# MATERIAL SAFETY DATA SHEET

according to the Hazard Communication Standard (29 CFR 1910.1200)

Date of issue: 09/17/2012 Version 1.0

## SECTION 1. Identification

### Product identifier

Product number 822296

Product name Phenol for synthesis

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

Identified uses Chemical for synthesis

### Details of the supplier of the safety data sheet

Company EMD Millipore Corporation | 290 Concord Road, Billerica, MA 01821, United States of America | SDS Phone Support: +1-978-715-1335 | General Inquiries: +1-978-715-4321 | Monday to Friday, 9:00 AM to 4:00 PM Eastern Time (GMT-5)

e-mail: mm_sds@merckgroup.com

**Emergency telephone** 800-424-9300 CHEMTREC (USA)
+1-703-527-3887 CHEMTREC (International)
24 Hours/day; 7 Days/week

## SECTION 2. Hazards identification

### GHS Classification

Acute toxicity, Category 3, Inhalation, H331
Acute toxicity, Category 3, Oral, H301
Acute toxicity, Category 3, Dermal, H311
Skin corrosion, Category 1B, H314
Germ cell mutagenicity, Category 2, H341
Specific target organ systemic toxicity - repeated exposure, Category 2, H373

For the full text of the H-Statements mentioned in this Section, see Section 16.

### GHS-Labeling

*Hazard pictograms*

*Signal Word*
Danger

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

*Precautionary Statements*
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P301 + P330 + P331 IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
P309 IF exposed or if you feel unwell:
P310 Immediately call a POISON CENTER or doctor/ physician.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

**OSHA Hazards**
This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

**Other hazards**
None known.

## SECTION 3. Composition/information on ingredients

| | | |
|---|---|---|
| Formula | $C_6H_5OH$ | $C_6H_6O$ (Hill) |
| CAS-No. | 108-95-2 | |
| Molar mass | 94.11 g/mol | |

**Hazardous ingredients**
*Chemical Name ( Concentration)*
CAS-No.
*Phenol ( <= 100 % )*
108-95-2

## SECTION 4. First aid measures

**Description of first-aid measures**

*General advice*
First aider needs to protect himself.

*Inhalation*
After inhalation: fresh air. If breathing stops: immediately apply artificial respiration, if necessary also oxygen. Call a physician immediately.

*Skin contact*
After contact with skin: rinse out with polyethylene glycol 400 or a mixture of polyethylene glycol 300/ethanol 2:1 and wash with plenty of water. If neither is available wash with plenty of water. Immediately take off contaminated clothing. Seek medical advice immediately.

*Eye contact*
After eye contact: rinse out with plenty of water. Immediately call in ophthalmologist.

*Ingestion*
If swallowed: give water to drink (two glasses at most). Seek medical advice immediately. In exceptional cases only, if medical care is not available within one hour, induce vomiting (only in persons who are wide awake and fully conscious), administer activated charcoal (20 - 40 g in a 10% slurry) and consult a doctor as quickly as possible. Subsequently administer: activated charcoal (20 - 40 g in 10% slurry).

Never give anything by mouth to an unconscious person.

**Most important symptoms and effects, both acute and delayed**
Irritation and corrosion, Cough, Shortness of breath, respiratory arrest, Drowsiness, Dizziness, Unconsciousness, inebriation, cardiovascular disorders, collapse, Headache, confusion, death
Risk of blindness!

**Indication of any immediate medical attention and special treatment needed**
No information available.

## SECTION 5. Fire-fighting measures

**Extinguishing media**
*Suitable extinguishing media*
Water, Carbon dioxide ($CO_2$), Foam, Dry powder

*Unsuitable extinguishing media*
For this substance/mixture no limitations of extinguishing agents are given.

**Special hazards arising from the substance or mixture**
Combustible material, Vapors are heavier than air and may spread along floors.
Forms explosive mixtures with air on intense heating.
Development of hazardous combustion gases or vapors possible in the event of fire.

**Advice for firefighters**
*Special protective equipment for fire-fighters*
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

*Further information*
Prevent fire extinguishing water from contaminating surface water or the ground water system.

## SECTION 6. Accidental release measures

**Personal precautions, protective equipment and emergency procedures**
Advice for non-emergency personnel: Avoid inhalation of vapors/aerosols or dusts. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.

Advice for emergency responders: Protective equipment see section 8.

**Environmental precautions**
Do not empty into drains.

**Methods and materials for containment and cleaning up**
Cover drains. Collect, bind, and pump off spills.
Observe possible material restrictions (see sections 7 and 10).

Depending on the state of matter, take up dry or with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

## SECTION 7. Handling and storage

### Precautions for safe handling

Work under hood. Do not inhale substance/mixture.

Observe label precautions.

### Conditions for safe storage, including any incompatibilities

Protected from light. Dry. Tightly closed. Keep in a well-ventilated place. Keep locked up or in an area accessible only to qualified or authorized persons.

Store at +15°C to +25°C (+59°F to +77°F).

## SECTION 8. Exposure controls/personal protection

### Exposure limit(s)

*Ingredients*

| Basis | Value | Threshold limits | Remarks |
|---|---|---|---|
| *Phenol 108-95-2* | | | |
| ACGIH | Time Weighted Average (TWA): | 5 ppm | |
| | Skin designation: | | Can be absorbed through the skin. |
| NIOSH/GUIDE | Skin designation: | | Can be absorbed through the skin. |
| | Ceiling Limit Value and Time Period (if specified): | 15.6 ppm<br>60 mg/m³ | Ceiling Limit Value 15-min |
| | Recommended exposure limit (REL): | 5 ppm<br>19 mg/m³ | |
| OSHA_TRANS | Skin designation: | | Can be absorbed through the skin. |
| | PEL: | 5 ppm<br>19 mg/m³ | |
| Z1A | Time Weighted Average (TWA): | 5 ppm<br>19 mg/m³ | |
| | Skin designation (Final Rule Limit applies): | | Can be absorbed through the skin. |

### Engineering measures

Technical measures and appropriate working operations should be given priority over the use of personal protective equipment.

### Individual protection measures

Protective clothing should be selected specifically for the workplace, depending on concentration and quantity of the hazardous substances handled. The chemical resistance of the protective equipment should be inquired at the respective supplier.

*Hygiene measures*

Immediately change contaminated clothing. Apply skin- protective barrier cream. Wash hands and face after working with substance. Work under hood. Do not inhale substance/mixture.

*Eye/face protection*
Tightly fitting safety goggles

*Hand protection*
Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Recommended:

full contact:

| | |
|---|---|
| Glove material: | Viton (R) |
| Glove thickness: | 0.70 mm |
| Break through time: | > 480 min |

splash contact:

| | |
|---|---|
| Glove material: | Viton (R) |
| Glove thickness: | 0.70 mm |
| Break through time: | > 480 min |

*Other protective equipment:*
protective clothing

*Respiratory protection*
required when dusts/vapors/aerosols are generated.
Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

## SECTION 9. Physical and chemical properties

| | |
|---|---|
| Physical state | solid |
| Color | colorless |
| Odor | characteristic |
| Odor Threshold | No information available. |
| pH | ca. 5<br>at 50 g/l<br>68 °F ( 20 °C) |
| Melting point | 105.4 °F ( 40.8 °C) |
| Boiling point/boiling range | 359.2 °F ( 181.8 °C)<br>at 1,013 hPa |
| Flash point | 178 °F ( 81 °C)<br>Method: c.c. |
| Evaporation rate | No information available. |

| | |
|---|---|
| Flammability (solid, gas) | No information available. |
| Lower explosion limit | 1.3 %(V) |
| Upper explosion limit | 9.5 %(V) |
| Vapor pressure | 0.2 hPa<br>at 68 °F ( 20 °C) |
| Relative vapor density | 3.24 |
| Relative density | 1.06 g/cm³<br>at 68 °F ( 20 °C) |
| Water solubility | 84 g/l<br>at 68 °F ( 20 °C) |
| Partition coefficient: n-octanol/water | log Pow: 1.46<br>(experimental)<br>(Lit.) Bioaccumulation is not expected (log Pow <1). |
| Autoignition temperature | No information available. |
| Decomposition temperature | No information available. |
| Viscosity, dynamic | 3.437 mPa.s<br>at 122 °F ( 50 °C) |
| Ignition temperature | 1103 °F ( 595 °C)<br>Method: DIN 51794 |
| Bulk density | ca. 620 kg/m³ |

## SECTION 10. Stability and reactivity

### Reactivity

Forms explosive mixtures with air on intense heating.
The following applies in general to flammable organic substances and mixtures: in correspondingly fine distribution, when whirled up a dust explosion potential may generally be assumed.

### Chemical stability

Sensitivity to light

### Possibility of hazardous reactions

Exothermic reaction with:

Aluminum, Aldehydes, halogens, hydrogen peroxide, iron(III) compounds, Oxidizing agents, Strong acids, Strong bases, formaldehyde

Risk of explosion with:

nitrites, nitrates, salts of oxyhalogenic acids, peroxi compounds

**Conditions to avoid**
Strong heating.
A range from approx. 15 Kelvin below the flash point is to be rated as critical.

**Incompatible materials**
rubber, various plastics, Metals, various alloys

**Hazardous decomposition products**
no information available

## SECTION 11. Toxicological information

**Information on toxicological effects**

*Likely route of exposure*
Eye contact, Skin contact, Ingestion

*Target Organs*
Eyes
Skin
Respiratory system
Liver
Kidneys

*Acute oral toxicity*
LD50 rat: 317 mg/kg (RTECS)
Symptoms: If ingested, severe burns of the mouth and throat, as well as a danger of perforation of the esophagus and the stomach.
LDLO human: 140 mg/kg (RTECS)

*Acute inhalation toxicity*
LC50 rat: 0.316 mg/l; 4 h (RTECS)
Symptoms: burns of mucous membranes, Cough, Shortness of breath
Corrosive to respiratory system

*Acute dermal toxicity*
LD50 rat: 525 - 714 mg/kg
(IUCLID)

absorption

*Skin irritation*
rabbit
Result: Causes burns.
(IUCLID)
Causes burns.

*Eye irritation*
rabbit
Result: Causes burns.
(IUCLID)

Causes serious eye damage.
Risk of blindness!

*Sensitization*
Sensitization test: guinea pig
Result: negative
(IUCLID)

*Genotoxicity in vitro*
Mutagenicity (mammal cell test):
Result: positive
(National Toxicology Program)

Ames test
Salmonella typhimurium
Result: negative
(National Toxicology Program)

Mutagenicity (mammal cell test): chromosome aberration.
Result: positive
(National Toxicology Program)

*CMR effects*
Mutagenicity:
Suspected of causing genetic defects.

*Specific target organ systemic toxicity - single exposure*
The substance or mixture is not classified as specific target organ toxicant, single exposure.

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

*Aspiration hazard*
Regarding the available data the classification criteria are not fulfilled.

**Carcinogenicity**

| | |
|---|---|
| IARC | No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC. |
| OSHA | No ingredient of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA. |
| NTP | No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP. |
| ACGIH | No ingredient of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH. |

**Further information**
After absorption:

Systemic effects:
Headache, Drowsiness, inebriation, confusion, Unconsciousness, Dizziness, cardiovascular disorders, collapse, Changes in the blood count, respiratory arrest, death, Possible risk of irreversible effects.
Damage to:
Liver, Kidney, Cardiac
Further data:
This substance should be handled with particular care.

## SECTION 12. Ecological information

### Ecotoxicity

*Toxicity to fish*
LC50 Oncorhynchus mykiss (rainbow trout): 5.0 mg/l; 96 h (ECOTOX Database)

*Toxicity to daphnia and other aquatic invertebrates*
EC50 Daphnia magna (Water flea): 4.2 mg/l; 48 h (ECOTOX Database)

EC5 E.sulcatum: 33 mg/l; 72 h (IUCLID) (maximum permissible toxic concentration)

*Toxicity to algae*
IC50 Pseudokirchneriella subcapitata (green algae): 150 mg/l; 96 h
OECD Test Guideline 201

IC5 Scenedesmus quadricauda (Green algae): 7.5 mg/l; 8 d (IUCLID) (maximum permissible toxic concentration)

*Toxicity to bacteria*
EC5 Pseudomonas putida: 64 mg/l; 16 h (IUCLID) (maximum permissible toxic concentration)

EC50 activated sludge: 766 mg/l; 3 h
OECD Test Guideline 209

### Persistence and degradability

*Biodegradability*
100 %; 6 d
OECD Test Guideline 302B
Easily eliminable.

85 %; 14 d
OECD Test Guideline 301C
Readily biodegradable.

*Biochemical Oxygen Demand (BOD)*
1,680 mg/g ( 5 d)
(IUCLID)

*Chemical Oxygen Demand (COD)*
2,300 mg/g
(IUCLID)

### Bioaccumulative potential

*Partition coefficient: n-octanol/water*
log Pow: 1.46
(experimental)
(Lit.) Bioaccumulation is not expected (log Pow <1).

### Mobility in soil

No information available.

### Other adverse effects

*Additional ecological information*
Biological effects:
Forms corrosive mixtures with water even if diluted. Endangers drinking-water supplies if allowed to enter soil or water. Change in the flavor characteristics of fish protein.
Further information on ecology
Discharge into the environment must be avoided.

## SECTION 13. Disposal considerations

The information presented only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations. Disposal should be in accordance with applicable regional, national and local laws and regulations.

## SECTION 14. Transport information

### Land transport (DOT)

| | |
|---|---|
| **UN number** | UN 1671 |
| **Proper shipping name** | PHENOL, SOLID |
| **Class** | 6.1 |
| **Packing group** | II |
| **Environmentally hazardous** | -- |

### Air transport (IATA)

| | |
|---|---|
| **UN number** | UN 1671 |
| **Proper shipping name** | PHENOL, SOLID |
| **Class** | 6.1 |
| **Packing group** | II |
| **Environmentally hazardous** | -- |
| **Special precautions for user** | no |

### Sea transport (IMDG)

| | |
|---|---|
| **UN number** | UN 1671 |
| **Proper shipping name** | PHENOL, SOLID |
| **Class** | 6.1 |
| **Packing group** | II |
| **Environmentally hazardous** | -- |
| **Special precautions for user** | yes |
| EmS | F-A S-A |

## SECTION 15. Regulatory information

### United States of America

**OSHA Hazards**

Highly toxic by inhalation
Toxic by ingestion
Toxic by skin absorption
Corrosive to skin
Corrosive to eyes
Corrosive by inhalation.
Mutagen
Target organ effects

This information is based on 29 CFR 1910.1200 criteria prior to adoption of the GHS, and may deviate from the GHS information on the label and in section 2.

**SARA 311/312 Hazards**

Acute Health Hazard
Chronic Health Hazard

**Clean Water Act**

The following Hazardous Substances are listed under the U.S. CleanWater Act, Section 311, Table 116.4A:
*Ingredients*
Phenol

The following Hazardous Chemicals are listed under the U.S. CleanWater Act, Section 311, Table 117.3:
*Ingredients*
Phenol

**Massachusetts Right To Know**

*Ingredients*
Phenol

**Pennsylvania Right To Know**

*Ingredients*
Phenol

**New Jersey Right To Know**

*Ingredients*
Phenol

### California Prop 65 Components

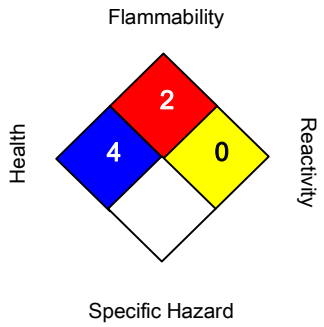
This product does not contain any chemicals known to the State of California to cause cancer, birth, or any other reproductive defects.

### Notification status

| | |
|---|---|
| TSCA: | On TSCA Inventory |
| DSL: | All components of this product are on the Canadian DSL. |

## SECTION 16. Other information

### National Fire Protection Association (U.S.A)




### Training advice

Provide adequate information, instruction and training for operators.

### Full text of H-Statements referred to under sections 2 and 3.

| | |
|---|---|
| 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. |

### Key or legend to abbreviations and acronyms used in the safety data sheet

Used abbreviations and acronyms can be looked up at www.wikipedia.org.