Proper Shipping Name: Pentachlorophenol  
UN#: 3155  
Class: 6.1  
Packing Group: Packing Group II  
Hazard Label: Toxic substances.  
PIH: Not PIH

IATA

Proper Shipping Name: Pentachlorophenol  
IATA UN Number: 3155  
Hazard Class: 6.1  
Packing Group: II

Section 15 - Regulatory Information

EU DIRECTIVES CLASSIFICATION

Symbol of Danger: T+-N  
Indication of Danger: Very toxic. Dangerous for the environment.  
R: 24/25-26-36/37/38-40-50/53  
Risk Statements: Toxic in contact with skin and if swallowed.
Very toxic by inhalation. Irritating to eyes, respiratory system and skin. Limited evidence of a carcinogenic effect. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. 

S: 22-36/37-45-52-60-61

Safety Statements: Do not breathe dust. Wear suitable protective clothing and gloves. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). Not recommended for interior use on large surface areas. This material and its container must be disposed of as hazardous waste. Avoid release to the environment. Refer to special instructions/safety data sheets.

US CLASSIFICATION AND LABEL TEXT
Indication of Danger: Highly Toxic (USA) Toxic (EU).
Risk Statements: Very toxic by inhalation. Toxic in contact with skin and if swallowed. Irritating to eyes, respiratory system and skin. Limited evidence of a carcinogenic effect. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Safety Statements: Avoid exposure - obtain special instructions before use. Do not breathe dust. Wear suitable protective clothing, gloves, and eye/face protection. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

UNITED STATES REGULATORY INFORMATION
SARA LISTED: Yes
DEMINIMIS: 1 %
NOTES: This product is subject to SARA section 313 reporting requirements.
TSCA INVENTORY ITEM: Yes

UNITED STATES - STATE REGULATORY INFORMATION
CALIFORNIA PROP - 65
California Prop - 65: This product is or contains chemical(s) known to the state of California to cause cancer. This product is or contains chemical(s) known to the state of California to cause cancer.

CANADA REGULATORY INFORMATION
WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.
DSL: Yes
NDSL: No

Section 16 - Other Information

DISCLAIMER
For R&D use only. Not for drug, household or other uses.

WARRANTY
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
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