Section-1 IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

1.1 Identification of the substance/preparation:
Commercial name: Linear Alkyl Benzene
Chemical name: Linear Alkyl Benzene (Benzene, C10-13-alkyl derivs)
Synonyms: Linear Alkyl Benzene, Benzene, C10-13-alkyl derivs.

1.2 Use of the substance /preparation: Surfactant intermediate for detergents.

1.3 MANUFACTURER & SUPPLIER: Reliance Industries Limited
Emergency Coordination Centre contact details:

Patalganga Mfg. Division
MIDC,
PO: Patalganga, 410220
Dist: Raigad
SSM Office +91 2192-257600

Vadodara Mfg. Division
PO Petrochemicals,
Dist: Vadodara, Gujrat, India
SSM Office +91 265-6696525/+91 265-6693869

SSM: Site Shift Manager

Section 2 – HAZARD IDENTIFICATION

2.1 Classification of the substance/preparation: Hazard class and category code.

GHS Category:

<table>
<thead>
<tr>
<th>Health</th>
<th>Environmental</th>
<th>Physical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harmful on contact with skin and on ingestion</td>
<td>Aquatic Toxicity – Category- NA</td>
<td>Flammable – Category NA</td>
</tr>
</tbody>
</table>

NA: Not available

GHS Category table for reference:

<table>
<thead>
<tr>
<th>Study/hazard statement</th>
<th>Category 1</th>
<th>Category 2</th>
<th>Category 3</th>
<th>Category 4</th>
<th>Category 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Oral LD50</td>
<td>≤ 5 mg/kg</td>
<td>&gt; 5 ≤ 50 mg/kg</td>
<td>&gt; 50 ≤ 300 mg/kg</td>
<td>&gt; 300 ≤ 2000 mg/kg</td>
<td>&gt; 2000 ≤ 5000 mg/kg</td>
</tr>
<tr>
<td>Acute Dermal LD50</td>
<td>≤ 50 mg/kg</td>
<td>≥ 50 ≤ 200 mg/kg</td>
<td>≥ 200 ≤ 1000 mg/kg</td>
<td>≥ 1000 ≤ 2000 mg/kg</td>
<td>&gt; 2000 ≤ 5000 mg/kg</td>
</tr>
<tr>
<td>Acute Inhalation Dust LC50</td>
<td>≤ 0.05 mg/L</td>
<td>&gt; 0.05 ≤ 0.5 mg/L</td>
<td>&gt; 0.5 ≤ 1.0 mg/L</td>
<td>&gt; 1.0 ≤ 5 mg/L</td>
<td>See footnote below this table</td>
</tr>
<tr>
<td>Gases LC50 Vapours LC50</td>
<td>≤ 50 ppm/V</td>
<td>&gt; 50 ≤ 2500 ppm/V</td>
<td>&gt; 2500 ≤ 20000 ppm/V</td>
<td>&gt; 10 ≤ 50 mg/L</td>
<td></td>
</tr>
<tr>
<td>Flammable liquids</td>
<td>Flash point ≥ 23 degrees C and initial boiling point ≤ 35 degrees C. Extemely flammable liquid and vapour</td>
<td>Flash point ≥ 23 degrees C and initial boiling point &gt; 35 degrees C. Highly flammable liquid and vapour</td>
<td>Flash point ≥ 23 degrees C ≤ 60 degrees C. Flammable liquid and vapour</td>
<td>Flash point &gt; 60 degrees C ≤ 93 degrees C. Combustible liquid</td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>

Note: Gases concentration are expressed in parts per million per volume (ppmV).

NOTE 1: Category 5 is for mixtures which are of relatively low acute toxicity but which under certain circumstances may pose a hazard to vulnerable populations. These mixtures are anticipated to have an oral or dermal LD50 value in the range of 2000-5000 mg/kg bodyweight or equivalent dose for other routes of exposure. In light of animal welfare considerations, testing in animals in Category 5 ranges is discouraged and should only be considered when there is a strong likelihood that results of such testing would have a direct relevance for protecting human health.
NOTE 2: These values are designed to be used in the calculation of the ATE for classification of a mixture based on its ingredients and do not represent test results. The values are conservatively set at the lower end of the range of Categories 1 and 2, and at a point approximately 1/10th from the lower end of the range for Categories 3 – 5.

### GHS Category table for reference: Continued

<table>
<thead>
<tr>
<th>Study/hazard statement</th>
<th>Category 1</th>
<th>Category 2</th>
<th>Category 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Eye Irritation</strong></td>
<td>Effects on the cornea, iris or conjunctiva that are not expected to reverse or that have not fully reversed within 21 days. Causes severe eye damage.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Skin Irritation</strong></td>
<td>Destruction of skin tissue, with sub categorization based on exposure of up to 3 minutes (A), 1 hour (B), or 4 hours (C). Causes severe skin burns and eye damage.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Environment:</strong></td>
<td>Mean value of ( \geq 2.3 ) for erythema / eschar or edema in at least 2 of 3 tested animals from gradings at 24, 48, and 72 hours (or on 3 consecutive days after onset if reactions are delayed); inflammation that persists to end of the (normally 14-day) observation period. Causes skin irritation.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Flammable Aerosol</strong></td>
<td>Not applicable</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Flammable solids</strong></td>
<td>Using the burning rate test, substances or mixtures other than metal powders: (a) wetted zone does not stop fire and (b) burning time &lt; 45 seconds or burning rate &gt; 2.2 mm/second Using the burning rate test, metal powders that have burning time &gt; 5 minutes Flammable solid</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Flammable gases</strong></td>
<td>Gases, which at 20 degrees C and a standard pressure of 101.3 kPa: (a) are ignitable when in a mixture of 13% or less by volume in air; or (b) have a flammable range with air of at least 12 percentage points regardless of the lower flammable limit. Extremely flammable gas</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### GHS Label: None

### Signal word: None

#### Details of statements:

<table>
<thead>
<tr>
<th>Hazard Statements</th>
<th>None.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precautionary Statement Prevention</td>
<td>None</td>
</tr>
<tr>
<td>Precautionary Statement Response</td>
<td>P391 Collect spillage</td>
</tr>
<tr>
<td>Precautionary Statement Storage</td>
<td>No storage statements</td>
</tr>
<tr>
<td>Precautionary Statement Disposal</td>
<td>Follow local regulation</td>
</tr>
</tbody>
</table>

### 2.2 Information pertaining to particular dangers for human:

No specific hazards are encountered under normal use condition. The product may cause slight irritation to eyes and skin after prolonged and repeated contact, this product has a low vapour pressure therefore it is not an inhalation hazard.

If product is heated, vaporization can occur. Eye, skin, and upper respiratory irritation may occur.
2.3 Information pertaining to particular dangers for the environment:
NA
2.4 Other adverse effects:
Ignition possible when exposed to hot surfaces, sparks, naked flames and by electrostatic discharges too.
Route of entry:
Those with history of lung diseases, or skin problems may be more susceptible to the effect of this material.

<table>
<thead>
<tr>
<th>Skin Contact</th>
<th>Skin Absorption</th>
<th>Eye Contact</th>
<th>Inhalation</th>
<th>Ingestion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>


Health hazards:

<table>
<thead>
<tr>
<th>Source</th>
<th>NTP listed?</th>
<th>IARC cancer review group?</th>
<th>OSHA Regulated?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carcinogenicity</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

DATA REFERENCE: Toxic release inventory (TRI) basis of Occupational Safety and Health Administration (OSHA) carcinogen, National Toxicological program (NTP), International Agency for Research on Cancer (IARC), http://toxnet.nlm.nih.gov/cgi-bin/sis/search.

Section 3 – COMPOSITION & INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Ingredients / Hazardous</th>
<th>CAS No.</th>
<th>EC No.</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linear alkyl benzene/No</td>
<td>67774-74-7</td>
<td>267-051-0</td>
<td>&gt;98.50 %</td>
</tr>
<tr>
<td>Paraffin Content</td>
<td>64771-72-8</td>
<td>265-233-4</td>
<td>&lt;0.20%</td>
</tr>
</tbody>
</table>


Section 4 – FIRST AID MEASURES

4.1 General advice
IMMEDIATE MEDICAL ATTENTION IS REQUIRED AFTER INHALATION OR AFTER SWALLOWING.
In case of health troubles or doubts, seek medical advice immediately and show this Material Safety Data Sheet.

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

4.3 Skin contact
Wash skin with water upon contact. Remove contaminated clothing. If irritation persists, get medical attention. Wash clothing before reuse.

4.4 Eye contact
In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

4.5 Swallowing
If swallowed, do NOT induce vomiting. Get medical attention. Never give anything by mouth to an unconscious person.
Section 5 – FIRE FIGHTING MEASURES

5.1 Suitable extinguishing media: Foam, Dry chemical powder, CO2. Cool containers with water spray.
5.2 Extinguishing media to be avoided: Water.
5.3 Caution about specific danger in case of fire and fire-fighting procedures
Do not empty into drains. When burning, it emits carbon monoxide, carbon dioxide and irritant fumes. Containers with the substance exposed to excessive heat may explode.
5.4 Special protective equipment for fire-fighters
Wear full protective fire-resistant clothing and self-contained breathing apparatus.

Section 6 – ACCIDENTAL RELEASE MEASURES

6.1 Person-related safety precautions
Wear protective clothing and equipment. Isolate hazard area. Evacuate all unauthorized personnel not participating in rescue operations from the area. Avoid entry into danger area. Remove all possible sources of ignition. Stop traffic and switch off the motors of the engines. Do not smoke and do not handle with naked flame. Use explosion-proof lamps and non-sparking tools. Avoid contact with the substance.

6.2 Precautions for protection of the environment
Prevent from further leaks of substance. Dike flow of spilled material using soil or sandbags to minimize contamination of drains, surface and ground waters.

6.3 Recommended methods for cleaning and disposal
Soak up residues with compatible porous material and forward for disposal in closed containers. Dispose off under valid legal waste regulations.

Section 7 – HANDLING AND STORAGE

7.1 Information for safe handling
Observe all fire-fighting measures (no smoking, do not handle with naked flame and remove all possible sources of ignition). Take precautionary measures against static discharges. Wear recommended personal protective equipment and observe instructions to prevent possible contact of substance with skin and eyes and inhalation.

7.2 Information for storage
Storerooms should meet the requirements for the fire safety of constructions and electrical facilities and should be in conformity with valid regulations. Store in cool, well-ventilated place with effective exhaust, away from heat and all sources of ignition. Take precautionary measures against static discharges.

7.3 Information for specific use
Detergent intermediate – follow bulk handling and storage procedures as noted above.
Section 8 – EXPOSURE CONTROL & PERSONAL PROTECTION

8.1 Occupational Exposure Limits:
NA
NA: Data not available
Provide adequate ventilation when using the material and follow the principles of good occupational hygiene to control personal exposure.

8.2 Occupational exposure controls
Collective protection measures: General and local ventilation, effective exhaust.
Individual protection measures: Personal protective equipment (PPE) for the protection of eyes, hands and skin corresponding with the performed labour has to be kept at disposition for the employees. In the case of continuous use of this equipment during constant work, safety breaks have to be scheduled, if the PPE-character requires this. All PPE have to be kept in disposable state and the damaged or contaminated equipment has to be replaced immediately.

RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT (PPE):

<table>
<thead>
<tr>
<th>HANDS</th>
<th>EYES</th>
<th>BODY</th>
<th>RESPIRATORY</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="Image" alt="Gloves" /></td>
<td><img src="Image" alt="Goggles" /></td>
<td><img src="Image" alt="Protective Clothing" /></td>
<td><img src="Image" alt="Respirator" /></td>
</tr>
</tbody>
</table>

Respiratory protection: If the exposure limit is exceeded and engineering controls are not feasible, wear a supplied air, full-face piece respirator, airline hood, or full face piece self-contained breathing apparatus.
Eye protection: Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.
Hand protection: Wear gloves of impervious material.
Body protection: Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact. Protective overall antistatic design recommended.
Hygiene Measures: Wash hands, forearms and face thoroughly after handling. Appropriate techniques should be used to remove potentially contaminated clothing.

8.3 Environmental exposure controls
Proceed in accordance with valid air and water legislative regulations.
Engineering measures: If user operations generate dust, fumes, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended limits.
### Section 9 – PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Clear Colourless liquid</td>
</tr>
<tr>
<td>Odour</td>
<td>Odourless</td>
</tr>
<tr>
<td>Solubility in water</td>
<td>Slightly soluble</td>
</tr>
<tr>
<td>Relative Density (H2O=1)</td>
<td>0.858 – 0.868 @ 15.5 °C</td>
</tr>
<tr>
<td>Boiling Point °C</td>
<td>278 – 314 °C</td>
</tr>
<tr>
<td>Melting Point °C</td>
<td>&lt; -70 °C</td>
</tr>
<tr>
<td>Relative Vapour Density (Air=1)</td>
<td>8.4</td>
</tr>
<tr>
<td>Flash point °C</td>
<td>140 °C</td>
</tr>
<tr>
<td>Auto ignition °C</td>
<td>NA</td>
</tr>
<tr>
<td>Vapour pressure (hPa) @ 25 °C</td>
<td>0.013</td>
</tr>
<tr>
<td>Molecular weight</td>
<td>239-245</td>
</tr>
<tr>
<td>Explosive limits in air % by volume</td>
<td>NA</td>
</tr>
<tr>
<td>pH</td>
<td>NA</td>
</tr>
<tr>
<td>Viscosity cst @37.7 °C</td>
<td>4.4</td>
</tr>
<tr>
<td>Pour point °C</td>
<td>&lt; -50</td>
</tr>
<tr>
<td>Evaporation rate (water=1)</td>
<td>NA</td>
</tr>
<tr>
<td>Octanol/water partition coefficient log Kow</td>
<td>7.5 – 9.12 @ 25 °C</td>
</tr>
<tr>
<td>% volatile</td>
<td>NA</td>
</tr>
</tbody>
</table>

NA: NOT AVAILABLE


### Section 10 – CHEMICAL STABILITY AND REACTIVITY INFORMATION

**10.1 Conditions to avoid**
Prolonged exposure of containers or tank cars to heat or fire may cause the material to expand with possible container rupture

**10.2 Material to avoid**
Very dangerous fire hazard when exposed to oxidizers

**10.3 Hazardous decomposition products**
Thermal decomposition generates carbon monoxide and carbon dioxide.

**Polymerization:** NA

### Section 11 – TOXICOLOGICAL INFORMATION

**11.1 Acute effects**
Product irritates eyes and skin.

Acute toxicity data:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Route</th>
<th>Species</th>
<th>Values</th>
<th>Exposure period</th>
</tr>
</thead>
<tbody>
<tr>
<td>LD50</td>
<td>Oral</td>
<td>Rat</td>
<td>&gt;5000 mg/kg</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>


**11.2 Repeated dose toxicity**
Chronic effects cause mild irritation

**11.3 Sensitisation**
May cause mild skin irritation.
11.4 CMR effects (carcinogenicity, mutagenicity, toxicity for reproduction)
Not a carcinogen, mutagenic
11.5 Toxicokinetics, metabolism, distribution
Not applicable.

Section 12 – ECOLOGICAL INFORMATION

12.1 Ecotoxicity data: NA
12.3 Persistence and degradability: Substance is biodegradable
12.4 Bioaccumulative potential: NA
12.5 Results of PBT assessment Persistence and Degradation: NA.
12.6 Other adverse effects: NA
Environmental Fate: The product is sparingly soluble in water. Liquid with moderate volatility. It is expected to have high mobility in soil. Volatilization from water surfaces is expected.

Section 13 – DISPOSAL CONSIDERATION

Local Legislation: Disposal should be in accordance with applicable regional, national, and local laws and regulations. This product should not be dumped, spilled, rinsed or washed into sewers or public waterways.
13.1 Recommended disposal methods for the substance / preparation
Product reuse or disposal in accordance with valid waste legislative regulations.
13.2 Recommended disposal methods for contaminated packaging
Product is transported in tank-vehicles.
13.3 Waste management measures that control exposure of humans and environment
Proceed in accordance with valid health, air and water legislative regulations.
13.4 Waste regulation: Follow local regulation.

Section 14 – TRANSPORT INFORMATION

International Transport Regulation:
ADR/RID (Road/Rail), IMDG (Sea) and ICAO/IATA (Air)
14.1 Proper Shipping Name: Linear Alkyl Benzene
UN Number: Not applicable
14.2 Special transport precautionary measures
Not applicable.

Section 15 – REGULATORY INFORMATION

MSDS format on a 16 Section based on guidance provided in:

Indian Regulation:
The Factories Act 1948
International Regulations:
European SDS Directive
ANSI MSDS Standard
ISO 11014-1 1994
WHMIS Requirements
United States
Hazard Communication Standard
Canada
Hazardous Products Act and Controlled Products Regulations
Europe
Dangerous Substance and Preparations Directives
Australia
National Model Regulations for the Control of Workplace Hazardous Substances

The Globally Harmonized System of Classification and Labeling of Chemicals endorsed by The UN Economic and Social Council.

*RISK PHRASES: NA.
*SAFETY PHRASES: NA.

*These standard risk and safety phrases for use when interpreting Material Safety data Sheets are derived from the European Union Regulation, CHIP Regulations - Chemicals (Hazard Information and Packaging for Supply). They are required to be used in Materials Safety Data Sheets to identify potential hazards and offer safe handling advice.

Section 16 – OTHER INFORMATION

Training instructions
Personnel handling the product has to be acquainted demonstrably with its properties, with health and environmental protection principles related to the product and first aid principles.
Tremcard details/Reference: Refer Section 14
Local bodies involved (Applicable only with in India): Local District Authority and Local Crisis Group

Sources of data used to compile the Material Safety Data Sheet

MSDS Revision Status:

<table>
<thead>
<tr>
<th>Date of Revision</th>
<th>Revised Sections</th>
<th>Supersedes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sep. 01, 2009</td>
<td>Format revised</td>
<td>Feb. 01, 2008</td>
</tr>
<tr>
<td>Sep. 01, 2011</td>
<td>Section 4 (4.3)</td>
<td>Sep. 01, 2009</td>
</tr>
<tr>
<td>Dec. 21, 2011</td>
<td>Section 14</td>
<td>Sep. 01, 2011</td>
</tr>
</tbody>
</table>

This MSDS is issued by the Centre for HSE Excellence, Reliance Industries Limited
Contact Details: For any enquiry/comment regarding this Material Safety Data Sheet, kindly contact the Centre for HSE Excellence at HSE.ExcellenceCentre@ril.com

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