

ADVENTURES IN CHEMICAL SAFETY

Common Name: PHENOL

CHARACTERISTICS

CAS NUMBER

CHEMICAL FORMULA

SYNONYMS

FLAMMABILITY

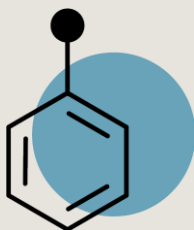
INFORMATION

108-95-2

C_6H_6O

Carbolic acid, Benzenol, Hydroxybenzene

Combustible Solid



PHENOL IS AN AROMATIC ORGANIC COMPOUND. PURE PHENOL IS A WHITE CRYSTALLINE SOLID THAT IS VOLATILE. IT IS MILDLY ACIDIC AND REQUIRES CAREFUL HANDLING DUE TO ITS PROPENSITY TO CAUSE CHEMICAL BURNS.



HAZARD PROFILE

GHS CLASSIFICATION

Signal Word: **Danger**

Pictograms

Hazard Classifications*

*For GHS the lower category number signifies more severity of hazard



Toxic

Acute toxicity (oral, dermal, inhalation), **category 3**



Corrosive

Skin corrosion, **category 1B**

Serious eye damage, **category 1**



Health hazard

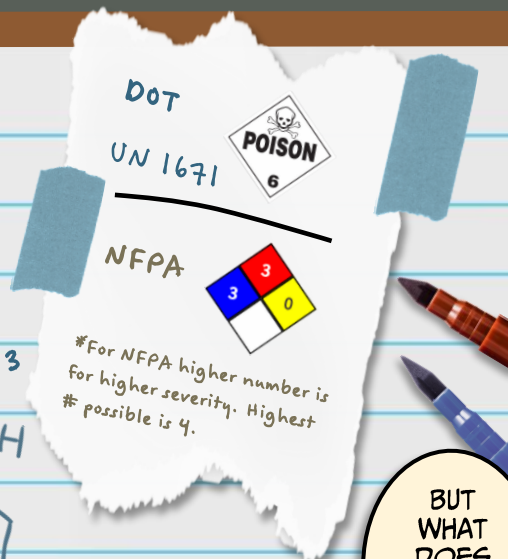
Germ cell mutagenicity, **category 2**

Specific target organ toxicity following repeat exposure, **category 2**

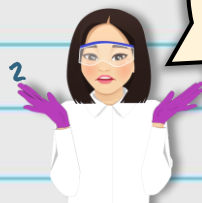


Environmentally damaging

Chronic hazards to the aquatic environment, **category 3**



BUT
WHAT
DOES
THIS
REALLY
MEAN?



Contact with eyes may cause severe damage and blindness.



Contact with skin may cause severe burns, although it may not cause immediate pain due to its local anesthetic effect.

- A whitening of the contact area generally occurs, with severe burns developing later.
- This can cause systemic poisoning
- Toxic or fatal amounts can be absorbed through relatively small areas.



Phenol is acutely toxic. Death can occur rapidly following ingestion.

- Symptoms include irritation, swelling, burns and damage to the mouth, throat and stomach, internal bleeding, vomiting, diarrhea, decreased blood pressure, shock, collapse, coma and death.



Irritation to the lungs causing coughing and/or shortness of breath.

- Higher exposures may cause a build-up of fluid in the lungs (pulmonary edema).

VARIOUS CONTROLS ARE UTILIZED TO PROTECT RESEARCHERS FROM THE HAZARDS OF THE MATERIALS THEY ARE WORKING WITH.

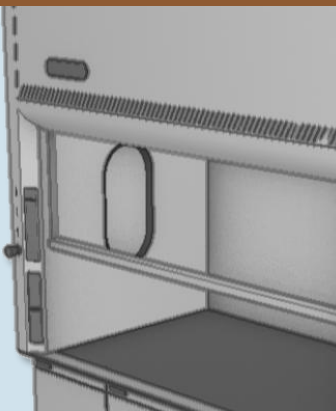
THESE INCLUDE:

- ENGINEERING CONTROLS
- ADMINISTRATIVE CONTROLS
- PERSONAL PROTECTIVE EQUIPMENT (PPE)

ENGINEERING CONTROL

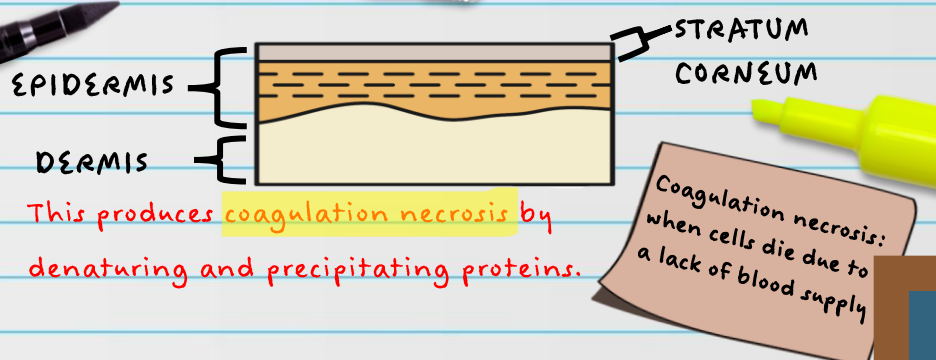
Using a fume hood is strongly recommended when handling phenol.

Small-scale, time-limited use of phenol in the open lab is permissible.



HOW DOES PHENOL DAMAGE SKIN AND TISSUE?

Phenol impairs the stratum corneum



RECOMMENDED PPE

- Lab coat
- Goggles + Face shield
- Double gloves

A WORD ABOUT GLOVES.

DISPOSABLE NEOPRENE GLOVES PROVIDE SOMEWHAT GREATER PROTECTION THAN NITRILE, BUT GLOVES MUST STILL BE CHANGED OFTEN.



DERMAL EXPOSURE (SMALL SURFACE AREA)

1. Remove contaminated clothing.
2. Have a lab buddy call 911.
3. Have a lab buddy Put on safety glasses and silver shield gloves.
4. Pour polyethylene glycol liberally on to one of the gauze pads.
5. Gently wipe off excessive phenol on exposed area.
 - Discard the gauze pad in the small plastic bag in the kit.
6. Repeat steps 3 and 4 until First Responders arrive.

ALL OTHER EXPOSURES

Flush with water in an eyewash or emergency shower station for at least 15 minutes and call 911 immediately.

Phenol Skin (Dermal) Exposure

First Aid Kit:

1. Pre-packaged gauze pads, 4" x 4" (~10)
2. Polyethylene Glycol 300 or 400, 500 mL (~ 1 pint) USP or NF
3. Laminate film gloves (Silver Shield gloves) 1-2 pairs
4. SOP Phenol Use
5. Small plastic bag (for collecting waste gauze pads)
6. Large plastic zip lock bag big enough to hold items above

REFERENCES

1. BROWN VK, BOX VL, SIMPSON BJ. DECONTAMINATION PROCEDURES FOR SKIN EXPOSED TO PHENOLIC SUBSTANCES. ARCH ENVIRON HEALTH. 1975 JAN;30(1):1-6. DOI: 10.1080/00039896.1975.10666623. PMID: 1109265.
2. HORCH R, SPILKER G, STARK GB. PHENOL BURNS AND INTOXICATIONS. BURNS. 1994 FEB;20(1):45-50. DOI: 10.1016/0305-4179(94)90105-8. PMID: 8148075.
3. MONTEIRO-RIVIERE NA, INMAN AO, JACKSON H, DUNN B, DIMOND S. EFFICACY OF TOPICAL PHENOL DECONTAMINATION STRATEGIES ON SEVERITY OF ACUTE PHENOL CHEMICAL BURNS AND DERMAL ABSORPTION: IN VITRO AND IN VIVO STUDIES IN PIG SKIN. TOXICOL IND HEALTH. 2001 MAY;17(4):95-104. DOI: 10.1191/0748233701TH0950A. PMID: 12479505.
4. PULLIN TG, PINKERTON MN, JOHNSTON RV, KILIAN DJ. DECONTAMINATION OF THE SKIN OF SWINE FOLLOWING PHENOL EXPOSURE: A COMPARISON OF THE RELATIVE EFFICACY OF WATER VERSUS POLYETHYLENE GLYCOL/INDUSTRIAL METHYLATED SPIRITS. TOXICOL APPL PHARMACOL. 1978 JAN;43(1):199-206. DOI: 10.1016/S0041-008X(78)80044-1. PMID: 625760.