



# PHENOL, CRYSTALS

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## 1. Product Identification

**Synonyms:** Carbolic acid; Phenic acid; Phenylic acid; Hydroxybenzene; Phenol, fused; Monohydroxybenzene; Phenol, solid

**CAS No.:** 108-95-2

**Molecular Weight:** 94.11

**Chemical Formula:** C<sub>6</sub>H<sub>5</sub>OH

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## 2. Composition/Information on Ingredients

Ingredient	CAS No	Percent
Hazardous		
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Phenol	108-95-2	99 - 100%
Yes		

## 3. Hazards Identification

### Emergency Overview

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**POISON! DANGER! MAY BE FATAL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. RAPIDLY ABSORBED THROUGH SKIN. CORROSIVE. CAUSES SEVERE BURNS TO EVERY AREA OF CONTACT. AFFECTS CENTRAL NERVOUS SYSTEM, LIVER AND KIDNEYS. COMBUSTIBLE.**

**SAF-T-DATA<sup>(tm)</sup>** Ratings (Provided here for your convenience)

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Health Rating: 3 - Severe (Poison)

Flammability Rating: 2 - Moderate

Reactivity Rating: 1 - Slight

Contact Rating: 4 - Extreme (Corrosive)

Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD;  
PROPER GLOVES; CLASS B EXTINGUISHER

Storage Color Code: White Stripe (Store Separately)

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**Potential Health Effects**

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The major hazard of phenol is its ability to penetrate the skin rapidly, particularly when liquid, causing severe injury which can be fatal. Phenol also has a strong corrosive effect on body tissue causing severe chemical burns. Due to its local anesthetizing properties, skin burns may be painless.

**Inhalation:**

Breathing vapor, dust or mist results in digestive disturbances (vomiting, difficulty in swallowing, diarrhea, loss of appetite). Will irritate, possibly burn respiratory tract. Other symptoms listed under ingestion may also occur.

**Ingestion:**

Poison. Symptoms may include burning pain in mouth and throat, abdominal pain, nausea, vomiting, headache, dizziness, muscular weakness, central nervous system effects, increase in heart rate, irregular breathing, coma, and possibly death. Acute exposure is also associated with kidney and liver damage. Ingestion of 1 gram has been lethal to humans.

**Skin Contact:**

Corrosive. Rapidly absorbed through the skin with systemic poisoning effects to follow. Discoloration and severe burns may occur, but may be disguised by a loss in pain sensation.

**Eye Contact:**

Corrosive. Eye burns with redness, pain, blurred vision may occur. May cause severe damage and blindness.

**Chronic Exposure:**

Repeated exposure may cause symptoms described for acute poisoning as well as eye and skin discoloration.

**Aggravation of Pre-existing Conditions:**

Persons with pre-existing skin, eye or central nervous system disorders, or impaired liver, kidney, or pulmonary function may be more susceptible to the effects of this substance.

## **4. First Aid Measures**

IN CASE OF PHENOL POISONING, start first aid treatment immediately, then get medical attention. People administering first aid should take precautions to avoid contact with phenol. A phenol antidote kit (castor oil or other vegetable oil, polyethylene glycol 300) should be available in any phenol work area. Actions to be taken in case of phenol poisoning should be planned and practiced before beginning work with phenol. Castor oil and or polyethylene glycol can be given by a first responder before medical help arrives.

**Inhalation:**

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

**Ingestion:**

If swallowed, immediately administer castor oil or other vegetable oil. Never give anything by mouth to an unconscious person. Be ready to induce vomiting at the advice of physician or poison control center. Castor oil (or vegetable oil) dosage should be between 15 and 30 cc. Get medical attention immediately.

**Skin Contact:**

In case of skin contact, immediately flush skin with large amounts of water while removing contaminated clothing and shoes. As soon as possible, repeatedly apply polyethylene glycol to affected area. Destroy contaminated clothing and shoes. Flush skin with water for at least 30 minutes. It is very important to avoid rubbing or wiping affected parts which would aggravate irritation and cause product dispersion. Continue treatment until the burned area changes color from white to pink. Expect that this can take a long period of time (20 minutes or more). The polyethylene glycol application should be done during transportation to the hospital. If polyethylene glycol is not available, flush with water for at least 30 minutes prior to going to hospital. Get medical attention immediately.

**Eye Contact:**

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

**Note to Physician:**

Treat ingestion with gastric lavage using 40% aqueous Bacto-Peptune, milk or water until phenolic odor is eliminated. Then give 15 to 50 cc castor or vegetable oil. Debride necrotic skin. Monitor vital signs, fluid status, electrolytes, BUN, renal and hepatic function, and electrocardiogram. Manage sedation, seizures, renal failure, and fluid electrolyte imbalances symptomatically as indicated.

## 5. Fire Fighting Measures

**Fire:**

Flash point: 79C (174F) CC

Autoignition temperature: 715C (1319F)

Flammable limits in air % by volume:

l<sub>el</sub>: 1.3; u<sub>el</sub>: 8.6

Combustible. Contact with strong oxidizers may cause fire.

**Explosion:**

Above flash point, vapor-air mixtures are explosive within flammable limits noted above.

Sealed containers may rupture when heated.

**Fire Extinguishing Media:**

Water spray, dry chemical, alcohol foam, or carbon dioxide. Water spray may be used to keep fire exposed containers cool.

**Special Information:**

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Structural firefighter's protective clothing is ineffective for fires involving this material. Stay away from sealed containers.

## 6. Accidental Release Measures

Remove all sources of ignition. Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Clean up spills in a manner that does not disperse dust into the air. Use non-sparking tools and equipment. Reduce airborne dust and prevent scattering by moistening with water. Pick up spill for recovery or disposal and place in a closed container. Do not flush to the sewer. Dry lime or soda ash may be used on spill for neutralization. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

## 7. Handling and Storage

Keep in a tightly closed container. Store in a cool, dry, ventilated area away from sources of heat or ignition. Protect against physical damage. Store separately from reactive or combustible materials, and out of direct sunlight. Avoid dust formation and control ignition sources. Employ grounding, venting and explosion relief provisions in accord with accepted engineering practices in any process capable of generating dust and/or static electricity. Empty only into inert or non-flammable atmosphere. Emptying contents into a non-inert atmosphere where flammable vapors may be present could cause a flash fire or explosion due to electrostatic discharge. All phenol workers should be properly trained on its hazards and the proper protective measures required. This training should also include emergency actions. All phenol operations should be enclosed to eliminate any potential exposure routes. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

## 8. Exposure Controls/Personal Protection

**Airborne Exposure Limits:**

Phenol:

-OSHA Permissible Exposure Limit (PEL):

5 ppm (TWA) (skin)

-ACGIH Threshold Limit Value (TLV):

5 ppm (TWA) (skin)

**Ventilation System:**

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

**Personal Respirators (NIOSH Approved):**

If the exposure limit is exceeded, a full facepiece respirator with organic vapor cartridge and dust/mist filter may be worn up to 50 times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. **WARNING:** Air purifying respirators do not protect workers in oxygen-deficient atmospheres.

**Skin Protection:**

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact. Butyl rubber and neoprene are suitable materials for personal protective equipment.

**Eye Protection:**

Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

## 9. Physical and Chemical Properties

**Appearance:**

Colorless to light pink crystals.

**Odor:**

Sharp, medicinal, sweet, tarry.

**Solubility:**

1 g/15 ml of water; very soluble in alcohol.

**Specific Gravity:**

1.06 @ 20C/4C

**pH:**

ca. 6.0 Aqueous solution

**% Volatiles by volume @ 21C (70F):**

100

**Boiling Point:**

182C (360F)

**Melting Point:**

43C (109F)

**Vapor Density (Air=1):**

3.2

**Vapor Pressure (mm Hg):**

0.4 @ 20C (68F)

**Evaporation Rate (BuAc=1):**

< 0.01

## 10. Stability and Reactivity

### **Stability:**

Stable under ordinary conditions of use and storage. Heat will contribute to instability.

### **Hazardous Decomposition Products:**

Carbon dioxide and carbon monoxide may form when heated to decomposition. Toxic gases and vapors may be released if involved in a fire.

### **Hazardous Polymerization:**

Will not occur.

### **Incompatibilities:**

Oxidizers, aluminum chloride and nitrobenzene, calcium hypochlorite, butadiene, halogens, formaldehyde, mineral oxidizing acids, isocyanates, sodium nitrite and many other materials. Hot liquid phenol will attack aluminum, magnesium, lead, and zinc metals.

### **Conditions to Avoid:**

Heat, flames, ignition sources and incompatibles.

## 11. Toxicological Information

Oral rat LD50: 317 mg/Kg; skin rabbit LD50:630 mg/kg; inhalation rat LC50: 316 mg/m<sup>3</sup>; irritation data: skin rabbit, standard Draize, 500 mg/24H severe; eye rabbit, standard Draize 5 mg/30S rinse, mild. Investigated as a tumorigen, mutagen, reproductive effector.

-----\Cancer Lists\-----			
Ingredient Category	---NTP Carcinogen---		IARC
	Known	Anticipated	
Phenol (108-95-2)	No	No	3

## 12. Ecological Information

### **Environmental Fate:**

When released into the soil, this material is expected to readily biodegrade. When released into the soil, this material is not expected to leach into groundwater. When released into the soil, this material may evaporate to a moderate extent. When released into the soil, this material is expected to have a half-life between 1 and 10 days. When released into water, this material is expected to readily biodegrade. When released into water, this material is not expected to evaporate significantly. When released into water, this material is expected to have a half-life between 10 and 30 days. This material has an estimated bioconcentration factor (BCF) of less than 100. This material is not expected to

significantly bioaccumulate. When released into the air, this material is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material may be moderately degraded by photolysis. When released into the air, this material is expected to have a half-life of less than 1 day.

**Environmental Toxicity:**

This material is expected to be toxic to aquatic life. The LC50/96-hour values for fish are between 10 and 100 mg/l.

### 13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

### 14. Transport Information

**Domestic (Land, D.O.T.)**

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**Proper Shipping Name:** PHENOL, SOLID  
**Hazard Class:** 6.1  
**UN/NA:** UN1671  
**Packing Group:** II  
**Information reported for product/size:** 2.5KG

**International (Water, I.M.O.)**  
**Proper Shipping Name:** PHENOL, SOLID  
**Hazard Class:** 6.1  
**UN/NA:** UN1671  
**Packing Group:** II  
**Information reported for product/size:** 2.5KG

### 15. Regulatory Information

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-----\Chemical Inventory Status - Part 1\-----
Ingredient                                TSCA  EC    Japan
Australia
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Phenol (108-95-2)                         Yes   Yes   Yes
Yes
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-----\Chemical Inventory Status - Part 2\-----
Ingredient                                Korea  DSL  NDSL
Phil.                                     --Canada--
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Phenol (108-95-2)	Yes	Yes	No
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Yes

-----\Federal, State & International Regulations - Part 1\-----			
	-SARA 302-	-----SARA	
313-----			
Ingredient	RQ	TPQ	List
Chemical Catg.			
Phenol (108-95-2)	1000	500*	Yes

No

-----\Federal, State & International Regulations - Part 2\-----			
	-RCRA-		-
TSCA-			
Ingredient	CERCLA	261.33	8(d)
Phenol (108-95-2)	1000	U188	No

Chemical Weapons Convention: No      TSCA 12(b): No      CDTA: No  
 SARA 311/312: Acute: Yes      Chronic: Yes      Fire: Yes      Pressure: No  
 Reactivity: No      (Pure / Solid)

**Australian Hazchem Code: 2X**

**Poison Schedule: S6**

**WHMIS:**

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

## 16. Other Information

**NFPA Ratings:** Health: 4 Flammability: 2 Reactivity: 0

**Label Hazard Warning:**

POISON! DANGER! MAY BE FATAL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. RAPIDLY ABSORBED THROUGH SKIN. CORROSIVE. CAUSES SEVERE BURNS TO EVERY AREA OF CONTACT. AFFECTS CENTRAL NERVOUS SYSTEM, LIVER AND KIDNEYS. COMBUSTIBLE.

**Label Precautions:**

- Do not breathe dust.
- Do not get in eyes, on skin, or on clothing.
- Keep container closed.
- Use only with adequate ventilation.
- Wash thoroughly after handling.
- Keep away from heat, sparks and flame.

**Label First Aid:**

IN ALL CASES, GET MEDICAL ATTENTION IMMEDIATELY. KEEP A PHENOL



ANTIDOTE KIT in area of product use or storage. Administer castor oil and/or polyethylene glycol per pre-planned directions. If swallowed, immediately administer castor oil or other vegetable oil. Never give anything by mouth to an unconscious person. In case of skin contact, immediately flush skin with large amounts of water while removing contaminated clothing and shoes. As soon as possible, repeatedly apply polyethylene glycol to affected area. Destroy contaminated clothing and shoes. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of eye contact, immediately flush eyes with plenty of water for at least 15 minutes while lifting lower and upper eyelids.

**Product Use:**

Laboratory Reagent.

**Revision Information:**

No Changes.

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