Product Safety Summary

Phenol, 2-(1-methylpropyl)-

This product safety summary is intended to provide a general overview of the chemical substance. The information on the Summary is basic information and is not intended to provide emergency response information or information on medical treatment. Additional information on this substance is available on its Material Safety Data Sheet which should be consulted prior to using the chemical.

1) Chemical Identity

Name: Phenol, 2-(1-methylpropyl)-
Abbreviation: OSBP
Common Names: o-sec-butylphenol, 2-sec-butylphenol
CAS Number: 89-72-5
EINECS Number: 201-933-8

2) Product Overview

2-sec-butylphenol has the chemical formula C_{10}H_{14}O. It is a viscous white to yellow liquid at room temperature and is typically sold in liquid form 180kg drums. OSBP may also be sold in in tank trucks or rail cars. In this form, the product must be heated to 90-120°F (30-50°C) to assure that its viscosity has been reduced prior to off-loading into storage facilities via pipeline. In molten form, OSBP can cause thermal burns due to its elevated temperature.

OSBP is a chemical intermediate which is typically marketed to other professional chemical companies for the purpose of acting as an intermediate raw material to be transformed into other chemical products.

3) The Main End Uses for OSBP Include:

- As a chemical intermediate for the synthesis of anti-oxidants
4) Physical Properties

- Physical state / appearance at 77°F (25°C) colourless to yellowish liquid
- Odour: aromatic
- Density: 0.982 g/cm³ @ 77°F (25°C)
- Solubility in water (bulk): 51.46 g/L @ 68°F (20°C)
- Vapor pressure: 2.98 Pa @ 68°F (20°C)
- Melting point: 50°F (10°C)
- Boiling point: 444°F (229°C) @ 1013 hPa
- Flash point (Tag closed cup): 212°F (100°C)
- Self ignition temperature: 608°F (320°C)
- Log Kow: 3.0 @ 77°F (25°C)

5) Health Information

OSBP caused the following effects in animal studies:
- A low concern for acute toxicity by the oral or dermal route of exposure; signs of toxicity and mortality occur at high dose levels that are greater than typical human exposure
- Corrosive to skin
- Not mutagenic or clastogenic
- A low concern for carcinogenicity by genotoxic and non-genotoxic mechanisms
- A no observed effect level (NOEL) of 12-60 mg/kg body weight/day was concluded from a 28 day oral toxicity study in rats (OECD Guideline 407)

<table>
<thead>
<tr>
<th>Species</th>
<th>End Point</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rabbit</td>
<td>Acute Dermal Exposure</td>
<td>LD50 = 600-2400 mg/kg</td>
</tr>
<tr>
<td>Rat</td>
<td>Acute Oral Toxicity</td>
<td>LD50 = 200-2000 mg/kg</td>
</tr>
<tr>
<td>Rabbit</td>
<td>Skin Irritation</td>
<td>Corrosive</td>
</tr>
</tbody>
</table>

6) Environmental Effects

OSBP is toxic to aquatic organisms. Special care should be taken to assure that OSBP or mixtures containing OSBP do not enter the aquatic environment

<table>
<thead>
<tr>
<th>Species</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fish (Rainbow trout), 96-hr</td>
<td>LC50 = &gt;1.0 mg/L</td>
</tr>
<tr>
<td>Daphnia magna, 48-hr</td>
<td>EC50 = 3.7 mg/L</td>
</tr>
<tr>
<td>Algae (Scenedesmus subspicatus), 72-hr</td>
<td>EC50 = 10 mg/L</td>
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</tbody>
</table>

Environmental Fate

OSBP is readily biodegradable. It is not bioaccumulative.
7) Exposure Potential

**Manufacturing**

The manufacture of OSBP is conducted in a batch process via the catalysed reaction of phenol and butene. After recycle streams are taken into account, all reactants are essentially 100% utilized and converted to product. The chemical reactions are carried out in closed reactors under strictly controlled conditions aided by modern process control computers. Raw materials are added by dedicated pipelines so that there is no worker exposure or environmental release during the process. Chemical operators oversee the reaction conditions in the manufacturing plants. These individuals are highly trained in chemical processing and handling as well as in the correct use of safety equipment and engineering controls. It is customary for chemical operators who may handle OSBP use personal protection equipment that includes coveralls, long sleeve shirts, work shoes with protective coverings, eye and face protection, chemical resistant gloves and hardhats.

Finished products are isolated by distillation and are handled in a closed system of pipes and dedicated storage tanks. There is no opportunity for dermal or inhalation exposure during the product transfer process.

Reaction products are monitored for quality assurance (QA) using aliquots of the vessel contents collected from controlled sampling spigots that precludes aerosol formation, splashing or spillage due to overflow. Samples analyzed in the QA lab are handled using good laboratory safety practices. No exposure to OSBP is expected during the sampling or analytical processes.

Maintenance worker exposure to OSBP during cleaning operations for storage vessels or shipping tanks is eliminated when proper engineering controls and required personal protective equipment are in use. Railcars and tank trucks are typically steam cleaned in an automated fashion. Workers complete the cleaning of these enclosures while wearing suitable personal protective equipment that includes chemical suits and respirators designed to protect against exposure.

**Packaged products**

Protection from exposure to liquid, vapour or mist from manufacturing operations is accomplished via engineering controls in the production area. Dermal or inhalation exposure to liquid, vapour or mist from OSBP by downstream users should be avoided.

Consult the relevant Material Safety Data Sheet for specific handling and packaging disposal precautions.

**Consumer Products**

OSBP has no direct application in consumer products and is sold only to professional chemical companies for use as a chemical intermediate which is transformed into other substances. OECD is expected to be published a summary of toxicological studies, a OECD HPV SIDS dossier is available: http://webnet.oecd.org/hpv/ui/handler.axd?id=6DF9DB3D-1E5D-4F79-A80A-4149BA209242
8) Risk Management Recommendations

Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Ventilation should be sufficient to effectively remove, and prevent buildup of, any vapors or fumes that may be generated during handling or thermal processing. In order to ensure appropriate electrical safety practices are followed, consult applicable standards. These may include guidelines such as the National Fire Protection Association [NFPA] 70, "The National Electrical Code" and NFPA 499, "Recommended Practice for the Classification of Combustible Dusts and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas ". NOTE: since this material's vapors or fumes can form explosive mixtures in air, ensure that any potential areas where explosions may occur are designed to minimize potential damage. For recommendations to prevent such explosions and associated damage, consult applicable guidelines such as NFPA 69, "Standard on Explosion Prevention Systems" and/or NFPA 68, "Guide for Venting Deflagrations". Keep working clothes separately and do not take them home.

9) State Agency Review

OSBP has been registered under REACH Regulation (EC) 1907/2006. A draft SIDS Initial Assessment Report is available.
10) Regulatory Information, Classification and Labelling
GHS classification of OSBP according CLP (CE) 1272/2008:

<table>
<thead>
<tr>
<th>Acute Toxicity</th>
<th>Category 4</th>
<th>H302 Harmful if swallowed</th>
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<tbody>
<tr>
<td>Skin/Eye corrosion</td>
<td>Category 1C</td>
<td>H314 Causes severe skin burns and eye damage</td>
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Signal Word: Danger

11) Conclusion
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12) Contact Information within Company
For further information please contact: sds.info@siigroup.com