# Material Safety Data Sheet

Date Printed: 15/DEC/2004
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Version 1.7
According to 91/155/EEC

## 1 - Product and Company Information

| | |
|---|---|
| Product Name | PHENOL |
| Product Number | 77609 |
| Company | Sigma-Aldrich Pte Ltd<br>#08-01 Citilink Warehouse<br>Singapore 118529<br>Singapore |
| Technical Phone # | 65 271 1089 |
| Fax | 65 271 1571 |

## 2 - Composition/Information on Ingredients

| Product Name | CAS # | EC no | Annex I Index Number |
|---|---|---|---|
| PHENOL | 108-95-2 | 203-632-7 | 604-001-00-2 |

| | |
|---|---|
| Formula | C6H6O |
| Molecular Weight | 94.11 AMU |
| Synonyms | Acide carbolique (French) * Baker's P and S Liquid and Ointment * Benzenol * Carbolic acid * Carbolsaure (German) * Fenol (Dutch, Polish) * Fenolo (Italian) * Hydroxybenzene * Monohydroxybenzene * Monophenol * NCI-C50124 * Oxybenzene * Phenic acid * Phenol (ACGIH:OSHA) * Phenol alcohol * Phenole (German) * Phenyl hydrate * Phenyl hydroxide * Phenylic acid * Phenylic alcohol * RCRA waste number U188 |

## 3 - Hazards Identification

SPECIAL INDICATION OF HAZARDS TO HUMANS AND THE ENVIRONMENT
Toxic in contact with skin and if swallowed. Causes burns.

## 4 - First Aid Measures

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

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

AFTER EYE CONTACT
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.

AFTER INGESTION

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

## 5 - Fire Fighting Measures

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

SPECIAL RISKS
Specific Hazard(s): Emits toxic fumes under fire conditions. Combustible.

SPECIAL PROTECTIVE EQUIPMENT FOR FIREFIGHTERS
Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

## 6 - Accidental Release Measures

PERSONAL PRECAUTION PROCEDURES 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
Avoid raising dust. Ventilate area and wash spill site after material pickup is complete. Cover with dry-lime, sand, or soda ash. Place in covered containers using non-sparking tools and transport outdoors.

## 7 - Handling and Storage

HANDLING
Directions for Safe Handling: Do not breathe dust. Do not get in eyes, on skin, on clothing. Avoid prolonged or repeated exposure.

STORAGE
Conditions of Storage: Keep tightly closed. Keep away from heat and open flame. Handle and store under nitrogen.
Store at 2-8°C

SPECIAL REQUIREMENTS: Handle and store under inert gas. Light sensitive.

## 8 - Exposure Controls / Personal Protection

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

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

EXPOSURE LIMITS

| Country | Source | Type | Value |
|---|---|---|---|
| Poland | | NDS | 7.8 MG/M3 |
| Poland | | NDSCh | - |
| Poland | | NDSP | - |

EXPOSURE LIMITS - EUROPEAN UNION

| Source | Type | Value |
|---|---|---|
| OEL | OEL | 7.8 mg/m3 |
| | | 2 ppm |

Remarks: Skin

EXPOSURE LIMITS - DENMARK

| Source | Type | Value |
|---|---|---|
| OEL | TWA | 4 mg/m3 |
| | | 1 ppm |

Remarks: H

EXPOSURE LIMITS - GERMANY

| Source | Type | Value |
|---|---|---|
| TRGS 900 | OEL | 19 mg/m3 |
| | | 5 ppm |

Remarks: =1=
Remarks: H

EXPOSURE LIMITS - NORWAY

| Source | Type | Value |
|---|---|---|
| | OEL | 4 mg/m3 |
| | | 1 ppm |

Remarks: H

EXPOSURE LIMITS - SWEDEN

| Source | Type | Value |
|---|---|---|
| | LLV (Level | 4 mg/m3 |
| | | 1 ppm |

Remarks: H

EXPOSURE LIMITS - SWITZERLAND

| Source | Type | Value |
|---|---|---|
| OEL | OEL | 19 mg/m3 |
| | | 5 ppm |

Remarks: H M

EXPOSURE LIMITS - UNITED KINGDOM

| Source | Type | Value |
|---|---|---|
| OEL | OEL | 20 mg/m3 |
| | | 5 ppm |
| OEL | STEL | 39 mg/m3 |
| | | 10 ppm |

Remarks: Chemical Hazard Alert Notice Skin Indicative

PERSONAL PROTECTIVE EQUIPMENT
Respiratory Protection: Government approved respirator.
Hand Protection: Compatible chemical-resistant gloves.
Eye Protection: Chemical safety goggles.

## 9 - Physical and Chemical Properties

Appearance — Physical State: Solid

| Property | Value | At Temperature or Pressure |
|---|---|---|
| pH | 6 | |
| BP/BP Range | 182 °C | 760 mmHg |
| MP/MP Range | 40 - 42 °C | |
| Flash Point | 79 °C | Method: closed cup |
| Flammability | N/A | |
| Autoignition Temp | 715 °C | |
| Oxidizing Properties | N/A | |

| | | |
|---|---|---|
| Explosive Properties | N/A | |
| Explosion Limits | Lower: 1.7 %<br>Upper: 8.6 % | |
| Vapor Pressure | 0.36 mmHg | 20 °C |
| SG/Density | 1.071 g/cm3 | |
| Partition Coefficient | Log Kow: 1.46 | |
| Viscosity | 3.437 Pas | 50 °C |
| Vapor Density | 3.24 g/l | |
| Saturated Vapor Conc. | N/A | |
| Evaporation Rate | N/A | |
| Bulk Density | N/A | |
| Decomposition Temp. | N/A | |
| Solvent Content | N/A | |
| Water Content | N/A | |
| Surface Tension | 38.2 mN/m | 50 °C |
| Conductivity | N/A | |
| Miscellaneous Data | N/A | |
| Solubility | N/A | |

## 10 - Stability and Reactivity

STABILITY

Stable: Stable.
Conditions of Instability: May discolor on exposure to light.
Materials to Avoid: Strong oxidizing agents, Strong bases, Strong acids.

HAZARDOUS DECOMPOSITION PRODUCTS

Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide.

HAZARDOUS POLYMERIZATION

Hazardous Polymerization: Will not occur

## 11 - Toxicological Information

RTECS NUMBER: SJ3325000

ACUTE TOXICITY

LDLO
Oral
Infant
10 mg/kg
Remarks: Behavioral:Muscle weakness. Lungs, Thorax, or Respiration:Cyanosis.

LDLO
Oral
Human
14000 mg/kg
Remarks: Behavioral:Muscle weakness. Lungs, Thorax, or Respiration:Cyanosis.

LDLO
Oral
Human
140 mg/kg
Remarks: Behavioral:Hallucinations, distorted perceptions. Skin and Appendages: Other: Sweating.

LD50
Oral

Rat
317 mg/kg
Remarks: Behavioral:Convulsions or effect on seizure threshold.

LC50
Inhalation
Rat
316 mg/m3

LD50
Skin
Rat
669 mg/kg
Remarks: Behavioral:Tremor. Kidney, Ureter, Bladder:Hematuria. Skin and Appendages:Skin: After topical exposure: Cutaneous sensitization (experimental).

LD50
Intraperitoneal
Rat
127 MG/KG

LD50
Subcutaneous
Rat
460 MG/KG

LD50
Oral
Mouse
270 mg/kg

LC50
Inhalation
Mouse
177 mg/m3

LD50
Intraperitoneal
Mouse
180 MG/KG

LD50
Subcutaneous
Mouse
344 MG/KG

LD50
Intravenous
Mouse
112 MG/KG
Remarks: Behavioral:Tremor.

LD50
Skin
Rabbit
630 mg/kg

LD50
Oral
Mammal
500 mg/kg

IRRITATION DATA

Skin
Rabbit
500 mg
24H
Remarks: Severe irritation effect

Skin
Rabbit
535 mg
Remarks: Open irritation test

Skin
Rabbit
100 mg
Remarks: Mild irritation effect

Eyes
Rabbit
5 mg
Remarks: Severe irritation effect

Eyes
Rabbit
5 mg
30S
Remarks: Rinsed

SIGNS AND SYMPTOMS OF EXPOSURE

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated. Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin. Inhalation may result in spasm, inflammation and edema of the larynxand bronchi, chemical pneumonitis, and pulmonary edema. Symptoms of exposure may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and vomiting. Ingestion can cause circulatory collapse, tachypnea, paralysis, convulsions, coma, necrosis of mouth and G.I. tract, jaundice, death from respiratory failure, sometimes from cardiac arrest.

ROUTE OF EXPOSURE

Skin Contact: Causes burns.
Skin Absorption: Toxic if absorbed through skin. Readily absorbed through skin.
Eye Contact: Causes burns.
Inhalation: Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract. May be harmful if inhaled.
Ingestion: Toxic if swallowed.

TARGET ORGAN INFORMATION

Central nervous system. Kidneys. Liver. Pancreas. Spleen.

CONDITIONS AGGRAVATED BY EXPOSURE

May cause nervous system disturbances.

CHRONIC EXPOSURE - CARCINOGEN

Result: This product is or contains a component that is not

classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

Mouse
Route of Application: Skin
Exposure Time: 40W
Result: Tumorigenic:Carcinogenic by RTECS criteria. Skin and Appendages: Other: Tumors.

Mouse
Route of Application: Skin
Exposure Time: 24W
Result: Tumorigenic:Neoplastic by RTECS criteria. Skin and Appendages: Other: Tumors.

IARC CARCINOGEN LIST

Rating: Group 3

CHRONIC EXPOSURE - MUTAGEN

Human
17 MG/L
Cell Type: HeLa cell
Other mutation test systems

Human
1 MMOL/L
Cell Type: HeLa cell
DNA inhibition

Human
5 UMOL/L
Cell Type: lymphocyte
Other mutation test systems

Human
5 UMOL/L
Cell Type: lymphocyte
Sister chromatid exchange

Rat
4 GM/KG
Oral
Unscheduled DNA synthesis

Mouse
265 MG/KG
Oral
Micronucleus test

Mouse
265 MG/KG
Intraperitoneal
Micronucleus test

Mouse
300 MG/L (+S9)
Cell Type: lymphocyte
Mutation in microorganisms

Mouse

1500 UMOL/L
Cell Type: lymphocyte
DNA damage

Mouse
20 GM/KG
Oral
DNA inhibition

Mouse
800 UMOL/L
Cell Type: lymphocyte
DNA inhibition

Mouse
2500 UMOL/L
Cell Type: Other cell types
Other mutation test systems

Mouse
1890 UMOL/L
Cell Type: lymphocyte
Mutation in mammalian somatic cells.

Hamster
4 MMOL/L
Cell Type: lung
Micronucleus test

Hamster
175 MG/L
Cell Type: ovary
Micronucleus test

Hamster
10 UMOL/L
Cell Type: Embryo
Morphological transformation.

Hamster
3 UMOL/L
Cell Type: Embryo
Unscheduled DNA synthesis

Hamster
1900 UMOL/L
Cell Type: lung
DNA inhibition

Hamster
2 GM/L
Cell Type: ovary
Cytogenetic analysis

Hamster
100 UMOL/L
Cell Type: Embryo
Cytogenetic analysis

Hamster
300 MG/L
Cell Type: ovary

Sister chromatid exchange

Hamster
1 MMOL/L
Cell Type: Embryo
Sister chromatid exchange

Hamster
3 MMOL/L
Cell Type: Embryo
Mutation in mammalian somatic cells.

Mammal
250 MMOL/L
Cell Type: lymphocyte
DNA damage

Rabbit
250 UMOL/L
Cell Type: Bone marrow
Other mutation test systems

CHRONIC EXPOSURE - TERATOGEN

Species: Rat
Dose: 1200 MG/KG
Route of Application: Oral
Exposure Time: (6-15D PREG)
Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

Species: Rat
Dose: 600 MG/KG
Route of Application: Intraperitoneal
Exposure Time: (12-14D PREG)
Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

Species: Mouse
Dose: 2600 MG/KG
Route of Application: Oral
Exposure Time: (6-15D PREG)
Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

Species: Mouse
Dose: 4 GM/KG
Route of Application: Oral
Exposure Time: (6-15D PREG)
Result: Specific Developmental Abnormalities: Musculoskeletal system.

Species: Mouse
Dose: 2800 MG/KG
Route of Application: Oral
Exposure Time: (6-15D PREG)
Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Specific Developmental Abnormalities: Craniofacial (including nose and tongue).

CHRONIC EXPOSURE - REPRODUCTIVE HAZARD

Species: Rat
Dose: 300 MG/KG
Route of Application: Oral
Exposure Time: (6-15D PREG)
Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).

Species: Rat
Dose: 3600 MG/KG
Route of Application: Oral
Exposure Time: (6-15D PREG)
Result: Maternal Effects: Other effects. Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

Species: Rat
Dose: 1200 MG/KG
Route of Application: Oral
Exposure Time: (6-15D PREG)
Result: Maternal Effects: Other effects.

Species: Mouse
Dose: 2300 MG/KG
Route of Application: Oral
Exposure Time: (6-15D PREG)
Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants). Effects on Embryo or Fetus: Fetal death.

## 12 - Ecological Information

ECOTOXICOLOGICAL EFFECTS

Test Type: EC50 Daphnia
Species: Daphnia magna
Time: 24 h
Value: 12 mg/l

Test Type: EC100 Daphnia
Species: Daphnia magna
Time: 24 h
Value: 100 mg/l

Test Type: LC50 Fish
Species: Leuciscus idus
Time: 48 h
Value: 14 - 25 mg/l

Test Type: LC50 Fish
Species: Carassius auratus (Goldfish)
Time: 96 h
Value: 36.1 - 68.80 mg/l

## 13 - Disposal Considerations

SUBSTANCE DISPOSAL
Contact a licensed professional waste disposal service to dispose of this material. Observe all federal, state, and local environmental regulations. This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber.

## 14 - Transport Information

RID/ADR
UN#: 1671
Class: 6.1
PG: II
Proper Shipping Name: Phenol, solid

IMDG
UN#: 1671
Class: 6.1
PG: II
Proper Shipping Name: Phenol, solid
Marine Pollutant: No
Severe Marine Pollutant: No

IATA
UN#: 1671
Class: 6.1
PG: II
Proper Shipping Name: Phenol, solid
Inhalation Packing Group I: No

## 15 - Regulatory Information

CLASSIFICATION AND LABELING ACCORDING TO EU DIRECTIVES
ANNEX I INDEX NUMBER: 604-001-00-2
INDICATION OF DANGER: T
Toxic.
R-PHRASES: 24/25 34
Toxic in contact with skin and if swallowed. Causes burns.
S-PHRASES: 28 45
After contact with skin, wash immediately with plenty of polyethylene glycol. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

COUNTRY SPECIFIC INFORMATION

Germany
WGK: 2

SWITZERLAND
SWISS POISON CLASS: 2

## 16 - Other Information

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 guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.


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