

Phenol Solution

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

1.1 Product identifier

Trade name: Phenol Solution
CAS 000108-95-2 (Phenol)
007732-18-5 (Water)
REACH registration No.: 01-2119471329-32-0002 (U.S.A.)

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

General use Phenol is an important raw material of the chemical industry. It is used for manufacturing of Bisphenol A, Phenol-Formaldehyde-Resins and Caprolactam. Furthermore it is used for manufacturing of Alkyl Phenols, Salicylic Acid and Nitrophenols.

Identified uses

1. Manufacture, processing and distribution of substances and mixtures *
2. Use in laboratories
3. Uses in coatings
4. Use as binders and release agents
5. Rubber production and processing
6. Polymer manufacturing
7. Polymer processing
8. Phenolic resin processing (uses of downstream users of phenolic resins)

* Examples for processing:
Use as an intermediate, use as a monomer etc., use as a solvent, use for the manufacturing of resins.

1.3 Details of the supplier of the safety data sheet

Company name: INEOS Phenol
Street Address: 7770 Rangeline Road
City/State/postal code: Theodore, Alabama 36582
World Wide Web: www.ineosphenol.com
Telephone: 251-443-3000
Fax: 251-443-3001

1.4 Emergency Telephone Numbers

24 Hour Emergency Number: 800-424-9300
24 Hour CHEMTREC Number: 800-424-9300 (USA)
703-527-3887 (International)
24 Hour Quantum Murray Number: 647-329-1054 (Canada)

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SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Global Harmonization System:

Physical Hazards: Flammable Liquid: Category 4 (Flash point $>60^{\circ}\text{C}$ and $\leq 93^{\circ}\text{C}$)

Health Hazards:

Acute Toxicity: Oral – Category 3 (see section 11)
Dermal – Category 3 (see section 11)
Inhalation – Category 3 (see section 11)

Skin Corrosion/Irritation: Corrosive 1B (causes severe skin burns and eye damage)

Mutagenicity: Category 2 (Suspected of causing genetic damage)

Specific Target Organ Toxicity – Repeated Exposure: Category 2 (may cause damage to organs through prolonged or repeated exposure)

Environmental Hazards:

Acute Toxicity: Category 2 - short term (fish)
See section 12 for additional information

Long Term Toxicity: Category Chronic 1 (fish)
See section 12 for additional information

2.2 Label elements

Labeling (CLP)



Signal word

Danger

Hazard statements

H227	Combustible liquid
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.
H401	Hazardous to the aquatic environment, acute hazard

Precautions

P210	Keep away from flames and hot surfaces. No smoking
P260	Do not breathe dust.
P280	Wear protective gloves/protective clothing/eye protection/ face protection.
P302+P352	IF ON SKIN: Wash with plenty of soap and water.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P309+P311	IF exposed or if concerned: Call a POISON CENTER or doctor/physician.
P273	Avoid release to the environment.

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SECTION 3: Composition/ information on ingredients

3.1 Substance (Mixture)

	Substance 1 - Phenol	Substance 2 - Water
Chemical characterization (substance):	C ₆ H ₆ O = C ₆ H ₅ OH Phenol, Hydrobenzene	H ₂ O Water
% (Wt/Wt)	85-95	5-15
CAS-Number	108-95-2	7732-18-5
EINECS-Number:	203-632-7	231-791-2
RTECS-Number	SJ3325000	ZC0110000
EU-number:	604-001-00-2	
Additional information:	Keep in cool, well ventilated place. Storage temperature below 60°C	

SECTION 4: First aid measures

4.1 Description of first aid measures

General information:	First-aid provider: Pay attention to self-protection! Protect yourself from exposure. Patient: Move into fresh air and keep victim calm. Remove contaminated clothing. If patient is at risk of losing consciousness, position and transport on their side.
After inhalation:	Provide for adequate fresh air. If breathing becomes irregular or difficult, give oxygen. If unconscious, evaluate artificial respiration immediately. Get immediate medical attention.
In case of skin contact:	Remove all contaminated clothing. Flush with water followed by polyethylene glycol and/or large quantities of water. Immediately get medical attention.
After eye contact:	Immediately flush eyes with plenty of flowing water for 10 to 15 minutes holding eyelids apart. Subsequently seek the immediate medical attention.
After ingestion:	Rinse mouth immediately and drink plenty of water. Do not induce vomiting. Immediately get medical attention.

4.2 Most important symptoms and effects, both acute and delayed

After contact with skin:
Rapid skin absorption is the main danger of phenol poisoning at the workplace with paralysis of the central nervous system and heart arrhythmias (with lethal consequences in severe cases) as well as liver and kidney damage.

4.3 Indication of any immediate medical attention and special treatment needed

Symptoms and dangers:
No specific antidote therapy for phenol poisoning is known. Therefore it is important to remove the phenol completely from the body surface and out of the body as quickly as possible, and in the case of inhalation prophylactic treatment to prevent pulmonary edema is important. Phenol causes strong caustic burns of the skin and mucous membranes due to its protein degenerating action. The skin initially discolors white, later red. After initial pain, local anesthesia appears. Absorption poisoning by large amounts of phenol is possible also through small affected skin regions and quickly leads to paralysis of the central nervous system as well as strong depression of the body temperature. Inhaling phenol vapors can lead to damage of the bronchial system and pulmonary edema. Systemic damage to kidneys, liver and heart as well as neuropsychiatric disturbances are produced.

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Treatment:

Thoroughly clean the wetted skin areas with water and if possible, apply polyethylene glycol (e.g. polyethylene glycol 300) intermittently with water washes. In case of eye contact, rinse copiously with water, in case of burns rinse continuously with water and seek medical attention. In case of inhalation, to prevent pulmonary edema, initiate inhalation cortisone therapy as early as possible (e.g. every 10 minutes 5 strokes of a cortisone containing aerosol dosing spray); administer codeine against dry coughing. In case of pulmonary edema, provide systemic administration of cortisone. If swallowed, gastric lavage after intubation activated charcoal, saline laxative.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing
media:

Extinguishing powder, alcohol resistant foam, carbon dioxide, water fog

Extinguishing media
that must not be used
for safety reasons:

Full water jet

5.2 Special hazards arising from the substance or mixture

Combustible liquid with vapors that is heavier than air. Vapors will spread at floor level which can travel to source of ignition and flashback.

Containers can build pressure if exposed to heat (fire). Cool with water spray. In case of fire, carbon monoxide and carbon dioxide will be liberated.

5.3 Advice for firefighters

Special protective
equipment for firefighters:

Wear a self-contained breathing apparatus and chemical protective clothing.

Additional information:

Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Fire residuals and contaminated extinguishing water must be disposed of in accordance with existing regulations of the local authorities.

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SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Remove all sources of ignition. Keep upwind.
Do not breathe vapors. Do not breathe dust. Avoid contact with the substance. Wear suitable protective clothing. Provide adequate ventilation.
Leaks may be repaired only with full protection (tightly closing chemical protection clothing, respirator equipment independent of the ambient air).

6.2 Environmental precautions

Do not allow to penetrate into soil, bodies of water or drains.
Danger to drinking water when soaking into the soil or waters. In case of entry into waterways, soil or drains, inform the responsible authorities.

6.3 Methods and material for containment and cleaning up

Allow the leaked product to solidify if this is possible without endangering people.
Take up mechanically, placing in appropriate containers for disposal.
Phenol, liquid: Collect spillage. Absorb with liquid-binding material (e.g. sand, diatomaceous earth, acid- or universal binding agents) and place in closed containers for disposal.
Collect the rinsing water when cleaning-down contaminated equipment and plant components
(to prevent phenol from escaping into deep soil layers).

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advices on safe handling Execute works under fume hood. Do not inhale substance.
Avoid contact with skin, eyes, and clothing.
The material is to be handled with extreme caution. Requires good ventilation.
Welding operations are permitted only under supervision.

Precautions against fire
and explosion:

Keep away from sources of ignition - No smoking.

7.2 Conditions for safe storage, including any incompatibilities

Requirements for
storerooms and
containers:

Keep container tightly closed.
Storage temperature:
Below 60 °C
Keep container in a well-ventilated place. Protect from light.
Material: steel or Refined steel.

Hints on joint storage

Keep locked up. Only trained personnel may be allowed to enter storage area.
Do not store together with food. Do not store together with: Solvent, aluminum, aldehydes, halogens, hydrogen peroxide, oxidizing agents, strong acids, strong bases, formaldehyde, nitrites, nitrates, halogenated, peroxide compounds.

Further details:

Reserved for industrial and professional use.

7.3 Specific end use(s)

Reserved for industrial and professional use.

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SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Phenol

Type	Limit	value
OSHA:	TWA/PEL	5 ppm or 19 mg/m ³ (skin)
ACGIH	TLV	5 ppm or 19 mg/m ³ (skin)
NIOSH	STEL/REL	15.6 ppm or 60 mg/m ³

Additional information: The IDLH is 250 ppm.

8.2 Exposure controls

Execute works under fume hood. Do not inhale substance.
The substance should only be handled in closed apparatus or systems. Process exhaust through separator/filter as needed.

Occupational exposure controls

- Respiratory protection: Respiratory protection must be worn whenever the permissible exposure limits have been exceeded.
NIOSH recommendations:
Up to 50 ppm: air purifying respirator with organic vapor cartridge in combination with N95, R95, or P95 filter.
Up to 125 ppm: supplied air respirator or powered air purifying respirator with organic vapor cartridge with high efficiency particulate filter.
Up to 250 ppm: supplied air respirator, powered air purifying respirator or any full face respirator with organic vapor cartridge and appropriate filter.
Emergency or planned entry into unknown or IDLH conditions: supplied air respirator in pressure positive mode.
- Hand protection: Protective gloves according to ASTM F 739 Permeation tests:
Glove material:
Neoprene - best
PVC - acceptable
Nitrile – not recommended
Observe glove manufacturer's instructions concerning penetrability and breakthrough time.
- Eye protection: Goggles or face protection shield.
- Body protection: Wear suitable protective clothing and chemical resistant safety shoes/boots.
- General protection and hygiene measures:
Take off immediately all contaminated clothing. When using do not eat, drink or smoke.
Have eye wash bottle or eye rinse ready at work place. Keep away from food, drink and animal feeding stuffs.
Have safety shower ready at work place in the event of skin contact.
Alternatives to the following personal protective measures can only be determined in agreement with responsible safety experts.

Environmental exposure controls

Operational conditions and risk management measures should focus on containment and prevention of exposure to air, land or water. Although phenol is biodegradable and bioaccumulation potential is low EPA has set regulatory limits for protection of human health. OSHA has set regulatory limits to protect workers from inhalation and skin exposure.

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SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Physical state:	liquid
Color:	colorless
Odor:	Pungent Aromatic Odor threshold: 0.022 - 22 mg/m ³
Boiling temperature / boiling point	181°C (357.8°F)
Freezing temperature /Freezing point	15°C (59°F)
Flash point- Closed cup	105°C (221°F)
Ignition temperature	716°C (1320°F)
Flammable limits:	LEL (Lower Explosion Limit): 1.70 Vol-% UEL (Upper Explosive Limit): 8.60 Vol-%
Vapor pressure:	at 20°C: 5.0 mbar
Density:	Is heavier than air
pH value:	at 20 °C, 10 g/L: 4-5
Water solubility:	at 20°C: 84 g/L at 25 °C: 87 g/L at 68°C: fully miscible
Partition coefficient n-octanol /water:	1.47 log P(o/w) (CPC) Appreciable bio-accumulation is not to be expected (log P (o/w 1-3).
Viscosity, dynamic:	at 50°C: 3,437 mPa*S

9.2 Other information

Molecular weight: 94.11 g/mol
Relative vapor density at 20°C (air=1): 3.2

SECTION 10: Stability and reactivity

10.1 Reactivity

No dangerous reactions are known.

10.2 Chemical stability

Hygroscopic

10.3 Possibility of hazardous reactions

No dangerous reactions are known.

10.4 Conditions to avoid

No decomposition when used properly.
It may react to form catechol, hydroquinone, as a result of radical formation.

10.5 Incompatible materials

Oxidizing agents, aldehydes, isocyanates, nitrites, nitrides, Friedel-Crafts catalysts.
Avoid ignitable vapor-air-mixtures.
Unsuitable materials Metals, Rubber, various plastics, alloys

10.6 Hazardous decomposition products

In case of fire may be liberated: carbon monoxide and carbon dioxide.

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SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity of Phenol:

LD50 Rat, oral: 340 mg/kg body weight
LDLo human, oral: 140 mg/kg body weight
LD50 Rat, dermal: 660 mg/kg body weight
LC50 Rat, inhalative: 316 mg/m³/4h

After inhalation: Toxic. Danger of serious damage to health by prolonged exposure.
The following symptoms may occur:
Mucous membrane irritation, cough, shortage of breath, damage of respiratory tract.

After swallowing: Toxic. Danger of serious damage to health by prolonged exposure.
Specific target organ toxicity: Harmful effects are not known.

In case of skin contact: Causes burns.

After eye contact: Causes burns.

Carcinogenic, germ cell mutagen and reproduction effects
Muta. 2 - Suspected of causing genetic defects.

Symptoms

After contact with skin:
Strong skin absorption as main danger of phenol poisoning at the workplace with
paralysis of the central nervous system (with lethal consequences in severe cases) as
well as liver and kidney damage

General remarks

Not known to cause sensitization.
Mutagenicity:
Bacterial mutagenicity: negative.
Chromosomal aberrations in-vitro: positive.
Micronucleus test: in-vitro: positive.
Gene-mutations mammalian cells in-vitro: positive.
Sister chromatid exchange in-vitro: positive.
Micronucleus test: in-vivo: weak positive.
Carcinogenicity:
Specific symptoms in animal studies: None carcinogenic effect.
Reproductive toxicity
Specific symptoms in animal studies: No reproductive hazards have been observed.

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SECTION 12: Ecological information

12.1 Toxicity

Material is moderately toxic to aquatic organisms on an acute basis (LC50/EC50 between 1 and 10 mg/L in most species tested). Category (Acute 2)

Aquatic toxicity:

Algae toxicity:

EC50 *Pseudokirchnerella subcapitata*, (freshwater, cell number): 61.1 mg/L/96h.

Bacterial toxicity:

IC50 *Nitrosomonas* sp: 21 mg/L/24h.

Daphnia toxicity:

EC50 *Ceriodaphnia dubia*: 3.1 mg/L/48h.

Fish toxicity:

LC50 *Oncorhynchus mykiss*: 8.9 mg/L/96h.

Long term fish toxicity:

60 d NOEC (*cirrhina mrigala*): 0.0077 mg/L

Water Hazard Class: Hazardous substance regulated by EPA under the Clean Water Act

12.2. Persistence and degradability

Further details:

Material is readily biodegradable based on OECD test(s)

Air (Indirect photodegradation by reaction with OH radicals.): half-life time approx. 14 hours

Water: Not susceptible to

hydrolysis. Biodegradation:

Activated sludge: 62 %/100h, readily biodegradable (OECD 301C).

Activated sludge: 85%/14d, rapidly biodegradable (OECD 301C).

12.3 Bioaccumulative potential

Low bioaccumulation potential.

Bioconcentration factor (BCF)

17.5

12.4 Mobility in soil

Mobility potential is high.

Koc: 82.8 l/kg (measured log Pow value of 1.47)

The soil sorption coefficient indicates a low sorption of phenol onto soil organic matter.

Evaporation rate (Volatilization) at 20°C: $H=0.022 \text{ Pa} \cdot \text{m}^3/\text{mol}$.

The calculated Henry's Law constant indicates a low to moderate volatility from aqueous solution.

12.5 Other adverse effects

General information: Do not allow to enter into ground-water, surface water or drains.

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SECTION 13: Disposal Considerations

13.1 Waste Disposal Information

Product

RCRA Waste Code U188 (commercial chemical product or off-spec commercial chemical product)
Recommendation: Dispose in accordance with all Federal, State, and local regulations or requirements.

Contaminated packaging

Recommendation: Handle contaminated packages in the same way as the substance itself.

SECTION 14: Transportation Information

14.1 UN Number and Proper Shipping Name

Liquid
UN2821
PHENOL, SOLUTIONS

14.2 Department of Transportation - Phenol Solutions

Proper shipping name: PHENOL, SOLUTIONS
UN 2821
Hazard class: 6.1
Packing group: PGII
Label codes: 6.1
Special provision: IB2, T7, TP2
Packaging exemptions: 153; Non-bulk: 202; Bulk: 243
Quality Limitations: Passenger aircraft/rail: 5L; Cargo aircraft only: 60L
Vessel stowage location: A

14.4 IMDG

Proper shipping name: PHENOL, SOLUTION
UN 2821
Hazard class: 6.1
Packing group: PGII
Quantity Limitations: 100mL limited quantities; E4 excepted quantities
Packing Instructions and provisions: P001
IBC Instructions: IBC02
Portable tank and bulk containers: Instructions T7; provisions TP2
EMS number: F-A, S-A
Stowage and segregation: Category A
Marine pollutant: No

14.5 IATA

Proper shipping name: PHENOL, SOLUTION
UN 2821
Hazard class: 6.1
Packing group: PGII
Hazard label: Toxic
Cargo Packing Instructions: 662
Passenger Packing Instructions: 654
Additional Information: RQ 1000 lbs for phenol

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SECTION 15: Regulatory information

15.1 U.S. Federal Regulations

OSHA:

This document has been prepared in accordance with the Safety Data Sheet (SDS) requirements of the OSHA Hazard Communications Standard and Global and Global Harmonization System (GHS)

EPA:

TSCA:

TSCA Inventory: (Phenol) listed
TSCA Section 8(b): (Water) listed
TSCA Section 12(b): (Phenol) Subject to export notification
TSCA HPVC: (Phenol) not listed

Clean Air Act: (Phenol)

Hazardous Air Pollutants: Listed Section 112 Hazardous air pollutants
SOCMI Chemical: yes

Clean Water Act: (Phenol)

Section 311: Hazardous Substance; RQ 1000 lbs.
Section 304(a): Priority Pollutant

SARA: (Phenol)

Section 302: EHS; TPQ 500/10000 lbs; RQ 1000lbs
Section 311/312: Hazard classifications: Immediate (acute), Fire
Section 313: Subject to Toxic Release Inventory (TRI) reporting

CERCLA: (Phenol)

RQ 1000 lbs

RCRA: (Phenol)

Listed as hazardous waste; classified as toxic waste and subject to the small quantity exclusion
U listed hazardous waste

EPA Pesticides (Phenol)

Listed as active ingredients
Listed as inert ingredients

Other: (Phenol)

Carcinogen Status:

IARC Rating: Group 3
OSHA Carcinogen: not listed
NTP Rating: not listed

NIOSH Recommendations: (Phenol)

Occupational Health Guideline 0493

SAFETY DATA SHEET

According to OSHA Global Harmonization Standard

INEOS Phenol

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15.2 U.S. State Regulations (Phenol)

New Jersey:

New Jersey Right-to-Know legislation: Phenol -Substance Number 1487, RTK Special Health Hazardous Substance

Pennsylvania:

Pennsylvania Worker and Community Right-To-Know Act: Listed as hazardous substance and/or the Pennsylvania Environmental Substance list.

California:

Proposition 65: This material contains no listed substances known to the State of California to cause cancer, birth defects or other reproductive harm, at levels which would require a warning under the requirements.

Louisiana Right-To-Know

List of Extremely Hazardous Substances; TQ 500 lbs.

Minnesota Right-To-Know

Listed on Chemicals of High Concern list.

New York Substance Release and Bulk Storage

List of hazardous substances.

Rhode Island

Listed on hazardous substances list.

15.3 International Regulations (Phenol)

Canada

Listed on National Pollutant Release Inventory.
On Workplace Hazardous Material Information System (WHMIS) ingredient list.

Mexico

Listed on Registry of Industrial Pollution and Transfer (RETC)

European Union

Listed on Pollutant Release and Transfer Registry (PRTR)

Singapore

List of Controlled Hazardous Substances

Japan

List of Priority Assessment Chemicals (PAC)

Hong Kong

Hazardous Chemicals Control Ordinance – Dangerous Goods list

Turkey

List of Priority Chemicals

India

List of Hazardous Chemicals

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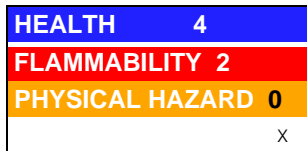
SECTION 16: Other Information

16.1 NFPA



NFPA Hazard Rating
Health: 4 (Severe)
Fire: 2 (Moderate)
Reactivity: 0 (Minimum)
Special Warnings: None

16.2 HMIS



HMIS Rating:
Health: 4 (Severe)
Flammability: 2 (Moderate)
Physical Hazard: 0 (Minimum)
Personal protection: X (consult your supervisor)

16.3 Disclaimer

INEOS Phenol provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. INEOS Phenol makes no representations or warranties, either expressed or implied, including without limitation any warranties of merchantability, fitness for a particular purpose with respect to the information set forth herein or the product which the information refers. Accordingly, INEOS Phenol will not be responsible for damages resulting from the use of or reliance upon this information.

