MATERIAL IDENTITY: SHELLSOL® Heptane

COMPANY ADDRESS: Shell Chemical Company, P.O. Box 2463, Houston, TX. 77342-2463, USA

SECTION 2 PRODUCT/INGREDIENTS

INGREDIENTS

<table>
<thead>
<tr>
<th>CAS#</th>
<th>CONCENTRATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>64742-89-8</td>
<td>100 %weight</td>
</tr>
</tbody>
</table>

Solvent Naphtha (Petroleum), Light Aliphatic

Comments:
A complex stream of predominately C5 to C8 hydrocarbons; exact composition will vary.

SECTION 3 HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Appearance & Odor: Colorless liquid. Hydrocarbon odor.

Health Hazards: Can cause severe lung damage and may be fatal if swallowed. May cause CNS depression.

Physical Hazards: EXTREMELY FLAMMABLE. Vapors are heavier than air. Vapors may travel across the ground and reach remote ignition sources causing a flashback fire danger.

Inhalation:
Breathing of high vapor concentrations may cause central nervous system (CNS) depression resulting in dizziness, light-headedness, headache, nausea and loss of coordination. Continued inhalation may result in unconsciousness and death. Vapors expected to be slightly irritating. Prolonged and repeated exposures to high concentrations may cause hearing loss (see section 11). Chronic hydrocarbon abuse (for example, sniffing glue or light hydrocarbons such as contained in this material) has been associated with irregular heart rhythms and potential cardiac arrest.

Eye Contact:
May cause temporary discomfort or irritation to the eye.

Skin Contact:
May be slightly irritating to the skin. Prolonged or repeated skin contact can cause defatting and drying of the skin which may result in a burning sensation and a dried, cracked appearance.
**Ingestion:**
Liquid can directly enter the lungs (aspiration) when swallowed or vomited. Serious lung damage and possibly fatal chemical pneumonia (chemical pneumonitis) can develop if this occurs.

**Primary Target Organs:**
The following organs and/or organ systems may be damaged by overexposure to this material.
Heart, Auditory System

**Inhalation:**
Move victim to fresh air. If the victim has difficulty breathing or tightness of the chest, is dizzy, vomiting or unresponsive, give 100% oxygen with rescue breathing or CPR as required and transport to the nearest medical facility.

**Skin:**
Wipe off excess material from exposed area. Flush exposed area with water and follow by washing with soap if available. If redness, swelling, pain and/or blisters occur, transport to the nearest medical facility for additional treatment.

**Eye:**
Flush eyes with water while holding eyelids open. Rest eyes for 30 minutes. If redness, burning, blurred vision or swelling persist, consult a physician.

**Ingestion:**
DO NOT induce vomiting. Have victim rinse mouth out with water, then drink sips of water to remove taste from mouth. In general no treatment is necessary unless large quantities are swallowed, however, get medical advice. If the victim is coughing, choking, has shortness of breath, or difficulty breathing, transport to the nearest medical facility for additional treatment. If any of the following delayed signs and symptoms appear within the next 6 hours, transport to the nearest medical facility: fever greater than 101º F, shortness of breath, chest congestion or continued coughing or wheezing. If vomiting occurs spontaneously, keep head below hips to prevent aspiration.

**Note to Physician:**
Light hydrocarbons like this one have been associated with cardiac sensitization in abuse situations. Hypoxia or the injection of adrenaline-like substances enhances these effects.

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**SECTION 5  FIRE FIGHTING MEASURES**

**Flash Point [Method]:**  <10 ºF/<-12.22 ºC [ Tagliabue Closed Cup]
**Autoignition Temperature:**  500 ºF/260 ºC
**Flammability in Air:**  1 - 8 %volume

**Extinguishing Media:**
Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames. Do not use a direct stream of water. Material will float and can be re-ignited on surface of water.

**Fire Fighting Instructions:**
EXTREMELY FLAMMABLE. Clear fire area of all non-emergency personnel. Do not enter confined fire space without full bunker gear (helmet with face shield, bunker coats, gloves and rubber boots), including a positive pressure, NIOSH approved, self-contained breathing apparatus. Containers exposed to intense heat from fires should be cooled with large quantities of water to prevent weakening of container structure which could result in container rupture.

**Unusual Fire Hazards:**
Vapors are flammable and heavier than air. Vapors may travel across the ground and reach remote ignition.
EXTREMELY FLAMMABLE. Vapors are flammable and heavier than air. Vapors may travel across the ground and reach remote ignition sources causing a flashback fire danger.

**Protective Measures:**
Isolate hazard area and deny entry to unnecessary or unprotected personnel. Eliminate potential sources of ignition (no smoking, flares, sparks or flames in immediate area). Stay upwind and keep out of low areas. Handling equipment must be bonded and grounded to prevent sparking.

Wear appropriate personal protective equipment when responding to spills. Refer to Section 8.

**Spill Management:**
Shut off source of leak if safe to do so. Dike and contain spill. Use water spray (fog) to reduce vapors or divert vapor cloud drift. If vapor cloud forms, use water fog to suppress or blanket spill area with foam. Remove with vacuum trucks or pump to storage/salvage vessels. Soak up residue with an absorbent such as clay, sand or other suitable material and dispose of properly. Flush area with water to remove trace residue. Contain run-off from residue flush and dispose of properly. Prevent entry into waterways, sewer, basements or confined areas. Remove contaminated soil to remove contaminated trace residues. Dispose of in same manner as material. For small spills: Soak up residue with an absorbent such as clay, sand or other suitable material. Place in non-leaking container and seal tightly for proper disposal.

Proper disposal should be evaluated based on regulatory status of this material (see Section 15), potential contamination from subsequent use and spillage, and regulations governing disposal in the local area.

**Reporting:**
This material is covered by EPA's Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Petroleum Exclusion. Therefore, releases to the environment may not be reportable under CERCLA. Notify authorities if any exposures to the general public or environment occurs or is likely to occur.

**Handling:**
Surfaces that are sufficiently hot may ignite liquid material. Vapors are flammable and heavier than air. Vapors may travel across the ground and reach remote ignition sources causing a flashback fire danger.

Keep away from heat, sparks and flame. Extinguish pilot lights, cigarettes and turn off other sources of ignition prior to use and until all vapors have dissipated. Use explosion-proof ventilation to prevent vapor accumulation while in use. Properly dispose of any contaminated rags or cleaning materials in order to prevent fires. Wash with soap and water before eating, drinking, smoking, applying cosmetics, or using toilet facilities. Launder contaminated clothing before reuse. Air-dry contaminated clothing in a well-ventilated area before laundering. Bond and ground handling equipment and transfer containers to prevent sparking.

**Storage:**
Keep containers closed when not in use.

**Container Warnings:**
Containers, even those that have been emptied, can contain explosive vapors. Do not cut, drill, grind, weld or perform similar operations on or near containers.
Exposure Controls

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Appropriate measures include:

Adequate explosion-proof ventilation to control airborne concentrations below the exposure guidelines/limits.

Personal Protection

Personal protective equipment (PPE) selections vary based on potential exposure conditions such as handling practices, concentration and ventilation. Information on the selection of eye, skin and respiratory protection for use with this material is provided below.

Eye Protection:
Chemical Goggles, if liquid contact is likely, or Safety Glasses

Skin Protection:
Use protective clothing which is chemical resistant to this material. Selection of protective clothing depends on potential exposure conditions and may include gloves, boots, suits and other items. The selection(s) should take into account such factors as job task, type of exposure and durability requirements.

Respiratory Protection:
If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, an approved respirator must be worn. Respirator selection, use and maintenance should be in accordance with the requirements of the OSHA Respiratory Protection Standard, 29 CFR 1910.134.

Types of respirator(s) to be considered in the selection process include:

Air-Purifying Respirator for Organic Vapors, Supplied-Air Respirator, Self-contained breathing apparatus (SCBA) - for use in environments with unknown concentrations or emergency situations.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance & Odor: Colorless liquid. Hydrocarbon odor.
Substance Chemical Family: Hydrocarbon Solvent

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auto Ignition Temperature</td>
<td>500 °F</td>
</tr>
<tr>
<td>Boiling Point</td>
<td>195 °F</td>
</tr>
<tr>
<td>Evaporation Rate</td>
<td>4.2 [vs. n-Butyl Acetate = 1]</td>
</tr>
<tr>
<td>Flammability in Air</td>
<td>1 - 8 %volume</td>
</tr>
<tr>
<td>Flash Point</td>
<td>&lt; 10 °F [Tagliabue Closed Cup]</td>
</tr>
<tr>
<td>Solubility (in Water)</td>
<td>Negligible</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>0.697 @ 60 °F</td>
</tr>
<tr>
<td>Stability</td>
<td>Stable</td>
</tr>
</tbody>
</table>

Stability:
Material is stable under normal conditions.

Conditions to Avoid:
Prevent vapor accumulation. Avoid heat, sparks, open flames and other ignition sources.

Materials to Avoid:
Avoid contact with strong oxidizing agents.

SECTION 11  TOXICOLOGICAL INFORMATION

Acute Toxicity

<table>
<thead>
<tr>
<th>Substance</th>
<th>Route</th>
<th>Effect</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrocarbon Solvent</td>
<td>Inhalation - LC50</td>
<td>15,000 ppm (v) (Rat) 4 hour(s)</td>
<td></td>
</tr>
<tr>
<td>Solvent Naphtha, Light Aliphatic</td>
<td>Dermal - LD50</td>
<td>&gt;2.84 g/kg (Rat)</td>
<td></td>
</tr>
<tr>
<td>Solvent Naphtha, Light Aliphatic</td>
<td>Oral - LD50</td>
<td>&gt;7.1 g/kg (Rat)</td>
<td></td>
</tr>
</tbody>
</table>

Eye Irritation:
minimal irritation [Rabbit] Material Tested - Solvent Naphtha, Light Aliphatic

Skin Irritation:
slight irritation [Rabbit, 24 hour(s)] Material Tested - Solvent Naphtha, Light Aliphatic

Subchronic Testing:
While there is no evidence that industrially acceptable levels of light hydrocarbon vapors (e.g., the occupational exposure limit) have produced cardiac effects in humans, animal studies have shown that inhalation of high levels produced cardiac sensitization. Such sensitization may cause fatal changes in heart rhythms, which was shown to be enhanced by hypoxia or the injection of adrenaline-like substances.

Neurotoxicity:
Prolonged and repeated exposures to high concentrations of some volatile hydrocarbon solvents have resulted in hearing loss in rats. Solvent abusers and noise interaction with these solvents in the work environment may cause symptoms of hearing loss.

Other Testing:
Kidney effects in male rats were observed in laboratory animals exposed to a similar material. Effects were consistent with male rat hyaline droplet nephropathy which is of questionable significance to human health.

Mutagenicity:
Some effects to chromosomes but no mutagenic effects were observed in genotoxicity studies conducted for similar hydrocarbon solvent mixtures. The biological significance of the chromosomal findings is unknown.
This section will be updated as ecological reviews are completed.

SECTION 13  DISPOSAL CONSIDERATIONS

Product Disposal:
Under EPA-RCRA (40 CFR 261) if this material becomes a waste material, it would be an ignitable hazardous waste, hazardous waste number D001. Refer to the latest EPA or state regulations regarding proper disposal.

SECTION 14  TRANSPORT INFORMATION

US Department of Transportation Classification

Proper Shipping Name: Petroleum Distillates, N.O.S.
Technical Names (s): PETROLEUM NAPHTHA
Identification Number: UN1268
Hazard Class/Division: 3 (Flammable Liquid)
Packing Group: II
Oil: This material is an 'OIL' under 49 CFR Part 130 when transported in a container of 3500 gallon capacity or greater.

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SECTION 15  REGULATORY INFORMATION

Federal Regulatory Status

Resource Conservation & Recovery Act (RCRA) Classification:
D001 (Ignitable Hazardous Waste)

Superfund Amendment & Reauthorization Act (SARA) Title III:

SARA Hazard Categories(311/312):
Fire Hazard. Delayed (Chronic) Health Hazard.

Toxic Substances Control Act (TSCA) Status:
This material is listed on the EPA/TSCA Inventory of Chemical Substances.

The following chemicals are specifically listed by individual states; other product specific health and safety data in other sections of the MSDS may also be applicable for state requirements. For details on your regulatory requirements you should contact the appropriate agency in your state.

New Jersey Right-To-Know Chemical List:

Heptane (142-82-5)  14 - 20 %weight

Pennsylvania Right-To-Know Chemical List:

Heptane (142-82-5)  14 - 20 %weight
Hexane, 2-Methyl- (591-76-4) 24 - 29 %weight
Hexane, 3-Methyl- (589-34-4) 29 - 32 %weight
Pentane, 2,3-Dimethyl - (565-59-3) 3 - 9 %weight
Pentane, 2,4-Dimethyl - (108-08-7) < 2 %weight

SECTION 16 OTHER INFORMATION

HMIS Rating (Health, Fire, Reactivity): 1, 3, 0

Revision#: 7
Revision Date: 06/05/2000
Revisions since last change (discussion): This Material Safety Data Sheet has changed because Shell Chemical Company has implemented new software to generate the sheet. There will be slight differences in the hazard and precautionary language as we incorporate the guidance contained in the ANSI MSDS standard (ANSI Z400.1-1998). There are no significant changes to the health, safety or precautionary messages. We encourage you to take the opportunity to reread the sheet and review the information contained.

Product Codes: 83229, Q6022

ADMINISTRATIVE INFORMATION

Company Address: Shell Chemical Company, P.O. Box 2463, Houston, TX. 77342-2463, USA

Company Product Stewardship & Regulatory Compliance Contact: Susan Eastridge
Phone Number: (713) 241-5985

The information contained herein is based on data considered accurate. However, no warranty is expressed or implied regarding the accuracy of these data or the results to be obtained from the use thereof.