1. PRODUCT AND COMPANY IDENTIFICATION

Product name: Lindane

Product Number: 233390
Brand: Aldrich
Product Use: For laboratory research purposes.

Supplier: Sigma-Aldrich Canada Co.
2149 Winston Park Drive
OAKVILLE ON L6H 6J8
CANADA

Emergency Phone #: 1-800-424-9300

Manufacturer: Sigma-Aldrich Corporation
3050 Spruce St.
St. Louis, Missouri 63103
USA

Telephone: +1 9058299500
Fax: +1 9058299292

Preparation Information: Sigma-Aldrich Corporation
Product Safety - Americas Region
1-800-521-8956

2. HAZARDS IDENTIFICATION

Emergency Overview

Target Organs
Central nervous system, Reproductive system.

WHMIS Classification
D1A Very Toxic Material Causing Immediate and Serious Toxic Effects
D2A Very Toxic Material Causing Other Toxic Effects

GHS Classification
Acute toxicity, Dermal (Category 3)
Acute toxicity, Oral (Category 3)
Acute toxicity, Inhalation (Category 4)
Carcinogenicity (Category 1B)
Effects on or via lactation
Acute aquatic toxicity (Category 1)
Chronic aquatic toxicity (Category 1)

GHS Label elements, including precautionary statements

Signal word: Danger

Hazard statement(s)
H301 + H311 Toxic if swallowed or in contact with skin
H332 Harmful if inhaled.
H350 May cause cancer.
H362 May cause harm to breast-fed children.
H410 Very toxic to aquatic life with long lasting effects.
Precautionary statement(s)

P201 Obtain special instructions before use.
P263 Avoid contact during pregnancy/ while nursing.
P273 Avoid release to the environment.
P280 Wear protective gloves/ protective clothing.
P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P501 Dispose of contents/ container to an approved waste disposal plant.

HMIS Classification

Health hazard: 2
Chronic Health Hazard: *
Flammability: 0
Physical hazards: 0

Potential Health Effects

Inhalation Toxic if inhaled. May cause respiratory tract irritation.
Skin Toxic if absorbed through skin. May cause skin irritation.
Eyes May cause eye irritation.
Ingestion Toxic if swallowed.

3. COMPOSITION/ INFORMATION ON INGREDIENTS

Synonyms: 1α,2α,3β,4α,5α,6β-Hexachlorocyclohexane
γ-BHC

Formula: C₆H₆Cl₆
Molecular weight: 290.83 g/mol

<table>
<thead>
<tr>
<th>CAS-No.</th>
<th>EC-No.</th>
<th>Index-No.</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>58-89-9</td>
<td>200-401-2</td>
<td>602-043-00-6</td>
<td>&lt;=100%</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

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. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

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

5. FIREFIGHTING MEASURES

Conditions of flammability
Not flammable or combustible.

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

Hazardous combustion products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas

Explosion data - sensitivity to mechanical impact
No data available
Explosion data - sensitivity to static discharge
No data available

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

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

Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Provide appropriate exhaust ventilation at places where dust is formed.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Value</th>
<th>Control parameters</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>γ-1,2,3,4,5,6-Hexachlorocyclohexane</td>
<td>58-89-9</td>
<td>TWA</td>
<td>0.5 mg/m³</td>
<td>Canada, Alberta, Occupational Health and Safety Code (table 2: OEL)</td>
</tr>
</tbody>
</table>

Remarks
Substance may be readily absorbed through intact skin

<table>
<thead>
<tr>
<th>TWA</th>
<th>0.5 mg/m³</th>
<th>Canada. British Columbia OEL</th>
</tr>
</thead>
</table>

Contributes significantly to the overall exposure by the skin route.

<table>
<thead>
<tr>
<th>TWAEV</th>
<th>0.5 mg/m³</th>
<th>Quèbec. Regulation respecting occupational health and safety, Schedule 1, Part 1: Permissible exposure values for airborne contaminants</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Skin (percutaneous)</th>
<th>TWA</th>
<th>0.5 mg/m³</th>
<th>USA. ACGIH Threshold Limit Values (TLV)</th>
</tr>
</thead>
</table>

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (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. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
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.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Eye protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection
Complete suit protecting against chemicals. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Specific engineering controls
Use mechanical exhaust or laboratory fume hood to avoid exposure.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance
Form solid
Colour No data available

Safety data
pH No data available
Melting point/freezing point Melting point/range: 113 - 115 °C (235 - 239 °F) - lit.
Boiling point No data available
Flash point No data available
Ignition temperature No data available
Auto-ignition temperature No data available
Lower explosion limit No data available
Upper explosion limit No data available
Vapour pressure No data available
Density 1.85 g/cm³
Water solubility 8.35 g/l at 25 °C (77 °F)
Partition coefficient: n-octanol/water Pow: 3.5 at 22 °C (72 °F)
Relative vapour density No data available
Odour No data available
Odour Threshold No data available
Evaporation rate No data available
10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions
No data available

Conditions to avoid
No data available

Materials to avoid
Strong oxidizing agents

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas
Other decomposition products - No data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50
LD50 Oral - Rat - 88.0 mg/kg

Inhalation LC50
LC50 Inhalation - Rat - 4 h - 1,560 mg/m3

Dermal LD50
No data available

Other information on acute toxicity
No data available

Skin corrosion/irritation
Skin - Rabbit - No skin irritation

Serious eye damage/eye irritation
Eyes - Rabbit - No eye irritation

Respiratory or skin sensitisation
Will not occur

Germ cell mutagenicity
No data available

Carcinogenicity
IARC: 2B - Group 2B: Possibly carcinogenic to humans (γ-1,2,3,4,5,6-Hexachlorocyclohexane)

Reproductive toxicity
No data available

Teratogenicity
Effects on or via lactation

Specific target organ toxicity - single exposure (Globally Harmonized System)
No data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
No data available
Aspiration hazard
No data available

Potential health effects

Inhalation Toxic if inhaled. May cause respiratory tract irritation.
Ingestion Toxic if swallowed.
Skin Toxic if absorbed through skin. May cause skin irritation.
Eyes May cause eye irritation.

Signs and Symptoms of Exposure
Neurotoxic effects., Cyanosis, Headache, Nausea, Incoordination., Tremors, Vomiting, Dizziness, Seizures., Unconsciousness

Synergistic effects
No data available

Additional Information
RTECS: GV4900000

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to fish
LC50 - Cyprinus carpio (Carp) - 0.2 mg/l - 96.0 h
LC50 - Cyprinodon variegatus (sheepshead minnow) - 0.9 - 1.3 mg/l - 96.0 h
LC50 - Oncorhynchus mykiss (rainbow trout) - 0.03 - 0.28 mg/l - 48.0 h
NOEC - Oncorhynchus mykiss (rainbow trout) - 0.056 mg/l - 3.0 d
LC50 - Oncorhynchus mykiss (rainbow trout) - 0.038 mg/l - 96.0 h
LOEC - Oncorhynchus mykiss (rainbow trout) - 0.1 mg/l - 3.0 d

Toxicity to daphnia and other aquatic invertebrates
EC50 - Daphnia magna (Water flea) - 0.80 - 6.50 mg/l - 48 h
LOEC - Daphnia (water flea) - 0.021 mg/l - 7 d

Toxicity to algae
EC50 - Algae - 4.00 mg/l - 72 h

Persistence and degradability
No data available

Bioaccumulative potential
Bioaccumulation Pimephales promelas (fathead minnow) - 304 d
Bioconcentration factor (BCF): 674

Mobility in soil
No data available

PBT and vPvB assessment
No data available

Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. 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.

Contaminated packaging
Dispose of as unused product.
14. TRANSPORT INFORMATION

**DOT (US)**
- UN number: 2811
- Class: 6.1
- Packing group: III
- Proper shipping name: Toxic solids, organic, n.o.s. (γ-1,2,3,4,5,6-Hexachlorocyclohexane)
- Reportable Quantity (RQ): 1 lbs
- Marine pollutant: No
- Poison Inhalation Hazard: No

**IMDG**
- UN number: 2811
- Class: 6.1
- Packing group: III
- EMS-No: F-A, S-A
- Proper shipping name: TOXIC SOLID, ORGANIC, N.O.S. (γ-1,2,3,4,5,6-Hexachlorocyclohexane)
- Marine pollutant: Marine pollutant

**IATA**
- UN number: 2811
- Class: 6.1
- Packing group: III
- Proper shipping name: Toxic solid, organic, n.o.s. (γ-1,2,3,4,5,6-Hexachlorocyclohexane)

15. REGULATORY INFORMATION

**WHMIS Classification**
- **D1A**: Very Toxic Material Causing Immediate and Serious Toxic Effects
- **D2A**: Very Toxic Material Causing Other Toxic Effects

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

16. OTHER INFORMATION

**Text of H-code(s) and R-phrase(s) mentioned in Section 3**

**Further information**
Copyright 2014 Sigma-Aldrich Co. LLC. License granted to make unlimited paper copies for internal use only.
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. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.