

Chemical Safety Data Sheet MSDS / SDS

Phenol SDS

Revision Date:2024-04-25 Revision Number:1

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SECTION 1: Identification of the substance/mixture and of the company/undertaking**Product identifier**

Product name: Phenol
CAS: 108-95-2

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses: For R&D use only. Not for medicinal, household or other use.
Uses advised against: none

Company Identification

Company: Chemicalbook.in
Address: 5 vasavi Layout Basaveswara Nilayam Pragathi Nagar Hyderabad, India -500090
Telephone: +91 9550333722

SECTION 2: Hazards identification**Classification of the substance or mixture**

Acute toxicity - Category 3, Oral
Acute toxicity - Category 3, Dermal

Skin corrosion, Sub-category 1B
Acute toxicity - Category 3, Inhalation
Germ cell mutagenicity, Category 2
Specific target organ toxicity - repeated exposure, Category 2

GHS label elements, including precautionary statements

Pictogram(s)



Signal word

Danger

Hazard statement(s)

H301 Toxic if swallowed
H311 Toxic in contact with skin
H314 Causes severe skin burns and eye damage
H331 Toxic if inhaled
H341 Suspected of causing genetic defects
H373 May cause damage to organs through prolonged or repeated exposure

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/...
P260 Do not breathe dust/fume/gas/mist/vapours/spray.
P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
P271 Use only outdoors or in a well-ventilated area.
P203 Obtain, read and follow all safety instructions before use.

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/...
P316 Get emergency medical help immediately.
P361+P364 Take off immediately all contaminated clothing and wash it before reuse.
P301+P330+P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

P363 Wash contaminated clothing before reuse.
P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P318 IF exposed or concerned, get medical advice.
P319 Get medical help if you feel unwell.

Storage

P405 Store locked up.
P403+P233 Store in a well-ventilated place. Keep container tightly closed.

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.

Other hazards which do not result in classification

no data available

SECTION 3: Composition/information on ingredients

Substance

Chemical name:	Phenol
Common names and synonyms:	Phenol
CAS number:	108-95-2
EC number:	203-632-7
Concentration:	100%

SECTION 4: First aid measures

Description of necessary first-aid measures

If inhaled

Fresh air, rest. Half-upright position. Refer for medical attention.

Following skin contact

Remove contaminated clothes. Rinse skin with plenty of water or shower. To remove substance use polyethylene glycol 300 or vegetable oil. Refer for medical attention . Wear protective gloves when administering first aid.

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

Rinse mouth. Give one or two glasses of water to drink. Do NOT induce vomiting. Refer for medical attention .

Most important symptoms/effects, acute and delayed

Excerpt from ERG Guide 153 [Substances - Toxic and/or Corrosive (Combustible)]: TOXIC; inhalation, ingestion or skin contact with material may cause severe injury or death. Contact with molten substance may cause severe burns to skin and eyes. Avoid any skin contact. Effects of contact or inhalation may be delayed. Fire may produce irritating, corrosive and/or toxic gases. Runoff from fire control or dilution water may be corrosive and/or toxic and cause pollution. (ERG, 2016)

Will burn eyes and skin. The analgesic action may cause loss of pain sensation. Readily absorbed through skin, causing increased heart rate, convulsions, and death. (USCG, 1999)

Excerpt from ERG Guide 153 [Substances - Toxic and/or Corrosive (Combustible)]: TOXIC; inhalation, ingestion or skin contact with material may cause severe injury or death. Contact with molten substance may cause severe burns to skin and eyes. Avoid any skin contact. Effects of contact or inhalation may be delayed. Fire may produce irritating, corrosive and/or toxic gases. Runoff from fire control or dilution water may be corrosive and/or toxic and cause pollution. (ERG, 2016)

Toxic hazard rating is very toxic: probable oral lethal dose (human) is 50-500 mg/kg. Ingestion of 1 gram has been lethal to humans. Lethal amounts may be absorbed through skin or inhaled. Industrial contact can cause chronic poisoning with kidney and liver damage. Persons affected with hepatic or kidney diseases are at a greater risk. (EPA, 1998)

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

Because of the rapid onset of symptoms, possible increased phenol absorption with dilution, and the potential for development of seizures, activated charcoal (1 g/kg) is preferable to lavage or syrup of ipecac. In vitro studies indicated that activated charcoal efficiently absorbs phenol. A cathartic should be given after oral activated charcoal.

SECTION 5: Firefighting measures

Suitable extinguishing media

If material on fire or involved in fire: Use water in flooding quantities as fog. Solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water. Apply water from as far a distance as possible. Use foam, dry chemical, or

carbon dioxide. Keep run off-water out of sewers and water sources. Phenol, solid

Specific hazards arising from the chemical

Excerpt from ERG Guide 153 [Substances - Toxic and/or Corrosive (Combustible)]: Combustible material: may burn but does not ignite readily. When heated, vapors may form explosive mixtures with air: indoors, outdoors and sewers explosion hazards. Those substances designated with a (P) may polymerize explosively when heated or involved in a fire. Contact with metals may evolve flammable hydrogen gas. Containers may explode when heated. Runoff may pollute waterways. Substance may be transported in a molten form. (ERG, 2016)

Special Hazards of Combustion Products: Unburned vapor is toxic Behavior in Fire: Yields flammable vapors when heated, which will form explosive mixtures with air (USCG, 1999)

Excerpt from ERG Guide 153 [Substances - Toxic and/or Corrosive (Combustible)]: Combustible material: may burn but does not ignite readily. When heated, vapors may form explosive mixtures with air: indoors, outdoors and sewers explosion hazards. Those substances designated with a (P) may polymerize explosively when heated or involved in a fire. Contact with metals may evolve flammable hydrogen gas. Containers may explode when heated. Runoff may pollute waterways. Substance may be transported in a molten form. (ERG, 2016)

Flammable vapors when heated. Runoff from fire control water may give off poisonous gases and cause pollution. Mixtures of 9-10% phenol in air are explosive. Avoid aluminum chloride/nitrobenzene mixture, peroxodisulfuric acid, peroxomonosulfuric acid and strong oxidizing agents. Decomposes slowly on air contact. Avoid contact with strong oxidizing agents. (EPA, 1998)

Special protective actions for fire-fighters

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

SECTION 6: Accidental release measures

Personal precautions, protective equipment and emergency procedures

Personal protection: chemical protection suit including self-contained breathing apparatus. Do NOT let this chemical enter the environment. Sweep spilled substance into covered sealable containers. If appropriate, moisten first to prevent dusting. Carefully collect remainder. Then store and dispose of according to local regulations.

Environmental precautions

Personal protection: complete protective clothing including self-contained breathing apparatus. Do NOT let this chemical enter the environment. Sweep spilled substance into covered sealable containers. If appropriate, moisten first to prevent dusting. Carefully collect remainder. Then store and dispose of according to local regulations.

Methods and materials for containment and cleaning up

Control runoff and isolate discharged material for proper disposal. Approach release from upwind.

SECTION 7: Handling and storage

Precautions for safe handling

NO open flames. NO contact with strong oxidizing agents. Above 79°C use a closed system and ventilation. 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.

Conditions for safe storage, including any incompatibilities

Provision to contain effluent from fire extinguishing. Separated from strong oxidants and food and feedstuffs. Dry. Well closed. Keep in a well-ventilated room. Phenol should be stored in closed containers in an area which is adequate to ensure that airborne phenol concentrations do not exceed 20 mg/cu m. Conditions shall be controlled to prevent overheating and the buildup of pressure in phenol containers. Storage tanks must be electrically grounded and bonded to transfer lines. Transfer and storage systems shall be designed and operated to prevent blockage by condensed phenol. Open flames are prohibited when drums of phenol are heated to melt the contents. The internal pressure will be vented by placing the drums with the bung up and the bung loosened. The bungs shall be tightened prior to moving or handling drums. Drums, carboys, or other containers of phenol shall be closed while being handled or moved. Transfer from such containers shall be done carefully to avoid splashes, spills, or other possible circumstances by which an employee may come in contact with phenol. Bulk storage facilities shall be designed and constructed to contain any leaks or spills.

SECTION 8: Exposure controls/personal protection

Control parameters

Occupational Exposure limit values

TLV: 5 ppm as TWA; (skin); A4 (not classifiable as a human carcinogen); BEI issued. MAK: skin absorption (H); carcinogen category: 3B; germ cell mutagen group: 3B. EU-OEL: 8 mg/m³, 2 ppm as TWA; 16 mg/m³, 4 ppm as STEL; (skin)

Biological limit values

no data available

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.

Individual protection measures, such as personal protective equipment (PPE)

Eye/face protection

Wear face shield or eye protection in combination with breathing protection.

Skin protection

Protective gloves. Protective clothing.

Respiratory protection

Avoid inhalation of dust and mist. Use ventilation, local exhaust or breathing protection.

Thermal hazards

no data available

SECTION 9: Physical and chemical properties and safety characteristics

Physical state:	Solid. Crystalline.
Colour:	Colourless to yellow or light pink.
Odour:	Distinct aromatic, somewhat sickening sweet and acrid odor, discernable at 0.5 to 5 ppm
Melting point/freezing point:	40.9 °C. Atm. press.:Ca. 1 013 hPa.
Boiling point or initial boiling point and boiling range:	181.8 °C. Atm. press.:1 013 hPa.
Flammability:	Combustible Solid
Lower and upper explosion limit/flammability limit:	1.7%-8.6% IN AIR
Flash point:	81 °C. Atm. press.:Ca. 1 013 hPa.
Auto-ignition temperature:	715 °C. Atm. press.:Ca. 1 013 hPa.

Decomposition temperature:	no data available
pH:	about 6.0 (aq soln)
Kinematic viscosity:	dynamic viscosity (in mPa s) = 3.437. Temperature:50.0°C.;dynamic viscosity (in mPa s) = 1.784. Temperature:75.0°C.
Solubility:	Miscible with water
Partition coefficient n-octanol/water:	log Pow = 1.47. Temperature:30 °C.
Vapour pressure:	0.2 hPa. Temperature:20 °C.;1 hPa. Temperature:36.1 °C.
Density and/or relative density:	1.07 g/cm ³ . Temperature:20 °C.
Relative vapour density:	3.24 (vs air)
Particle characteristics:	no data available

SECTION 10: Stability and reactivity

Reactivity

Upon heating, toxic fumes are formed. Decomposes on heating. This produces toxic fumes. The solution in water is a weak acid. Reacts with oxidants. This generates fire and explosion hazard.

Chemical stability

Prone to redden on exposure to air and light, hastened by presence of alkalinity.

Possibility of hazardous reactions

May be ignited by electrostatic discharge. Phenols do not behave as organic alcohols, as one might guess from the presence of a hydroxyl (-OH) group in their structure. Instead, they react as weak organic acids. Phenols and cresols are much weaker as acids than common carboxylic acids (phenol has pKa = 9.88). These materials are 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. Heat is also generated by the acid-base reaction between phenols and bases. Such heating may initiate polymerization of the

organic compound. Phenols are sulfonated very readily (for example, by concentrated sulfuric acid at room temperature). The reactions generate heat. Phenols are also nitrated very rapidly, even by dilute nitric acid. Phenol may explode in contact with peroxodisulfuric acid (D'Ans, J. Ber., 1910, 43, 1880; Z. Anorg. Chem., 1911, 73, 1911.) or peroxomonosulfuric acid. (Sidgwick, 1950, 939)

Conditions to avoid

no data available

Incompatible materials

Addition of aluminum chloride to a large volume of recovered nitrobenzene containing 5% phenol caused a violent explosion. Experiment showed that mixtures containing all three components reacted violently at 120 deg C.

Hazardous decomposition products

When heated to decomposition it emits acrid smoke and irritating fumes.

SECTION 11: Toxicological information

Acute toxicity

Oral: LD50 - rat (male/female) - 530 mg/kg bw. Remarks: 2 & 5% solution.

Inhalation: LC0 - rat (female) - 900 mg/m³ air (nominal).

Dermal: LD50 - rat (female) - 0.625 mL/kg bw.

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 inadequate evidence in humans for the carcinogenicity of phenol. There is inadequate evidence in experimental animals for the carcinogenicity of phenol. Overall evaluation: Phenol is not classifiable as to its carcinogenicity to humans (Group 3).

Reproductive toxicity

no data available

STOT-single exposure

The substance and the vapour are corrosive to the eyes, skin and respiratory tract. Corrosive on ingestion. Inhalation of the vapour may cause lung oedema, but only after initial corrosive effects on eyes and/or airways have become manifest. See Notes. The substance may cause effects on the central nervous system, heart and kidneys. This may result in convulsions, coma, cardiac disorders, respiratory failure and collapse. The effects may be delayed. Medical observation is indicated. Exposure could cause death.

STOT-repeated exposure

The substance may have effects on the liver, kidneys and nervous system.

Aspiration hazard

A harmful concentration of airborne particles can be reached quickly when dispersed, especially if powdered.

SECTION 12: Ecological information

Toxicity

Toxicity to fish: LC50 - *Oncorhynchus mykiss* (previous name: *Salmo gairdneri*) - 8.9 mg/L - 96 h.

Toxicity to daphnia and other aquatic invertebrates: EC50 - *Ceriodaphnia dubia* - 3.1 mg/L - 48 h.

Toxicity to algae: EC50 - *Pseudokirchneriella subcapitata* (previous names: *Raphidocelis subcapitata*, *Selenastrum capricornutum*) - 61.1 mg/L - 96 h.

Toxicity to microorganisms: IC50 - *Nitrosomonas* sp. - 21 mg/L - 24 h. Remarks: Inhibition of ammonium oxidation.

Persistence and degradability

AEROBIC: Phenol is a benchmark chemical in screening tests and there is abundant data to indicate that phenol biodegrades fast in aerobic screening tests using a variety of techniques and inocula, including acclimated and unacclimated activated sludge, sewage, and soil(SRC). Only selected results are included here (SRC). In a 2-week biodegradation screening test (MITI test) using phenol (100 mg/l) and an activated sludge inoculum, 85% of theoretical BOD was removed(1). Phenol was completely removed in 1 day or less using a soil suspension(2) or activated sludge inocula(3,6). Complete degradation was observed in 4 days using sediment from an oil refinery settling pond as an inoculum(4). It was shown that the presence of aromatic compounds like benzene and naphthalene had a mild inhibitory effect on degradation(4). In five days, the BOD consumed was 90% and 50% of theoretical using a sewage inoculum and freshwater and seawater, respectively(5). Another investigator who obtained 80% of theoretical BOD consumed after 5 days demonstrated that adaptation of the inoculum has a marked effect on the biodegradation rate(8). Decreasing the concn of phenol significantly reduces the lag time required to initiate degradation and increases the removal rate(9). The maximum mineralization rates of phenol in sewage and landfill leachate were 6.5×10^{-4} and $2.7 \times 10^{-4} \text{ hr}^{-1}$, respectively(7). A lag period was observed in landfill leachate(7).

Bioaccumulative potential

The BCFs reported in fish include: Goldorfe, 20 (1); goldfish, (*Carassius auratus*), 1.9(2); fish (unspecified), 17(3); fish (unspecified), 1.7(4); and 39, rainbow trout (*Salmo gairdneri*) (5). Phenol was rapidly eliminated from goldfish(6) and therefore would be unlikely to bioaccumulate(SRC). When U- ^{14}C -phenol was interperitonally administered to goldfish, the concn decreased to one tenth the initial concn in 2 hr(6). A BCF of 15,800 was reported in fathead minnows using ^{14}C labeled phenol(7). Minor amounts of ^{14}C in tissues were present as parent compound after 28 days of exposure to radiolabeled phenol(7). Parent compound comprised 1.5% of total ^{14}C as phenol after 28 days of depuration(7). According to a classification scheme(8), reported BCF values and the rapid elimination of phenol suggests that bioaccumulation of phenol is unlikely(SRC). According to a classification scheme, BCF values <30 are low and from 100 or greater are high(8).

Mobility in soil

Phenol is reported to have low adsorptivity to clay soils and silt loam(1) and no adsorption to aquifer material(3) and montmorillonite and kaolinite clays(8). The Koc for phenol to a Batcombe silt loam soil (pH 6.7, organic carbon 2.51%) was 30(6). It was 16 for a Brookstone clay loam (pH 5.7, organic matter 5.1%) and varied with pH and iron content of the soil(7). The Freundlich K and (1/N) for phenol in Captina (pH 5.7, 1.1 % organic matter) and Palouse silt loam (pH 5.7, 3.6% organic matter) soils were 0.58 (1.15) and 0.81 (1.00)(2); the Koc values for these soils are 91 and 39(SRC). Based on the reported Koc values, phenol would be expected to generally exhibit very high mobility in soil, based on a classification scheme(4). In a study of the adsorption of phenol onto siltstone associated with a Wyoming coal deposit suitable for in situ gasification, the pH of the solution was the major controlling factor with adsorption occurring at pHs below the pKa of phenol and no adsorption occurring at pHs above the pKa(5). The log of the Freundlich K value was approximately -4(5). Therefore, phenol may be transported by groundwater near in situ coal gasification sites due to the elevated pHs at these sites after gasification(5). The pKa of phenol is 9.99(9), indicating that it will be partially dissociated at the upper end of environmental pH range and its mobility may be pH dependent(SRC). In general, anions

generally do not adsorb to organic carbon and clay as strongly as their neutral counterparts(10).

Other adverse effects

no data available

SECTION 13: Disposal considerations

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

UN Number

ADR/RID: UN2312 (For reference only, please check.)

IMDG: UN2312 (For reference only, please check.)

IATA: UN2312 (For reference only, please check.)

UN Proper Shipping Name

ADR/RID: PHENOL, MOLTEN (For reference only, please check.)

IMDG: PHENOL, MOLTEN (For reference only, please check.)

IATA: PHENOL, MOLTEN (For reference only, please check.)

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.)

Packing group, if applicable

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

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

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

Environmental hazards

ADR/RID: No

IMDG: No

IATA: No

Special precautions for user

no data available

Transport in bulk according to IMO instruments

no data available

SECTION 15: Regulatory information

Safety, health and environmental regulations specific for the product in question

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)

Listed.

(PICCS)

Listed.

Vietnam National Chemical Inventory

Listed.

IECSC)

Listed.

Korea Existing Chemicals List (KECL)

Listed.

SECTION 16: Other information

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

Other UN numbers: 2312 (molten); 2821 (solution). Depending on the degree of exposure, periodic medical examination is suggested. The symptoms of lung oedema often do not become manifest until a few hours have passed and they are aggravated by physical effort. Rest and medical observation are therefore essential.

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