



SAFETY DATA SHEET

1. Identification

Product identifier	Phenol	
Other means of identification		
Catalog number	1524806	
CAS number	108-95-2	
Synonyms	Carbolic acid * Hydroxybenzene	
Chemical name	Phenol	
Recommended use	Specified quality tests and assay use only.	
Recommended restrictions	Not for use as a drug. Not for administration to humans or animals.	
Manufacturer/Importer/Supplier/Distributor information		
Manufacturer		
Company name	U. S. Pharmacopeia	
Address	12601 Twinbrook Parkway Rockville MD 20852-1790 United States	
Telephone	RS Technical Services	301-816-8129
Website	www.usp.org	
E-mail	RSTECH@usp.org	
Emergency phone number	CHEMTREC within US & Canada	1-800-424-9300
	CHEMTREC outside US & Canada	+1 703-527-3887

2. Hazard(s) identification

Physical hazards	Not classified.	
Health hazards	Acute toxicity, oral	Category 3
	Acute toxicity, dermal	Category 3
	Acute toxicity, inhalation	Category 3
	Skin corrosion/irritation	Category 1
	Serious eye damage/eye irritation	Category 1
	Germ cell mutagenicity	Category 2
	Specific target organ toxicity, repeated exposure	Category 2
Environmental hazards	Not classified.	
OSHA defined hazards	Not classified.	
Label elements		



Signal word Danger

Hazard statement Toxic if swallowed. Toxic in contact with skin. Causes severe skin burns and eye damage. Toxic if inhaled. Suspected of causing genetic defects. May cause damage to organs through prolonged or repeated exposure.

Precautionary statement

Prevention

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not breathe dust/fume. Wash thoroughly after handling. Wear protective gloves/protective clothing/eye protection/face protection. Use only outdoors or in a well-ventilated area.

Response

If exposed: Immediately call a poison center/doctor. If swallowed: Rinse mouth. Do NOT induce vomiting. If on skin (or hair): Take off immediately all contaminated clothing. Wash with plenty of water. Wash contaminated clothing before reuse. If inhaled: Remove person to fresh air and keep comfortable for breathing. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical advice/attention if you feel unwell.

Storage

Store in a well-ventilated place. Keep container tightly closed. Store locked up.

Disposal

Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise classified (HNOC)

This product is supplied in a small quantity which does not constitute a combustible dust hazard. The physical properties of this material indicate that in large quantities accumulated dust may be hazardous.

Supplemental information

None.

3. Composition/information on ingredients

Substance

Chemical name	Common name and synonyms	CAS number	%
Phenol	Carbolic acid Hydroxybenzene	108-95-2	100

4. First-aid measures

Inhalation

If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing. Call a physician or poison control center immediately.

Skin contact

Take off immediately all contaminated clothing. Rinse skin with water/shower. Call a physician or poison control center immediately. Wash contaminated clothing before reuse.

Eye contact

Call a physician or poison control center immediately. Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Ingestion

If swallowed: Immediately call a poison center or doctor/physician. Rinse mouth. Do not induce vomiting without advice from poison control center. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.

Most important symptoms/effects, acute and delayed

Not available.

Indication of immediate medical attention and special treatment needed

Provide general supportive measures and treat symptomatically. Treatment for phenol overdose may include the following: For skin exposure, first rinse with polyethylene glycol 300 to 400 or isopropanol, then wash with soapy water for at least 10 minutes. Water alone may be harmful. For inhalation exposure, monitor for respiratory distress, administer oxygen, and assist ventilation as needed. Treat bronchospasm with inhaled beta2 agonist and oral or parenteral corticosteroids. Evaluate with frequent arterial blood gas or pulse oximetry monitoring. Onset of acute lung injury may be delayed. If ingested, do not induce vomiting. Dilution may enhance absorption and should be avoided. Perform gastric lavage with 40% aqueous Bacto-Peptide, milk, or water followed by castor oil or vegetable oil. Activated charcoal may limit toxicity but could interfere with endoscopic evaluation of gastrointestinal burns. Support respiratory and cardiovascular function. Obtain CBC, electrolytes, urinalysis, and baseline renal and liver measurements. Monitor acid-base balance. Institute continuous cardiac monitoring. For methemoglobinemia, administer methylene blue intravenously. For seizures, administer a benzodiazepine IV. If seizures recur, consider phenobarbital or propofol. For hypotension, infuse isotonic fluid. If persistent, administer dopamine or norepinephrine. For ventricular tachycardia, lidocaine or amiodarone are generally first-line agents. Unstable rhythms require cardioversion.

General information

Remove from exposure. Remove contaminated clothing. For treatment advice, seek guidance from an occupational health physician or other licensed health-care provider familiar with workplace chemical exposures. In the United States, the national poison control center phone number is 1-800-222-1222. If person is not breathing, give artificial respiration. If breathing is difficult, give oxygen if available. Persons developing serious hypersensitivity (anaphylactic) reactions must receive immediate medical attention.

5. Fire-fighting measures

Suitable extinguishing media

Water. Foam. Dry chemical or CO2. Use fire-extinguishing media appropriate for surrounding materials.

Unsuitable extinguishing media	None known.
Specific hazards arising from the chemical	Explosion hazard: Avoid generating dust; fine dust dispersed in air in sufficient concentrations and in the presence of an ignition source is a potential dust explosion hazard.
Special protective equipment and precautions for firefighters	Wear suitable protective equipment.
Fire fighting equipment/instructions	Use water spray to cool unopened containers. As with all fires, evacuate personnel to a safe area. Firefighters should use self-contained breathing equipment and protective clothing.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.
General fire hazards	No unusual fire or explosion hazards noted.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. Dust deposits should not be allowed to accumulate on surfaces, as these may form an explosive mixture if they are released into the atmosphere in sufficient concentration. Wear appropriate personal protective equipment. Avoid inhalation of dust from the spilled material. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. For personal protection, see section 8 of the SDS.
Methods and materials for containment and cleaning up	For waste disposal, see section 13 of the SDS. Avoid the generation of dusts during clean-up. Sweep up or vacuum up spillage and collect in suitable container for disposal. Clean surface thoroughly to remove residual contamination.
Environmental precautions	Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling	As a general rule, when handling USP Reference Standards, avoid all contact and inhalation of dust, mists, and/or vapors associated with the material. Clean equipment and work surfaces with suitable detergent or solvent after use. After removing gloves, wash hands and other exposed skin thoroughly. Avoid significant deposits of material, especially on horizontal surfaces, which may become airborne and form combustible dust clouds and may contribute to secondary explosions. Combustible dust clouds may be created where operations produce fine material (dust). Select and use containment devices and personal protective equipment based on a risk assessment of material potency and exposure potential.
Conditions for safe storage, including any incompatibilities	Store in tight container as defined in the USP-NF. This material should be handled and stored per label instructions to ensure product integrity.

8. Exposure controls/personal protection

Occupational exposure limits

The following constituents are the only constituents of the product which have a PEL, TLV or other recommended exposure limit. At this time, the other constituents have no known exposure limits.

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Material	Type	Value
Phenol (CAS 108-95-2)	PEL	19 mg/m ³ 5 ppm

US. ACGIH Threshold Limit Values

Material	Type	Value
Phenol (CAS 108-95-2)	TWA	5 ppm

US. NIOSH: Pocket Guide to Chemical Hazards

Material	Type	Value
Phenol (CAS 108-95-2)	Ceiling	60 mg/m ³
		15.6 ppm
	TWA	19 mg/m ³
		5 ppm

Biological limit values

ACGIH Biological Exposure Indices

Material	Value	Determinant	Specimen	Sampling Time
Phenol (CAS 108-95-2)	250 mg/g	Phenol with hydrolysis	Creatinine in urine	*

* - For sampling details, please see the source document.

Exposure guidelines

US - California OELs: Skin designation

Phenol (CAS 108-95-2) Can be absorbed through the skin.

US - Minnesota Haz Subs: Skin designation applies

Phenol (CAS 108-95-2) Skin designation applies.

US - Tennessee OELs: Skin designation

Phenol (CAS 108-95-2) Can be absorbed through the skin.

US ACGIH Threshold Limit Values: Skin designation

Phenol (CAS 108-95-2) Can be absorbed through the skin.

US NIOSH Pocket Guide to Chemical Hazards: Skin designation

Phenol (CAS 108-95-2) Can be absorbed through the skin.

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Phenol (CAS 108-95-2) Can be absorbed through the skin.

Appropriate engineering controls

For laboratory operations, use good technique and limit open handling. Control exposures to below the occupational exposure level (if available). Select and use containment devices and personal protective equipment based on a risk assessment of exposure potential. Cover all containers for solutions and slurries while being transferred.

Individual protection measures, such as personal protective equipment

Eye/face protection

Wear safety glasses with side shields, chemical splash goggles, or full face shield, if necessary. Base the choice of protection on the job activity and potential for contact with eyes or face. An emergency eye wash station should be available.

Skin protection

Hand protection

Wear nitrile or other impervious gloves if skin contact is possible. When the material is dissolved or suspended in an organic solvent, wear gloves that provide protection against the solvent.

Other

Wear lab coat. Base the choice of skin protection on the job activity, potential for skin contact and solvents and reagents in use. Do not wear protective garments in common areas (e.g., cafeterias) or out-of-doors.

Respiratory protection

Respirators are generally not required for laboratory operations. Choose respiratory protection appropriate to the task and the level of existing engineering controls.

Thermal hazards

Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations

Handling practices in this SDS are recommendations for laboratory use of reference standards. Procedures for any other uses or quantities should be determined after an appropriate assessment.

9. Physical and chemical properties

Appearance

Appearance descriptions are general information and not specific to any USP lot.

Physical state

Solid.

Form

Crystals. Flakes.

Color

Colorless. White. Light pink.

Odor

Characteristic sweet, acrid odor.

Odor threshold

0.06 ppm (detectable) (AIHA)

pH

Not available.

Melting point/freezing point

104 - 109.4 °F (40 - 43 °C)

Initial boiling point and boiling range

359.6 °F (182 °C)

Flash point

Not available.

Evaporation rate

< 0.01 (butyl acetate = 1)

Flammability (solid, gas)

Not available.

Upper/lower flammability or explosive limits

Flammability limit - lower (%) > 1.3 %

Flammability limit - upper (%) 8.6 %

Explosive limit - lower (%) Not available.

Explosive limit - upper (%) Not available.

Vapor pressure 0.35 mm Hg (at 25 ° C)

Vapor density 3.24 (air = 1)

Relative density Not available.

Solubility(ies)

Solubility (water) Soluble.

Solubility (other) Alcohol: Very soluble.
Aqueous alkali hydroxides: Very soluble.
Benzene: Soluble.
Carbon disulfide: Very soluble.
Chloroform: Very soluble.
Ether: Very soluble.
Glycerol: Very soluble.
Petroleum ether: Almost insoluble.

Partition coefficient (n-octanol/water) 1.46

Auto-ignition temperature 1319 °F (715 °C)

Decomposition temperature Not available.

Viscosity Not available.

Other information

Chemical family Phenol.

Molecular formula C₆H₆O

Molecular weight 94.11

Percent volatile 0 %

pH in aqueous solution 6

10. Stability and reactivity

Reactivity The product is stable and non-reactive under normal conditions of use, storage and transport.

Chemical stability Material is stable under normal conditions.

Possibility of hazardous reactions No dangerous reaction known under conditions of normal use.

Conditions to avoid Contact with incompatible materials.

Incompatible materials Acids. Strong oxidizing agents. Calcium hypochlorite. Aluminum. Isocyanates.. Caustic solutions. Sodium nitrite. Aliphatic amines. Aluminum chloride. Butadiene. Nitrobenzene.

Hazardous decomposition products Irritating and/or toxic fumes or gases. Emits toxic fumes under fire conditions.

11. Toxicological information**Information on likely routes of exposure**

Inhalation Toxic if inhaled.

Skin contact Toxic in contact with skin. Causes severe skin burns.

Eye contact Causes serious eye damage.

Ingestion Toxic if swallowed. Causes digestive tract burns.

Symptoms related to the physical, chemical and toxicological characteristics Burning in mouth, throat, and/or stomach. Cough. Gastrointestinal disturbances. Loss of appetite. Dark urine. Rapid breathing. Difficulty breathing. Headache. Fast heartbeat. Excitement. Skin discoloration. Weight gain. Muscle pain. Insomnia. Blue or pale lips, fingernails, and skin. Stupor. Seizures.

Information on toxicological effects

Acute toxicity Toxic if swallowed. Toxic in contact with skin. Toxic if inhaled.

Product	Species	Test Results
Phenol (CAS 108-95-2)		
Acute		
Dermal		
LD50	Rabbit	630 mg/kg
	Rat	669 mg/kg
		525 mg/kg
Inhalation		
LC50	Rat	0.316 mg/l
Oral		
LD50	Rat	317 mg/kg
Skin corrosion/irritation	Causes severe skin burns.	
Serious eye damage/eye irritation	Causes serious eye damage.	
Local effects		
100 mg Eye Irritation		
Result: Corrosive. Not reversible.		
Species: Rabbit		
100 mg Irritancy test (standard Draize)		
Result: Irritant.		
Species: Rabbit		
Organ: Skin.		
Severity: Mild.		
5 mg Irritancy test (open Draize)		
Result: Irritant.		
Species: Rabbit		
Organ: Eyes.		
Test Duration: 30 seconds		
Severity: Mild.		
5 mg Irritancy test (standard Draize)		
Result: Irritant.		
Species: Rabbit		
Organ: Eyes.		
Severity: Severe.		
500 mg Skin irritation		
Result: Corrosive.		
Species: Rabbit		
535 mg Irritancy test (open Draize)		
Result: Irritant.		
Species: Rabbit		
Organ: Skin.		
Severity: Severe.		
Respiratory or skin sensitization		
Respiratory sensitization	Knowledge about sensitization hazard is incomplete.	
Skin sensitization	Based on available data, the classification criteria are not met.	
Ear Swelling Test		
Result: Non-sensitizing.		
Species: Mouse		
Organ: Skin.		
Maximization Test		
Result: Non-sensitizing.		
Species: Guinea pig		
Organ: Skin.		
Maximization Test		
Result: Non-sensitizing.		
Species: Human		
Organ: Skin.		
Germ cell mutagenicity	Suspected of causing genetic defects.	
Mutagenicity		
Ames Salmonella typhimurium assay		
Result: Negative (with and without activation).		

Mutagenicity

E. coli assay
Result: Negative.
In vitro chromosome aberration assays in developing mouse sperm cells
Result: Positive.
In vitro chromosome aberration assays in hamster ovary cells
Result: Positive.
In vitro sister chromatid exchange in human cells
Result: Positive.
In vivo chromosome aberration assays in rats and fish
Result: Positive.
Micronuclei induction in human peripheral lymphocytes
Result: Positive.
Micronuclei induction in mouse bone marrow cells
Result: Positive.
Severity: Weak.
Mouse lymphoma assay in L5178Y cells
Result: Positive.

Carcinogenicity Knowledge about carcinogenicity is incomplete.

0 - 5000 ppm Carcinogenicity study
Result: No carcinogenic effects.
Species: Mouse

IARC Monographs. Overall Evaluation of Carcinogenicity

Phenol (CAS 108-95-2) 3 Not classifiable as to carcinogenicity to humans.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not listed.

US. National Toxicology Program (NTP) Report on Carcinogens

Not listed.

Reproductive toxicity Based on available data, the classification criteria are not met.

Reproductivity

120 mg/kg Reproduction and development study
Result: Dose related fetotoxicity; no increase in malformations.
Species: Rat
280 mg/kg Reproduction and development study
Result: Dose related fetotoxicity; no increase in malformations.
Species: Mouse
280 mg/kg/day Reproduction and development study
Result: Fetotoxicity, maternal toxicity, slight increase in cleft palate in offspring.
Species: Mouse
53 mg/kg Reproduction and development study
Result: Decreased litter size, maternal toxicity, no increases in malformations.
Species: Rat

Specific target organ toxicity - single exposure Knowledge about health hazard is incomplete.

Specific target organ toxicity - repeated exposure May cause damage to organs through prolonged or repeated exposure.

Aspiration hazard Based on available data, the classification criteria are not met.

12. Ecological information

Ecotoxicity

Product	Species		Test Results
Phenol (CAS 108-95-2)			
Aquatic			
Crustacea	EC50	Water flea (Daphnia obtusa)	4.7 - 6.4 mg/l, 48 hours
Fish	LC50	Rainbow trout,donaldson trout (Oncorhynchus mykiss)	7.7 mg/l, 96 hours

Persistence and degradability No data is available on the degradability of this product.

Bioaccumulative potential

Octanol/water partition coefficient log K_{ow}

1.46

Mobility in soil

No data available.

Other adverse effects

No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal considerations

Disposal instructions

Dispose in accordance with all applicable regulations. Under RCRA, it is the responsibility of the user of the product to determine, at the time of disposal, whether the product meets RCRA criteria for hazardous waste.

Local disposal regulations

Dispose in accordance with all applicable regulations.

Hazardous waste code

The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

U188: Waste Phenol

US RCRA Hazardous Waste U List: Reference

Phenol (CAS 108-95-2)

U188

Waste from residues / unused products

Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

Contaminated packaging

Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14. Transport information

DOT

UN number	UN1671
UN proper shipping name	Phenol, solid
Transport hazard class(es)	
Class	6.1
Subsidiary risk	-
Packing group	II
Packaging exceptions	153
Packaging non bulk	212
Packaging bulk	242

IATA

UN number	UN1671
UN proper shipping name	Phenol, solid
Transport hazard class(es)	
Class	6.1
Subsidiary risk	-
Packing group	II
Other information	
Passenger and cargo aircraft	Allowed with restrictions.
Cargo aircraft only	Allowed with restrictions.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable.

DOT; IATA



General information

It is the shipper's responsibility to determine the correct transport classification at the time of shipment.

15. Regulatory information**US federal regulations**

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Toxic Substances Control Act (TSCA)**TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)**

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Phenol (CAS 108-95-2) Listed.

SARA 304 Emergency release notification

PHENOL (CAS 108-95-2) 1000 LBS

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not listed.

Superfund Amendments and Reauthorization Act of 1986 (SARA)**SARA 302 Extremely hazardous substance**

Chemical name	CAS number	Reportable quantity (pounds)	Threshold planning quantity (pounds)	Threshold planning quantity, lower value (pounds)	Threshold planning quantity, upper value (pounds)
Phenol	108-95-2	1000		500	10000

SARA 311/312 Hazardous chemical

Classified hazard categories Acute toxicity (any route of exposure)
Skin corrosion or irritation
Serious eye damage or eye irritation
Germ cell mutagenicity
Specific target organ toxicity (single or repeated exposure)

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
Phenol	108-95-2	100

Other federal regulations**Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List**

Phenol (CAS 108-95-2)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Clean Water Act (CWA) Section 112(r) (40 CFR 68.130) Hazardous substance
Priority pollutant
Toxic pollutant

Safe Drinking Water Act (SDWA) Not regulated.

FEMA Priority Substances Respiratory Health and Safety in the Flavor Manufacturing Workplace

Phenol (CAS 108-95-2) Low priority

US state regulations

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

California Proposition 65

US. California. Candidate Chemicals List. Safer Consumer Products Regulations (Cal. Code Regs, tit. 22, 69502.3, subd. (a))

Phenol (CAS 108-95-2)

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes

Country(s) or region	Inventory name	On inventory (yes/no)*
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
Taiwan	Taiwan Chemical Substance Inventory (TCSI)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date	06-08-2009
Revision date	06-01-2020
Version #	09
Further information	Refer to NFPA 654, Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids, for safe handling.
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