SAFETY DATA SHEET

Substance Name: BENZENE

Complying with 1907/2006/EEC Regulation of 18 December 2006 ("REACH Regulation") and REGULATION (EC) No 1272/2008 (CLP)

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

Identification of the substance/preparation

Substance Name: BENZENE

Trade names: BENZENE

Synonyms: Benzol; Cyclohexatriene; Phenyl hydride

CAS #: 71-43-2
EC #: 200-753-7

Common/important uses of the substance/preparation: Benzene is used as an intermediate in synthesis and manufacture of organic aromatic substances. Benzene is defined as "transported isolated intermediate" (Article 3 (15) of REACH) and should be used under "Strictly Controlled Conditions" (Article 18 (4) for Intermediates under REACH.

Company/undertaking identification

Supplier/Manufacturer: GADIV PETROCHEMICAL INDUSTRIES Ltd.
P.O.B 32 HAIFA
Tel: +972-4-8788020
Fax: +972-4-8788018
E-mail: Gadiv@orl.co.il

E-mail address of person responsible for this SDS: gamiram@orl.co.il

Emergency telephone number (including hours of operation): +972-4-8788643

Section 2. HAZARDS IDENTIFICATION

According to EC Directive 2001/59/EC

Most Important Hazards

Physical / Chemical Hazards:
R11: Highly flammable.

Health Hazards:
R45: May cause cancer.
R46: May cause heritable genetic damage.
R36/38: Irritant; Irritating to eyes and skin.
R48/23/24/25: Toxic: danger of serious damage to health by prolonged exposure through inhalation, in contact with the skin and if swallowed.
R65: Harmful: may cause lung damage if swallowed.

Environmentally Hazards:
Not Classified.
Classification

F – Highly flammable
T-Toxic

GHS-Classification

Physical / Chemical Hazard Statements:
H225: Highly flammable liquid and vapour.

Health Hazard Statements:
H350: May cause cancer.
H340: May cause genetic defects.
H372: Causes damage to organs through prolonged or repeated exposure.
H304: May be fatal if swallowed and enters airways.
H319: Causes serious eye irritation.
H315: Causes skin irritation.

Signal Word
Danger

See section 11 for more detailed information on health effects and symptoms.

Section 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance/preparation

Formula: C₆H₆
Molecular weight: 78.11 g/mol

<table>
<thead>
<tr>
<th>Ingredient name</th>
<th>CAS number</th>
<th>EC number</th>
<th>%</th>
<th>EU Classification</th>
<th>GHS Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzene</td>
<td>71-43-2</td>
<td>200-753-7</td>
<td>100</td>
<td>F; R11 Carc. Cat. 1; R45 Muta. Cat. 2; R46 T; R48/23/24/25 Xn; R65 Xi; R36/38</td>
<td>Flam. Liq. 2 H225 Carc. 1A H350 Muta. 1B H340 STOT RE 1 H372 Asp. Tox. 1 H304 Eye Irrit. 2 H319 Skin Irrit. 2 H315</td>
</tr>
</tbody>
</table>

See section 16 for the full text of the R-phrases declared above

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in section 8.
Section 4. FIRST AID MEASURES

Eyes contact: In case of contact with eyes rinse thoroughly with plenty of water and seek medical advice.

Skin contact: In case of contact with skin wash off immediately with soap and plenty of water, and seek medical advice.

Inhalation: Remove from exposure, lie down. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Get medical attention.

Ingestion: Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Get medical attention immediately.

Expected delayed effects: N/A

See section 11 for more detailed information on health effects and symptoms.

Section 5: FIRE-FIGHTING MEASURES

Extinguishing media

Suitable: For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray. Cool all affected containers with flooding quantities of water.

Not suitable: Solid streams of water may be ineffective.

Special exposure hazards arising from the substance/preparation including combustion products and gases: Thermal decomposition can lead to release of irritating gases and vapors. Highly flammable material. Flash back possible over considerable distance. Container explosion may occur under fire conditions.

Special protective equipment for fire fighters: Fire fighters should wear full protective clothing and self-contained breathing apparatus in positive pressure mode.

Further information: Move containers from fire area if possible to do so without risk. Use water spray to cool unopened containers.

Section 6: ACCIDENTAL RELEASE MEASURES

Personal precautions: Wear protective clothing. Avoid contact with skin eyes. Avoid breathing vapors, mist or gas. Remove all sources of ignition. Ventilate area of spill. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

Environmental precautions: Prevent entry into waterways, sewers, basements or confined areas.

Methods for cleaning up
Absorb the chemical onto sand, vermiculite, or any other non-combustible absorbent, and scoop into containers for later disposal.
Section 7: HANDLING AND STORAGE

Handling: Avoid contact with eyes, skin and clothing. Avoid inhalation of vapour or mist. Do not permit eating/drinking/smoking near the material. Keep away from heat, sparks and open flame. Take measures to prevent the build up of electrostatic charge.

Storage: Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Keep away from incompatible materials.

Section 8: EXPOSURE CONTROL / PERSONAL PROTECTION

Exposure limit values:

<table>
<thead>
<tr>
<th>Ingredient name</th>
<th>Occupational exposure limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzene</td>
<td>TLV-ACGIH 0.5 ppm (TWA), 2.5 ppm (STEL)</td>
</tr>
<tr>
<td></td>
<td>REL-NIOSH 0.1 ppm (TWA), 1 ppm (CEIL)*</td>
</tr>
<tr>
<td></td>
<td>*15 Minutes</td>
</tr>
</tbody>
</table>

Exposure controls

Occupational exposure controls:

Use process enclosures, local exhaust ventilation, or others engineering controls to keep airborne levels below recommend exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Respiratory protection: Suitable respirator. Be sure to use an approved/certified or equivalent. Wear appropriate respirator when ventilation is inadequate.

Hand protection: Chemically compatible gloves.

Eye protection: Wear protective safety glasses.

Skin protection: Wear appropriate long-sleeved clothing to minimize skin contact.

Hygiene measures: Handle in accordance with good industrial hygiene and safety practice.

Environmental exposure controls: Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment may be necessary to reduce emissions to acceptable levels.
Section 9: PHYSICAL AND CHEMICAL PROPERTIES

General information
Physical state: Liquid
Colour: Colourless
Odour: Aromatic

Safety data
pH: Not available
Boiling point/boiling range: 80°C
Flash point: -11°C
Flammability: Not applicable
Explosive properties: Not applicable
Oxidizing properties: Not applicable
Vapor pressure: 10 hPa at 20°C and 100hPa at 79.7°C
Water solubility: 1.88 g/l at 23.5°C
Relative density (15.6°C): 0.8765 g/cm³
Solubility: Not available
Log Octanol/Water partition coefficient: 2.13
Viscosity: 0.604 mPa at 25°C
Vapor density: Not available
Evaporation rate (butyl acetate=1): Not available

Other information:
Melting point/melting range: 5.5 °C
Auto-ignition temperature: 498°C

Section 10: STABILITY AND REACTIVITY

Stability: Stable under normal conditions.

Conditions to avoid: Heat, flames and sparks.

Materials to avoid: Acids, Bases, Halogens, Strong oxidizing agents, Metallic salts.

Hazardous Decomposition products: Carbon oxides.

Hazard polymerization: Not available.
**Section 11: TOXICOLOGICAL INFORMATION**

**Potential acute health effects**

**Acute toxicity:**

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Test</th>
<th>Species</th>
<th>Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzene</td>
<td>LD₅₀, Oral</td>
<td>Rat</td>
<td>1800 mg/kg</td>
</tr>
<tr>
<td></td>
<td>LD₅₀, Oral</td>
<td>Mouse</td>
<td>4700 mg/kg</td>
</tr>
<tr>
<td></td>
<td>LC₅₀, Inhalation</td>
<td>Rat</td>
<td>10000 ppm/7H</td>
</tr>
<tr>
<td></td>
<td>LC₅₀, Dermal</td>
<td></td>
<td>&gt;5000 mg/kg</td>
</tr>
</tbody>
</table>

**Inhalation:** Toxic if inhaled. May cause respiratory tract irritation.

**Ingestion:** Toxic if swallowed. Aspiration hazard if swallowed - can enter lungs and cause damage.

**Skin contact:** Toxic if absorbed through skin. Causes skin irritation.

**Eyes contact:** Causes eye irritation.

**Irritation and corrosivity:** Irritating.

**Skin Sensitization:** Not sensitizing.

**Toxicokinetics:**
At low exposure levels, benzene is rapidly metabolized and excreted predominantly as conjugated urinary metabolites. At higher exposure levels, metabolic pathways appear to become saturated and a large portion of an absorbed dose of benzene is excreted as parent compound in exhaled air.

**CMR Effects:**

**Carcinogenicity:**
IARC-GROUP 1 – Carcinogenic to humans.
EPA-GROUP A – Human carcinogen.
NTP1 – Known to be carcinogenic.
Carcinogenic by OSHA.
Carcinogenic by NIOSH.
ACGIH A1: Confirmed Human Carcinogen.

**Mutagenicity:** Genotoxic.

**Reproductive toxicity:** No evidence of reproductive or developmental effects.

**Repeated dose toxicity:**
Inhalation: May cause bone marrow toxicity and depression of red and white blood cells.

**Chronic/Other Effects**
Carcinogen and an aspiration hazard (kinematic viscosity below 20.5 mm²/s at 40°C).
Section 12: ECOLOGICAL INFORMATION

Ecotoxicity: Experimental data from reliable studies are available for acute aquatic ecotoxicity endpoints. Data are not available for sediment or soil toxicity.

<table>
<thead>
<tr>
<th>Substance name</th>
<th>Toxicity to fish</th>
<th>Toxicity to crustaceans</th>
<th>Toxicity to algae / terrestrial plants</th>
<th>Toxicity to other aquatic plants</th>
<th>Other toxicity data (birds, bees, plants etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzene</td>
<td>LC₅₀/96H: 5.3 mg/l</td>
<td>EC₅₀/48H (Daphnia): 10 mg/l</td>
<td>Not available</td>
<td>EC₅₀/72H: 100 mg/l</td>
<td>Not available</td>
</tr>
<tr>
<td></td>
<td>Long-term: (32 day NOEC) 0.8 mg/l</td>
<td>Long term (7 day NOEC) 3 mg/l</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Activated sludge respiration inhibition testing (24 hour IC₅₀ - nitrification): 13 mg/l

Mobility: Not expected to adsorb to soil or sediment due to the low log Kow < 3.

Persistence and Degradability

Biotic - Readily biodegradable.  
Abiotic - Will not undergo hydrolysis. Will not undergo photolysis. Expected to rapidly degrade by indirect photolysis in air.

Bioaccumulative potential: Not expected to bioaccumulate due to the low log Kow < 3.

Result of PBT / vPvB assessment (if CSR is required): Does not meet the criteria.

Other adverse effects:

Substances which have an unfavorable influence on the oxygen balance and can be measured using parameters such as BOD, COD, etc.: Not available.

Substances, which contribute to eutrophication: Not available

Remarks: Not available.

Section 13: DISPOSAL CONSIDERATIONS

Methods of disposal: Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Hazardous waste: Not available.
Section 14: TRANSPORT INFORMATION

International transport regulations

<table>
<thead>
<tr>
<th>Regulatory Information</th>
<th>UN number</th>
<th>Proper shipping name</th>
<th>Class</th>
<th>Packing group</th>
<th>Label</th>
<th>Additional information</th>
<th>Marine pollutant</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADR/RID Class</td>
<td>1114</td>
<td>BENZENE</td>
<td>3</td>
<td>II</td>
<td></td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>IMDG class</td>
<td>1114</td>
<td>BENZENE</td>
<td>3</td>
<td>II</td>
<td>EMS-No: F-E, S-D</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>IATA class</td>
<td>1114</td>
<td>BENZENE</td>
<td>3</td>
<td>II</td>
<td></td>
<td></td>
<td>-</td>
</tr>
</tbody>
</table>

National Fire Protection Association Hazard Ratings- NFPA (R):

Health Hazard - 2
Flammability - 3
Stability - 0

Section 15: REGULATORY INFORMATION

Chemical Safety Assessment has been performed for Benzene.

Classification and labeling according to EU Directives 67/548/EEC and 1999/45/EC (including amendments) and take into account the intended product use:

F – Highly flammable
T-Toxic

Risk phrases:
R11: Highly flammable.
R45: May cause cancer.
R46: May cause heritable genetic damage.
R36/38: Irritating to eyes and skin.
R48/23/24/25: Toxic: danger of serious damage to health by prolonged exposure through inhalation, in contact with the skin and if swallowed.
R65: Harmful: may cause lung damage if swallowed.
Safety advice:
S45: In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S53: Avoid exposure - obtain special instructions before use.

Classification and labeling according to EU Regulation (EC) 1272/2008 (CLP Regulation) and Globally Harmonized System (GHS):

**Signal Word**     **Danger**

**Dangerous as defined by the EU CLP 2008:**

**Physical/Chemical Properties:**

**Health Hazards:**
Carcinogenicity: Carc. cat. 1A H350: May cause cancer.
Germ cell mutagenicity: Muta. cat. 1B H340: May cause genetic defects.
Specific target organ toxicity - repeated exposure: STOT RE 1 H372: Causes damage to organs through prolonged or repeated exposure.
Aspiration hazard: Asp. Tox. cat. 1 H304: May be fatal if swallowed and enters airways.
Eye irritation: Eye Irrit. cat. 2 H319: Causes serious eye irritation.
Skin corrosion / irritation: Skin Irrit. cat. 2 H315: Causes skin irritation.

**Precautionary Statements**
P202: Do not handle until all safety precautions have been read and understood.
P210: Keep away from heat, sparks, open flame, hot surfaces - no smoking.
P243: Take precautionary measures against static discharges.
P280: Wear protective gloves/clothing/eye protection/face protection.
P303+P361+P353: if on skin (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
P331: Do NOT induce vomiting.

**National Paint & Coating Hazardous Materials Identification System – HMIS (R):**

- Health Hazard Rating -2
- Flammability Rating - 3
- Instability Rating - 0
- Personal Protection - H
SAFETY DATA SHEET

Substance Name: BENZENE

Section 16: OTHER INFORMATION

Full text of R-phrases referred to in sections 2 and 3:
R11: Highly flammable.
R45: May cause cancer.
R46: May cause heritable genetic damage.
R36/38: Irritating to eyes and skin.
R48/23/24/25: Toxic: danger of serious damage to health by prolonged exposure through inhalation, in contact with the skin and if swallowed.
R65: Harmful: may cause lung damage if swallowed.

Full text of Hazards Statements referred to in sections 2 and 3:
H225: Highly flammable liquid and vapour.
H350: May cause cancer.
H340: May cause genetic defects.
H372: Causes damage to organs through prolonged or repeated exposure.
H304: May be fatal if swallowed and enters airways.
H319: Causes serious eye irritation.
H315: Causes skin irritation.

Training advice: Before using / handling the product one must read carefully present MSDS.

Recommended restriction on use: Should be used under Strictly Controlled Conditions (Article 18 (4)) for Intermediates under REACH.

Key Legend Information:
ACGIH- American Conference of Govermental Industrial Hygienists
OSHA- Occupational Safety and Health Administration
NTP- National Toxicology program
IARC- International Agency for Research on Cancer
ND- Not Determined
N/A- Not available
R-phrases- Risk phrases
S-phrases- Safety phrases

Date of printing: 2.12.2010

Version no. 1


To the best of our knowledge the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.