

MATERIAL SAFETY DATA SHEET

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Version 1.5

Section 1 - Product and Company Information

Product Name PHENOL, 99+%
Product Number 185450
Brand ALDRICH

Company Sigma-Aldrich
Street Address 3050 Spruce Street
City, State, Zip, Country SAINT LOUIS MO 63103 US
Technical Phone: 314 771 5765
Emergency Phone: 414 273 3850 Ext. 5996
Fax: 800 325 5052

Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313
PHENOL	108-95-2	Yes

Formula C6H6O
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

RTECS Number: SJ3325000

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Toxic.

Toxic in contact with skin and if swallowed. Causes burns.

Vesicant. Readily absorbed through skin. Combustible. Target organ(s): Central nervous system. Kidneys.

HMIS RATING

HEALTH: 3*

FLAMMABILITY: 2

REACTIVITY: 1

NFPA RATING

HEALTH: 3

FLAMMABILITY: 2

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

174.2 °F 79 °C Method: closed cup

EXPLOSION LIMITS

Lower: 1.7 % Upper: 8.6 %

AUTOIGNITION TEMP

715 °C

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.
Combustible.

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

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.

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. Keep away from heat and open flame. Handle and store under nitrogen.

SPECIAL REQUIREMENTS

Handle and store under inert gas. Light sensitive.

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS

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

PERSONAL PROTECTIVE EQUIPMENT

Respiratory: Government approved respirator.

Hand: Compatible chemical-resistant gloves.

Eye: Chemical safety goggles.

GENERAL HYGIENE MEASURES

Wash contaminated clothing before reuse. Discard contaminated shoes. Wash thoroughly after handling.

EXPOSURE LIMITS, RTECS

Country	Source	Type	Value
USA	ACGIH	TWA	5 PPM
Remarks: Skin			
USA	MSHA Standard-air	TWA	5 PPM (19 MG/M3) (SKIN)
USA	OSHA.	PEL	8H TWA 5 PPM (19 MG/M3) (SKIN)
New Zealand OEL			
Remarks: check ACGIH TLV			
USA	NIOSH	TWA	5 PPM (SK)
		Ceiling	15.6 PPM/15M (SK)

EXPOSURE LIMITS

Country	Source	Type	Value
Poland		NDS	10 MG/M3
Poland		NDSch	20 MG/M3
Poland		NDSP	-

Section 9 - Physical/Chemical Properties

Appearance	Physical State: Solid	
Property	Value	At Temperature or Pressure
Molecular Weight	94.11 AMU	
pH	6	
BP/BP Range	182 °C	760 mmHg
MP/MP Range	40 - 42 °C	
Freezing Point	N/A	
Vapor Pressure	0.36 mmHg	20 °C
Vapor Density	3.24 g/l	
Saturated Vapor Conc.	N/A	
SG/Density	1.071 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	3.437 Pas	50 °C
Surface Tension	38.2 mN/m	50 °C
Partition Coefficient	Log Kow: 1.46	
Decomposition Temp.	N/A	
Flash Point	174.2 °F 79 °C	Method: closed cup
Explosion Limits	Lower: 1.7 % Upper: 8.6 %	
Flammability	N/A	
Autoignition Temp	715 °C	
Refractive Index	1.5408	41 °C
Optical Rotation	N/A	
Miscellaneous Data	N/A	
Solubility	N/A	

N/A = not available

Section 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

Section 11 - Toxicological Information

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(S) OR SYSTEM(S)

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

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 larynx and 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.

CONDITIONS AGGRAVATED BY EXPOSURE

May cause nervous system disturbances.

TOXICITY DATA

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

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

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

Oral
Rat
317 mg/kg
LD50
Remarks: Behavioral:Convulsions or effect on seizure threshold.

Inhalation
Rat
316 mg/m³
LC50

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

Intraperitoneal
Rat
127 MG/KG
LD50

Subcutaneous
Rat
460 MG/KG
LD50

Oral
Mouse
270 mg/kg
LD50

Inhalation
Mouse
177 mg/m³
LC50

Intraperitoneal
Mouse
180 MG/KG
LD50

Subcutaneous
Mouse
344 MG/KG
LD50

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

Skin
Rabbit
630 mg/kg
LD50

Oral
Mammal
500 mg/kg
LD50

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

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.

Species: Mouse
Route of Application: Skin

Dose: 16 GM/KG
Exposure Time: 40W
Frequency: I
Result: Tumorigenic: Carcinogenic by RTECS criteria. Skin and
Appendages: Other: Tumors.

Species: Mouse
Route of Application: Skin
Dose: 4000 MG/KG
Exposure Time: 24W
Frequency: I
Result: Tumorigenic: Neoplastic by RTECS criteria. Skin and
Appendages: Other: Tumors.

IARC CARCINOGEN LIST

Rating: Group 3

NTP CARCINOGEN LIST

Rating: No evidence.
Species: Mouse/rat
Route: Oral

ACGIH CARCINOGEN LIST

Rating: A4

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 - MUTAGEN

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

Species: Human
Dose: 1 MMOL/L
Cell Type: HeLa cell
Mutation test: DNA inhibition

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

Species: Human
Dose: 5 UMOL/L
Cell Type: lymphocyte
Mutation test: Sister chromatid exchange

Species: Rat
Route: Oral
Dose: 4 GM/KG
Mutation test: Unscheduled DNA synthesis

Species: Mouse
Route: Oral
Dose: 265 MG/KG
Mutation test: Micronucleus test

Species: Mouse
Route: Intraperitoneal
Dose: 265 MG/KG
Mutation test: Micronucleus test

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

Species: Mouse
Dose: 1500 UMOL/L
Cell Type: lymphocyte
Mutation test: DNA damage

Species: Mouse
Route: Oral
Dose: 20 GM/KG
Mutation test: DNA inhibition

Species: Mouse
Dose: 800 UMOL/L
Cell Type: lymphocyte
Mutation test: DNA inhibition

Species: Mouse

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

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

Species: Hamster
Dose: 4 MMOL/L
Cell Type: lung
Mutation test: Micronucleus test

Species: Hamster
Dose: 175 MG/L
Cell Type: ovary
Mutation test: Micronucleus test

Species: Hamster
Dose: 10 UMOL/L
Cell Type: Embryo
Mutation test: Morphological transformation.

Species: Hamster
Dose: 3 UMOL/L
Cell Type: Embryo
Mutation test: Unscheduled DNA synthesis

Species: Hamster
Dose: 1900 UMOL/L
Cell Type: lung
Mutation test: DNA inhibition

Species: Hamster
Dose: 2 GM/L
Cell Type: ovary
Mutation test: Cytogenetic analysis

Species: Hamster
Dose: 100 UMOL/L
Cell Type: Embryo
Mutation test: Cytogenetic analysis

Species: Hamster
Dose: 300 MG/L
Cell Type: ovary
Mutation test: Sister chromatid exchange

Species: Hamster
Dose: 1 MMOL/L
Cell Type: Embryo
Mutation test: Sister chromatid exchange

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

Species: Mammal
Dose: 250 MMOL/L
Cell Type: lymphocyte

Mutation test: DNA damage

Species: Rabbit

Dose: 250 UMOL/L

Cell Type: Bone marrow

Mutation test: Other mutation test systems

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.

Section 12 - Ecological Information

ACUTE ECOTOXICITY TESTS

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

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION

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.

Section 14 - Transport Information

DOT

Proper Shipping Name: Phenol, solid
UN#: 1671
Class: 6.1
Packing Group: Packing Group II
Hazard Label: Toxic substances.
PIH: Not PIH

IATA

Proper Shipping Name: Phenol, solid
IATA UN Number: 1671
Hazard Class: 6.1
Packing Group: II

Section 15 - Regulatory Information

EU DIRECTIVES CLASSIFICATION

Symbol of Danger: T
Indication of Danger: Toxic.
R: 24/25 34
Risk Statements: Toxic in contact with skin and if swallowed.
Causes burns.
S: 28 45
Safety Statements: 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).

US CLASSIFICATION AND LABEL TEXT

Indication of Danger: Toxic.
Risk Statements: Toxic in contact with skin and if swallowed.
Causes burns.
Safety Statements: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing, gloves, and eye/face protection. 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).
US Statements: Vesicant. Readily absorbed through skin.
Combustible. Target organ(s): Central nervous system. Kidneys.

UNITED STATES REGULATORY INFORMATION

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

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 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. Copyright 2004 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.