SAFETY DATA SHEET

According to OSHA Hazard Communication Standard, 29 CFR 1910.1200

Phenol Sustainable

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SECTION 1. IDENTIFICATION

Product name : Phenol Sustainable

Product code : S1252

CAS-No. : 108-95-2
Other means of identification : Hydroxybenzene, Phenyl hydroxide, Phenylic acid

Manufacturer or supplier's details

Company : **Shell Chemical LP**
PO Box 576
HOUSTON TX 77001
USA

SDS Request : 1-800-240-6737

Customer Service : 1-855-697-4355

Emergency telephone number

Chemtrec Domestic (24 hr) : 1-800-424-9300

Chemtrec International (24 hr) : 1-703-527-3887

Recommended use of the chemical and restrictions on use

Recommended use : Use as an intermediate in industrial chemicals manufacture.

Restrictions on use : Restricted to professional users., This product must not be used in applications other than the above without first seeking the advice of the supplier., Do not use in the manufacture or preparation of foods, drugs, or cosmetics.

SECTION 2. HAZARDS IDENTIFICATION

GHS classification in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200)

Flammable liquids : Category 4

Acute toxicity (Oral) : Category 3

Acute toxicity (Dermal) : Category 3

Acute toxicity (Inhalation) : Category 3

Skin corrosion : Category 1B

Serious eye damage	:	Category 1
Germ cell mutagenicity	:	Category 2
Specific target organ toxicity - repeated exposure	:	Category 2 (Kidney, Liver, Skin, Respiratory system, Heart)

GHS label elements

Hazard pictograms :

Signal word : Danger

Hazard statements :

PHYSICAL HAZARDS:
H227 Combustible liquid.
HEALTH HAZARDS:
H301 Toxic if swallowed.
H311 Toxic in contact with skin.
H314 Causes severe skin burns and eye damage.
H318 Causes serious eye damage.
H331 Toxic if inhaled.
H341 Suspected of causing genetic defects.
H373 May cause damage to organs (Kidney, Liver, Skin, Respiratory system, Heart) through prolonged or repeated exposure.
ENVIRONMENTAL HAZARDS:
Not classified as an environmental hazard under GHS criteria.

Precautionary statements :

Prevention:

P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P210 Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.
P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264 Wash hands thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response:

P370+P378 In case of fire: Use appropriate media for extinction.
P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P310 Immediately call a POISON CENTER or doctor/ physician.
P312 Call a POISON CENTER/doctor if you feel unwell.
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P303 + P361 + P353 IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/

shower.
P330 Rinse mouth.
P304 + P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P321 Specific treatment (see supplemental first aid instructions on this label).
P361 Take off immediately all contaminated clothing.

Storage:

P403 + P233 Store in a well-ventilated place. Keep container tightly closed.
P235 Keep cool.
P405 Store locked up.

Disposal:

P501 Dispose of contents/ container to an approved waste disposal plant.

Other hazards which do not result in classification

Risk of explosion if heated under confinement.
Even with proper grounding and bonding, this material can still accumulate an electrostatic charge.
If sufficient charge is allowed to accumulate, electrostatic discharge and ignition of flammable air-vapour mixtures can occur.
The classification of this material is based on OSHA HCS 2012 criteria.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Substance

Hazardous components

Chemical name	Synonyms	CAS-No.	Concentration (% w/w)
Phenol	Hydroxybenzene	108-95-2	<= 100

SECTION 4. FIRST-AID MEASURES

General advice : DO NOT DELAY.
Keep victim calm. Obtain medical treatment immediately.

If inhaled : Call emergency number for your location / facility.
Remove to fresh air. Do not attempt to rescue the victim unless proper respiratory protection is worn. If the victim has difficulty breathing or tightness of the chest, is dizzy, vomiting, or unresponsive, give 100% oxygen with rescue breathing or Cardio-Pulmonary Resuscitation as required and transport to the nearest medical facility.

In case of skin contact	:	Call emergency number for your location / facility. DO NOT DELAY. Rescuers should AVOID DIRECT CONTACT. Rescuers should wear protective clothing and gloves while treating patients whose skin is contaminated with phenol. Rapid skin decontamination is critical. To remove phenol from a small affected body area (10% of body area or less, e.g. a finger, hand or arm), remove any contaminated clothing and swab the area promptly and repeatedly with cotton soaked in PEG-300 or PEG-400 (polyethylene glycol-300 or 400). If possible, immerse the contaminated area directly in PEG-300 or PEG-400. If a larger body area has been contaminated, immediately remove all phenol-contaminated clothing and shoes under a shower with lukewarm, gently flowing water. After several minutes flushing, decontaminate the affected areas with repeated swabbing or spraying with PEG-300 or PEG-400. If PEG-300 or PEG-400 is not available, do not delay removing contaminated clothing and flushing the affected area with lukewarm, gently flowing water for at least 60 minutes. DO NOT INTERRUPT FLUSHING. Transport to the nearest medical facility for additional treatment. Double-bag contaminated clothing and personal belongings for disposal. All burns should receive medical attention.
In case of eye contact	:	Immediately flush eye(s) with plenty of water. Remove contact lenses, if present and easy to do. Continue rinsing. Transport to the nearest medical facility for additional treatment. All burns should receive medical attention.
If swallowed	:	Call emergency number for your location / facility. If swallowed, do not induce vomiting: transport to nearest medical facility for additional treatment. If vomiting occurs spontaneously, keep head below hips to prevent aspiration. Rinse mouth. Do not induce vomiting. If victim is alert, rinse mouth and drink 1/2 to 1 glass of water to help dilute the material. Do not give liquids to a drowsy, convulsing, or unconscious person. Transport to nearest medical facility for additional treatment.
Most important symptoms and effects, both acute and delayed	:	Phenol can be rapidly absorbed through skin causing systemic poisoning and possibly death. Phenol has local anesthetic properties, and can cause extensive damage before pain is felt. Corrosive to skin. Contact with the skin can cause chemical burns, redness, swelling, and tissue damage. Corrosive to eyes. Contact can cause severe eye damage including chemical burns, pain, clouding of the eye surface, inflammation of the eye, and may result in permanent loss of vision. Swallowing of corrosive chemicals may cause immediate pain and burning in the mouth, throat, and stomach followed by

vomiting and diarrhea.

Burns and tearing of the esophagus and stomach are possible.
Respiratory irritation signs and symptoms may include a temporary burning sensation of the nose and throat, coughing, and/or difficulty breathing.
Kidney damage may be indicated by changes in urine output or appearance, pain upon urination or in the lower back, or general oedema (swelling from fluid retention).

Liver damage may be indicated by loss of appetite, jaundice (yellowish skin and eye colour), fatigue, bleeding or easy bruising and sometimes pain and swelling in the upper right abdomen.

Heart damage may be evidenced by shortness of breath and, in severe cases, by collapse (cardiac arrest).
Breathing of high vapour concentrations may cause central nervous system (CNS) depression resulting in dizziness, lightheadedness, headache, nausea and loss of coordination. Continued inhalation may result in unconsciousness and death.
Symptoms may vary by the agent. Symptoms may extend to being locally corrosive to involving generalized systems including respiratory system, circulatory system, central nervous system (CNS), and may lead to death.

Protection of first-aiders	:	When administering first aid, ensure that you are wearing the appropriate personal protective equipment according to the incident, injury and surroundings.
Indication of any immediate medical attention and special treatment needed	:	IMMEDIATE TREATMENT IS EXTREMELY IMPORTANT! Artificial respiration and/or oxygen may be necessary. Call a doctor or poison control center for guidance. Treat symptomatically. Transport to the nearest medical facility for additional treatment. Absorption through the skin may occur on prolonged or repeated exposure.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable extinguishing media	:	Alcohol-resistant foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only.
Unsuitable extinguishing media	:	Do not use water in a jet.
Specific hazards during fire-fighting	:	Material will not burn unless preheated. Carbon monoxide may be evolved if incomplete combustion occurs.

Specific extinguishing methods	:	Standard procedure for chemical fires.
Further information	:	Clear fire area of all non-emergency personnel. Keep adjacent containers cool by spraying with water.
Special protective equipment for firefighters	:	Proper protective equipment including chemical resistant gloves are to be worn; chemical resistant suit is indicated if large contact with spilled product is expected. Self-Contained Breathing Apparatus must be worn when approaching a fire in a confined space. Select fire fighter's clothing approved to relevant Standards (e.g. Europe: EN469).

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	Observe all relevant local and international regulations. Avoid inhaling vapour and/or mists. Stay upwind and keep out of low areas. Avoid contact with the skin. Isolate hazard area and deny entry to unnecessary or unprotected personnel. Notify authorities if any exposure to the general public or the environment occurs or is likely to occur. Local authorities should be advised if significant spillages cannot be contained. Avoid contact with skin, eyes and clothing. Isolate hazard area and deny entry to unnecessary or unprotected personnel. Do not breathe fumes, vapour. Do not operate electrical equipment.
Environmental precautions	:	Remove all possible sources of ignition in the surrounding area. Use appropriate containment to avoid environmental contamination. Prevent from spreading or entering drains, ditches or rivers by using sand, earth, or other appropriate barriers. Attempt to disperse the vapour or to direct its flow to a safe location, for example by using fog sprays. Take precautionary measures against static discharge. Ensure electrical continuity by bonding and grounding (earthing) all equipment. Ventilate contaminated area thoroughly.
Methods and materials for containment and cleaning up	:	If molten allow to congeal. Attempt to disperse the vapour or to direct its flow to a safe location, for example by using fog sprays. Do not use water in a jet. For large liquid spills (> 1 drum), transfer by mechanical means such as vacuum truck to a salvage tank for recovery or safe disposal. Do not flush away residues with water. Retain as contaminated waste. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely For small liquid spills (< 1 drum), transfer by mechanical

means to a labeled, sealable container for product recovery or safe disposal. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely.

Additional advice : For guidance on selection of personal protective equipment see Section 8 of this Safety Data Sheet.
For guidance on disposal of spilled material see Section 13 of this Safety Data Sheet.

Proper disposal should be evaluated based on regulatory status of this material (refer to Section 13), potential contamination from subsequent use and spillage, and regulations governing disposal in the local area.

U.S. regulations may require reporting releases of this material to the environment which exceed the reportable quantity (refer to Section 15) to the National Response Center at (800) 424-8802.

SECTION 7. HANDLING AND STORAGE

Technical measures : Avoid breathing of or direct contact with material. Only use in well ventilated areas. Wash thoroughly after handling. For guidance on selection of personal protective equipment see Section 8 of this Safety Data Sheet.
Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material.
Ensure that all local regulations regarding handling and storage facilities are followed.

Advice on safe handling : Avoid exposure. Obtain special instructions before use.
Avoid inhaling vapour and/or mists.
Ventilate workplace in such a way that the Occupational Exposure Limit (OEL) is not exceeded.
Extinguish any naked flames. Do not smoke. Remove ignition sources. Avoid sparks.
Electrostatic discharge may cause fire. Ensure electrical continuity by bonding and grounding (earthing) all equipment to reduce the risk.
The vapours in the head space of the storage vessel may lie in the flammable/explosive range and hence may be flammable.
Do not empty into drains.

Avoidance of contact : Aluminum
Zinc.
Avoid contact with strong oxidizing agents, copper and copper alloys.
Avoid contact with calcium hypochlorite.

Product Transfer	:	Lines should be purged with nitrogen before and after product transfer. Steam coils may be used as a heating medium. Refer to guidance under Handling section.
Conditions for safe storage	:	Refer to section 15 for any additional specific legislation covering the packaging and storage of this product.
Further information on storage stability	:	A reliable fixed sprinkler/deluge system should be installed. Must be stored in a diked (bunded) well- ventilated area, away from sunlight, ignition sources and other sources of heat. Tanks must be specifically designed for use with this product. Tanks should be fitted with a vapour recovery system. Nitrogen blanket recommended. Tanks should be fitted with heating coils in areas where ambient conditions can result in handling temperatures below the freezing point/pour point of the product. Cleaning, inspection and maintenance of storage tanks is a specialist operation, which requires the implementation of strict procedures and precautions. These include issuing of work permits, gas-freeing of tanks, using a manned harness and lifelines and wearing air-supplied breathing apparatus.
Packaging material	:	Suitable material: Stainless steel. Unsuitable material: Aluminium alloys., Copper., Zinc., For containers, or container linings avoid copper, copper alloys, zinc., For lines and fittings, avoid copper, copper alloys, zinc., Natural and synthetic rubbers.
Container Advice	:	Containers, even those that have been emptied, can contain explosive vapours. Do not cut, drill, grind, weld or perform similar operations on or near containers.
Specific use(s)	:	Not applicable
		Ensure that all local regulations regarding handling and storage facilities are followed. See additional references that provide safe handling practices for liquids that are determined to be static accumulators: American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practices on Static Electricity). IEC/TS 60079-32-1: Electrostatic hazards, guidance

SECTION 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value type	Control parame-	Basis

		(Form of exposure)	ters / Permissible concentration	
Phenol	108-95-2	TWA	5 ppm	ACGIH
Phenol		TWA	5 ppm 19 mg/m3	OSHA Z-1

Biological occupational exposure limits

Components	CAS-No.	Control parameters	Biological specimen	Sampling time	Permissible concentration	Basis
Phenol	108-95-2	Phenol	Urine	End of shift (As soon as possible after exposure ceases)	250 mg/g creatinine	ACGIH BEI

Monitoring Methods

Monitoring of the concentration of substances in the breathing zone of workers or in the general workplace may be required to confirm compliance with an OEL and adequacy of exposure controls. For some substances biological monitoring may also be appropriate.
Validated exposure measurement methods should be applied by a competent person and samples analysed by an accredited laboratory.
Examples of sources of recommended exposure measurement methods are given below or contact the supplier. Further national methods may be available.
National Institute of Occupational Safety and Health (NIOSH), USA: Manual of Analytical Methods http://www.cdc.gov/niosh/
Occupational Safety and Health Administration (OSHA), USA: Sampling and Analytical Methods http://www.osha.gov/
Health and Safety Executive (HSE), UK: Methods for the Determination of Hazardous Substances http://www.hse.gov.uk/
Institut für Arbeitsschutz Deutschen Gesetzlichen Unfallversicherung (IFA) , Germany http://www.dguv.de/inhalt/index.jsp
L'Institut National de Recherche et de Securité, (INRS), France http://www.inrs.fr/accueil

Engineering measures : Use sealed systems as far as possible.
Adequate explosion-proof ventilation to control airborne concentrations below the exposure guidelines/limits.
Local exhaust ventilation is recommended.
Eye washes and showers for emergency use.
Firewater monitors and deluge systems are recommended.
The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances.
Appropriate measures include:

The American Industrial Hygiene Association has established emergency response planning guidelines (ERPG) for phenol. These guidelines are estimates of concentration ranges which alone could reasonably anticipate observing adverse effects.
Phenol ERPG-1, 10 ppm, is a maximum airborne concentra-

tion below which individuals could be exposed for up to 1 hour without experiencing mild transient health effects.
Phenol, ERPG-2, 50 ppm, is a maximum airborne concentration below which it is believed that an individual could be exposed for up to 1 hour without experiencing or developing irreversible or other serious health effects.
Phenol ERPG-3, 200 ppm, is a maximum airborne concentration below which it is believed that individuals could be exposed for up to 1 hour without experiencing or developing life threatening health effects.

Personal protective equipment

Respiratory protection : In accordance with good industrial hygiene practices, precautions should be taken to avoid breathing of material.
If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation.
Check with respiratory protective equipment suppliers.
Where air-filtering respirators are unsuitable (e.g. airborne concentrations are high, risk of oxygen deficiency, confined space) use appropriate positive pressure breathing apparatus.
Where air-filtering respirators are suitable, select an appropriate combination of mask and filter.
Where respiratory protective equipment is required, use a full-face mask.
Select a filter suitable for organic gases and vapours [boiling point >65 °C (149 °F)].

Respirator selection, use and maintenance should be in accordance with the requirements of the OSHA Respiratory Protection Standard, 29 CFR 1910.134.

Hand protection

Remarks : Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, dexterity. Always seek advice from glove suppliers. Contaminated gloves should be replaced. Where hand contact with the product may occur the use of gloves approved to relevant standards (e.g. Europe: EN374, US: F739) made from the following materials may provide suitable chemical protection. Longer term protection: Viton. Butyl rubber. Incidental contact/Splash protection: Nitrile rubber gloves.
Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturizer is recommended.
For continuous contact we recommend gloves with breakthrough time of more than 240 minutes with preference for > 480 minutes where suitable gloves can be identified. For short-term/splash protection we recommend the same but

recognize that suitable gloves offering this level of protection may not be available and in this case a lower breakthrough time maybe acceptable so long as appropriate maintenance and replacement regimes are followed. Glove thickness is not a good predictor of glove resistance to a chemical as it is dependent on the exact composition of the glove material. Glove thickness should be typically greater than 0.35 mm depending on the glove make and model. When handling heated product, wear heat resistant gloves, safety hat with chin strap, face shield (preferably with a chin guard), safety glasses, heat resistant coveralls (with cuffs over gloves and legs over boots), neck protection and heavy duty boots, e.g. leather for heat resistance.

Eye protection : Wear goggles for use against liquids and gas, combined with face shield.

Skin and body protection : Where risk of splashing or in spillage clean up, use chemical resistant one-piece overall with integral hood, chemical resistant knee length boots and chemical resistant gloves. Otherwise use chemical resistant apron and gauntlets.
When handling heated product, wear heat resistant gloves, safety hat with chin strap, face shield (preferably with a chin guard), safety glasses, heat resistant coveralls (with cuffs over gloves and legs over boots), neck protection and heavy duty boots, e.g. leather for heat resistance.

Protective measures : Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.

Thermal hazards : When handling heated product, wear heat resistant gloves, safety hat with chin strap, face shield (preferably with a chin guard), safety glasses, heat resistant coveralls (with cuffs over gloves and legs over boots), neck protection and heavy duty boots, e.g. leather for heat resistance.

Hygiene measures : Wash hands before eating, drinking, smoking and using the toilet.

Environmental exposure controls

General advice : Local guidelines on emission limits for volatile substances must be observed for the discharge of exhaust air containing vapour.
Take appropriate measures to fulfill the requirements of relevant environmental protection legislation. Avoid contamination of the environment by following advice given in Section 6. If necessary, prevent undissolved material from being discharged to waste water. Waste water should be treated in a municipal or industrial waste water treatment plant before discharge to surface water.
Information on accidental release measures are to be found in section 6.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	White crystals below 109º F. Clear liquid on melting.
Colour	:	Data not available
Odour	:	Phenolic, sweet
Odour Threshold	:	< 0.05 ppm
pH	:	Data not available
Melting point/freezing point	:	Typical 40.7 °C / 105.3 °F
Boiling point/boiling range	:	181 °C / 358 °F
Flash point	:	79.4 °C / 174.9 °F Method: Tag closed cup
Evaporation rate	:	Data not available
Flammability		
Flammability (solid, gas)	:	Not applicable
Lower explosion limit and upper explosion limit / flammability limit		
Upper explosion limit / upper flammability limit	:	8.6 %(V)
Lower explosion limit / Lower flammability limit	:	1.5 %(V)
Vapour pressure	:	0.35 kPa (50 °C / 122 °F)
Relative vapour density	:	3.2
Relative density	:	1.1 Method: ASTM D4052
Density	:	1,071 kg/m3 (20 °C / 68 °F) Method: ASTM D4052
Solubility(ies)		
Water solubility	:	Moderate
Partition coefficient: n-octanol/water	:	log Pow: < 1.47
Auto-ignition temperature	:	716 °C / 1321 °F
Decomposition temperature	:	Data not available

Viscosity		
Viscosity, dynamic	:	3.6 mPa.s (50 °C / 122 °F) Method: ASTM D445 < 50 mPa.s (41 °C / 106 °F) Method: ASTM D445
Viscosity, kinematic	:	3.4 mm2/s (50 °C / 122 °F) Method: ASTM D445 1.1 mm2/s (100 °C / 212 °F) Method: ASTM D445 2.6 mm2/s (60 °C / 140 °F) Method: ASTM D445 4.2 mm2/s (41 °C / 106 °F) Method: ASTM D445
Explosive properties	:	Not applicable
Oxidizing properties	:	Data not available
Surface tension	:	Data not available
Conductivity	:	3.5 µS/cm (50 °C / 122 °F) Method: ASTM D-4308 Electrical conductivity: > 10,000 pS/m A number of factors, for example liquid temperature, presence of contaminants, and anti-static additives can greatly influence the conductivity of a liquid, This material is not expected to be a static accumulator.
Molecular weight	:	94.1 g/mol
Particle size	:	Data not available

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	The product does not pose any further reactivity hazards in addition to those listed in the following sub-paragraph.
Chemical stability	:	No hazardous reaction is expected when handled and stored according to provisions Reacts with strong oxidising agents.

Possibility of hazardous reactions	:	Stable under normal conditions.
Conditions to avoid	:	Exposure to air. Exposure to sunlight. Do not store or handle in aluminium equipment at temperatures above 120 ºF (48.9 ºC). Prevent vapour accumulation. Avoid heat, sparks, open flames and other ignition sources. In certain circumstances product can ignite due to static electricity.
Incompatible materials	:	Aluminum Zinc. Avoid contact with strong oxidizing agents, copper and copper alloys. Avoid contact with calcium hypochlorite.
Hazardous decomposition products	:	Hazardous decomposition products are not expected to form during normal storage.

SECTION 11. TOXICOLOGICAL INFORMATION

Basis for assessment	:	Information given is based on product testing. Unless indicated otherwise, the data presented is representative of the product as a whole, rather than for individual component(s).

Information on likely routes of exposure
Skin and eye contact are the primary routes of exposure although exposure may occur through inhalation or following accidental ingestion.
This material penetrates the intact skin and eye rapidly as a liquid or mist, producing severe burns.

Acute toxicity

Components:

Phenol:

Acute oral toxicity	:	LD 50 (Rat): 340 - 530 mg/kg Method: Test(s) equivalent or similar to OECD Test Guideline 401 Remarks: Toxic if swallowed.
Acute inhalation toxicity	:	LC 50 (Rat, female): > 900 mg/m3 Exposure time: 8 h Test atmosphere: Aerosol Method: Test(s) equivalent or similar to OECD Test Guideline 403 Remarks: Toxic if inhaled.
Acute dermal toxicity	:	LD 50 (Rat, female): 660 mg/kg bw Method: Test(s) equivalent or similar to OECD Test Guideline 402 Remarks: Toxic in contact with skin.

Skin corrosion/irritation

Components:

Phenol:
Species: Rabbit
Method: Acceptable non-standard method.
Remarks: Causes severe skin burns and eye damage., Contact with hot material can cause thermal burns which may result in permanent skin damage and/or blindness.

Serious eye damage/eye irritation

Components:

Phenol:
Species: Rabbit
Method: Test(s) equivalent or similar to OECD Test Guideline 405
Remarks: Causes serious eye irritation., Contact with hot material can cause thermal burns which may result in permanent skin damage and/or blindness.

Respiratory or skin sensitisation

Components:

Phenol:
Species: Guinea pig
Method: Test(s) equivalent or similar to OECD Test Guideline 406
Remarks: Based on available data, the classification criteria are not met.

Germ cell mutagenicity

Components:

Phenol:

Genotoxicity in vitro	:	Method: Test(s) equivalent or similar to OECD Test Guideline 473 Remarks: Suspected of causing genetic defects.
	:	Method: Test(s) equivalent or similar to OECD Test Guideline 476 Remarks: Suspected of causing genetic defects.
	:	Method: Test(s) equivalent or similar to OECD Test Guideline 487 Remarks: Suspected of causing genetic defects.
Genotoxicity in vivo	:	Test species: Mouse Method: Test(s) equivalent or similar to OECD Test Guideline 474 Remarks: Suspected of causing genetic defects.
Germ cell mutagenicity- Assessment	:	This product does not meet the criteria for classification in categories 1A/1B.

Carcinogenicity

Components:

Phenol:
Species: Rat, (male and female)
Application Route: Oral
Method: Test(s) equivalent or similar to OECD Test Guideline 453
Remarks: Based on available data, the classification criteria are not met., IARC Group 3: Not classifiable as to its carcinogenicity to humans.

Carcinogenicity - Assessment	:	This product does not meet the criteria for classification in categories 1A/1B.

IARC	No component 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 component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.
NTP	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

Reproductive toxicity

Components:

Phenol:

Effects on fertility	:	Species: Rat Sex: male and female Application Route: Oral Method: Equivalent or similar to OECD Test Guideline 416 Remarks: Based on available data, the classification criteria are not met.
Effects on foetal development	:	Species: Rat, female Application Route: Oral Method: Test(s) equivalent or similar to OECD Test Guideline 414 Remarks: Based on available data, the classification criteria are not met.
Reproductive toxicity - Assessment	:	This product does not meet the criteria for classification in categories 1A/1B.

STOT - single exposure

Components:

Phenol:
Remarks: Based on available data, the classification criteria are not met.

STOT - repeated exposure

Components:

Phenol:
Target Organs: Kidney, Liver, Skin, Central nervous system
Remarks: May cause damage to organs or organ systems through prolonged or repeated exposure., Kidney: can cause kidney damage., Liver: can cause liver damage., Respiratory system: caused breathing difficulty in animals., Heart: can cause heart damage

Repeated dose toxicity

Components:

Phenol:
Species: Rat, male and female
Application Route: Oral
Method: Test(s) equivalent or similar to OECD Test Guideline 451
Target Organs: Kidney, Liver, Skin, Central nervous system

Species: Rat, male and female
Application Route: Inhalation
Test atmosphere: vapour
Method: Test(s) equivalent or similar to OECD Test Guideline 412
Target Organs: Kidney, Liver, Skin, Central nervous system

Species: Rabbit
Application Route: Dermal
Method: Literature data
Target Organs: Kidney, Liver, Skin, Central nervous system

Aspiration toxicity

Components:

Phenol:
Based on available data, the classification criteria are not met.

Further information

Components:

Phenol:
Remarks: Classifications by other authorities under varying regulatory frameworks may exist.

SECTION 12. ECOLOGICAL INFORMATION

Basis for assessment : Incomplete ecotoxicological data are available for this product. The information given below is based partly on a knowledge of the components and the ecotoxicology of similar products. Unless indicated otherwise, the data presented is representative of the product as a whole, rather than for individual com-

ponent(s).

Ecotoxicity

Components:

Phenol:

Toxicity to fish (Acute toxicity)	:	LC50 (Oncorhynchus mykiss (rainbow trout)): 8.9 mg/l Exposure time: 96 h Method: Other guideline method. Remarks: Very toxic. Remarks: LL/EL/IL50 > 1 <= 10 mg/l
Toxicity to daphnia and other aquatic invertebrates (Acute toxicity)	:	EC50 (Ceriodaphnia dubia (water flea)): 3.1 mg/l Exposure time: 48 h Method: Other guideline method. Remarks: Very toxic. Remarks: LL/EL/IL50 > 1 <= 10 mg/l
Toxicity to algae (Acute toxicity)	:	EC50 (Pseudokirchneriella subcapitata (algae)): 61.1 mg/l Exposure time: 96 h Method: Other guideline method. Remarks: Harmful Exposure time: Remarks: LL/EL/IL50 >10 <= 100 mg/l
Toxicity to fish (Chronic toxicity)	:	NOEC (Mrigal (Cirrhinus mrigala)): 0.077 mg/l Exposure time: 60 d Method: Other guideline method. Remarks: Data not available
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	NOEC (Daphnia magna (Water flea)): 0.46 mg/l Exposure time: 16 d Method: Other guideline method. Remarks: Data not available
Toxicity to microorganisms (Acute toxicity)	:	IC50 (Nitrosomonas): 21 mg/l Exposure time: 24 h Method: Other guideline method. Remarks: Harmful Remarks: LL/EL/IL50 >10 <= 100 mg/l

Persistence and degradability

Components:

Phenol:

Biodegradability	:	Biodegradation: 62 % Exposure time: 100 h Method: OECD Test Guideline 301C

Remarks: Readily biodegradable.

Bioaccumulative potential

Components:

Phenol:

Bioaccumulation : Species: Danio rerio (zebra fish)
Bioconcentration factor (BCF): 17.5
Method: OECD Test Guideline 305
Remarks: Contains components with the potential to bioaccumulate.

Mobility in soil

Components:

Phenol:

Mobility : Remarks: If the product enters soil, one or more constituents will or may be mobile and may contaminate groundwater.

Other adverse effects

Components:

Phenol:

Results of PBT and vPvB assessment : The substance does not fulfill all screening criteria for persistence, bioaccumulation and toxicity and hence is not considered to be PBT or vPvB.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues : Recover or recycle if possible.
It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations.

Do not dispose into the environment, in drains or in water courses.
Waste product should not be allowed to contaminate soil or water.

Disposal should be in accordance with applicable regional, national, and local laws and regulations.
Local regulations may be more stringent than regional or national requirements and must be complied with.

Contaminated packaging : Drain container thoroughly.
After draining, vent in a safe place away from sparks and fire.

SECTION 14. TRANSPORT INFORMATION

National Regulations

US Department of Transportation Classification (49 CFR Parts 171-180)

UN/ID/NA number	:	UN 2312
Proper shipping name	:	PHENOL, MOLTEN
Class	:	6.1
Packing group	:	II
Labels	:	6.1
Reportable quantity		Phenol (1,000 lb)
ERG Code	:	153
Marine pollutant	:	no

International Regulations

IATA-DGR

UN/ID No.	:	UN 1671
Proper shipping name	:	PHENOL, SOLID
Class	:	6.1
Packing group	:	II
Labels	:	6.1

IMDG-Code

UN number	:	UN 2312
Proper shipping name	:	PHENOL, MOLTEN
Class	:	6.1
Packing group	:	II
Labels	:	6.1
Marine pollutant	:	no

Maritime transport in bulk according to IMO instruments

Pollution category	:	Y
Ship type	:	2
Product name	:	Phenol

Special precautions for user

Remarks	:	Special Precautions: Refer to Section 7, Handling & Storage, for special precautions which a user needs to be aware of or needs to comply with in connection with transport.
Additional Information	**:**	This product may be transported under nitrogen blanketing. Nitrogen is an odourless and invisible gas. Exposure to nitrogen enriched atmospheres displaces available oxygen which may cause asphyxiation or death. Personnel must observe strict safety precautions when involved with a confined space entry. Transport in bulk according to Annex II of Marpol and the IBC Code

SECTION 15. REGULATORY INFORMATION

EPCRA - Emergency Planning and Community Right-to-Know Act

CERCLA Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
Phenol	108-95-2	1000	1000

*: The components with RQs are given for information.

SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

Components	CAS-No.	Component TPQ (lbs)
Phenol	108-95-2	10000
Phenol	108-95-2	500

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

Phenol 108-95-2 >= 90 - <= 100 %

SARA 311/312 Hazards : Flammable (gases, aerosols, liquids, or solids)
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 : The following components are subject to reporting levels established by SARA Title III, Section 313:

Phenol 108-95-2 >= 90 - <= 100 %

Clean Water Act

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

Phenol 108-95-2 100 %

US State Regulations

Pennsylvania Right To Know

Phenol 108-95-2

California Prop. 65

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

California List of Hazardous Substances

Phenol 108-95-2

Other regulations:

The regulatory information is not intended to be comprehensive. Other regulations may apply

to this material.

The components of this product are reported in the following inventories:

AIIC	:	Listed
DSL	:	Listed
IECSC	:	Listed
ENCS	:	Listed
KECI	:	Listed
NZIoC	:	Listed
PICCS	:	Listed
TCSI	:	Listed
TSCA	:	Listed

SECTION 16. OTHER INFORMATION

Further information

NFPA Rating (Health, Fire, Reactivity)		3, 2, 0

Full text of other abbreviations

ACGIH	:	USA. ACGIH Threshold Limit Values (TLV)
ACGIH BEI	:	ACGIH - Biological Exposure Indices (BEI)
OSHA Z-1	:	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
ACGIH / TWA	:	8-hour, time-weighted average
OSHA Z-1 / TWA	:	8-hour time weighted average
Abbreviations and Acronyms	:	The standard abbreviations and acronyms used in this document can be looked up in reference literature (e.g. scientific dictionaries) and/or websites. ACGIH = American Conference of Governmental Industrial Hygienists ADR = European Agreement concerning the International Carriage of Dangerous Goods by Road AICS = Australian Inventory of Chemical Substances ASTM = American Society for Testing and Materials BEL = Biological exposure limits BTEX = Benzene, Toluene, Ethylbenzene, Xylenes CAS = Chemical Abstracts Service CEFIC = European Chemical Industry Council CLP = Classification Packaging and Labelling

COC = Cleveland Open-Cup
DIN = Deutsches Institut fur Normung
DMEL = Derived Minimal Effect Level
DNEL = Derived No Effect Level
DSL = Canada Domestic Substance List
EC = European Commission
EC50 = Effective Concentration fifty
ECETOC = European Center on Ecotoxicology and Toxicology Of Chemicals
ECHA = European Chemicals Agency
EINECS = The European Inventory of Existing Commercial Chemical Substances
EL50 = Effective Loading fifty
ENCS = Japanese Existing and New Chemical Substances Inventory
EWC = European Waste Code
GHS = Globally Harmonised System of Classification and Labelling of Chemicals
IARC = International Agency for Research on Cancer
IATA = International Air Transport Association
IC50 = Inhibitory Concentration fifty
IL50 = Inhibitory Level fifty
IMDG = International Maritime Dangerous Goods
INV = Chinese Chemicals Inventory
IP346 = Institute of Petroleum test method N° 346 for the determination of polycyclic aromatics DMSO-extractables
KECI = Korea Existing Chemicals Inventory
LC50 = Lethal Concentration fifty
LD50 = Lethal Dose fifty per cent.
LL/EL/IL = Lethal Loading/Effective Loading/Inhibitory loading
LL50 = Lethal Loading fifty
MARPOL = International Convention for the Prevention of Pollution From Ships
NOEC/NOEL = No Observed Effect Concentration / No Observed Effect Level
OE_HPV = Occupational Exposure - High Production Volume
PBT = Persistent, Bioaccumulative and Toxic
PICCS = Philippine Inventory of Chemicals and Chemical Substances
PNEC = Predicted No Effect Concentration
REACH = Registration Evaluation And Authorisation Of Chemicals
RID = Regulations Relating to International Carriage of Dangerous Goods by Rail
SKIN_DES = Skin Designation
STEL = Short term exposure limit
TRA = Targeted Risk Assessment
TSCA = US Toxic Substances Control Act
TWA = Time-Weighted Average
vPvB = very Persistent and very Bioaccumulative

A vertical bar (|) in the left margin indicates an amendment from the previous version.

Sources of key data used to : The quoted data are from, but not limited to, one or more

compile the Safety Data Sheet		sources of information (e.g. toxicological data from Shell Health Services, material suppliers' data, CONCAWE, EU IUCLID date base, EC 1272 regulation, etc).
Revision Date	:	12/28/2023

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

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