Safety Data Sheet
Heating Oil Plus mj2

1. Product and company identification

<table>
<thead>
<tr>
<th>Product name</th>
<th>Heating Oil Plus mj2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material uses</td>
<td>Petrochemical industry: Fuel additive.</td>
</tr>
<tr>
<td>Internal code</td>
<td>FS-000102</td>
</tr>
<tr>
<td>System code</td>
<td>IFS0572</td>
</tr>
</tbody>
</table>
| Supplier              | Advanced Fuel Solutions  
1060 Osgood Street  
North Andover  
MA 01845 |

Information contact : 1-978-258-8360

Emergency telephone number
In USA, Canada and North America, 24 hour / 7 day emergency information for our product is provided by the CHEMTREC® Emergency Call Center based in the USA

Country information
USA, Canada, Puerto Rico, Virgin Islands : Emergency telephone number : +1 800 424 9300
In case of difficulties, or for ships at sea : +1 703 527 3887

In Europe, Middle East, Africa, Asia Pacific and South America 24 hour / 7 day emergency response for our products is provided by the NCEC CARECHEM 24 global network

Country information
South America ( all countries ) : Emergency telephone number : +1 215 207 0061
Brazil : +55 113 711 9144
Mexico : +52 555 004 8763

Europe ( all countries ) Middle East, Africa ( French, Portuguese, English ) : +44 (0) 1235 239 670
France, Portugal, Spain, Italy, Germany, Belgium, Netherlands, Luxembourg, Switzerland, Austria, Sweden, Denmark, Norway, Finland, Russia : London, UK

Middle East, Africa ( Arabic, French, English ) : +44 (0) 1235 239 671
Arabian Peninsula, North Africa, Sub-Saharan Africa, North America : Lebanon

Asia Pacific ( all countries except China )
Australia, New Zealand, Japan, Indonesia, Malaysia, Philippines, Singapore, Thailand, Vietnam, Korea, Taiwan : +65 3158 1074

China : +86 10 5100 3039

Date of issue/Date of revision : 2015-06-01
Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture : FLAMMABLE LIQUIDS - Category 3
SKIN CORROSION/IRRITATION - Category 1B
SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 1
SKIN SENSITIZATION - Category 1
CARCINOGENICITY - Category 2
TOXIC TO REPRODUCTION (Fertility) - Category 1B
TOXIC TO REPRODUCTION (Unborn child) - Category 1B

GHS label elements
Hazard pictograms : [Diagram of hazard pictograms]

Signal word : Danger

Hazard statements : H226 - Flammable liquid and vapor.
H314 - Causes severe skin burns and eye damage.
H317 - May cause an allergic skin reaction.
H360 - May damage fertility or the unborn child.
H351 - Suspected of causing cancer.

Precautionary statements

Prevention : P201 - Obtain special instructions before use.
P202 - Do not handle until all safety precautions have been read and understood.
P281 - Use personal protective equipment as required.
P280 - Wear protective gloves. Wear eye or face protection. Wear protective clothing.
P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P241 - Use explosion-proof electrical, ventilating, lighting and all material-handling equipment.
P242 - Use only non-sparking tools.
P243 - Take precautionary measures against static discharge.
P233 - Keep container tightly closed.
P261 - Avoid breathing vapor.
P264 - Wash hands thoroughly after handling.
P272 - Contaminated work clothing should not be allowed out of the workplace.

Response : P308 + P313 - IF exposed or concerned: Get medical attention.
P304 + P340 + P310 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or physician.
P301 + P310 + P330 + P331 - IF SWALLOWED: Immediately call a POISON CENTER or physician. Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353 + P363 + P310 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. Wash contaminated clothing before reuse. Immediately call a POISON CENTER or physician.
P302 + P352 - IF ON SKIN: Wash with plenty of soap and water.
P333 + P313 - If skin irritation or rash occurs: Get medical attention.
P305 + P351 + P338 + P310 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or physician.

Storage : P405 - Store locked up.
P403 - Store in a well-ventilated place.
P235 - Keep cool.

Disposal : P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.

Date of issue/Date of revision : 2015-06-01
Section 2. Hazards identification

Supplemental label elements: Do not taste or swallow. Wash thoroughly after handling.

Hazards not otherwise classified: Causes digestive tract burns.

Target organs: Contains material which causes damage to the following organs: skin. Contains material which may cause damage to the following organs: blood, kidneys, liver, gastrointestinal tract, upper respiratory tract, central nervous system (CNS), eye, lens or cornea.

See toxicological information (Section 11)

Section 3. Composition/information on ingredients

<table>
<thead>
<tr>
<th>Substance/mixture</th>
<th>Mixture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ingredient name</td>
<td>%</td>
</tr>
<tr>
<td>Solvent naphtha (petroleum), light arom.</td>
<td>30 - 60</td>
</tr>
<tr>
<td>Solvent naphtha (petroleum), heavy arom.</td>
<td>4.99 - 9.99</td>
</tr>
<tr>
<td>phenol, 2,2'-(1-methyl-1,2-ethanediyl)bis(nitrilomethylene)bis-naphthalene</td>
<td>0.99 - 4.99</td>
</tr>
<tr>
<td>Proprietary</td>
<td>-</td>
</tr>
</tbody>
</table>

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

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

Description of necessary first aid measures

Eye contact: Get medical attention immediately. Call a poison center or physician. Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician.

Inhalation: Get medical attention immediately. Call a poison center or physician. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Skin contact: Get medical attention immediately. Call a poison center or physician. Wash with plenty of soap and water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician. In the event of any complaints or symptoms, avoid further exposure. Wash clothing before reuse. Clean shoes thoroughly before reuse.

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Section 4. First aid measures

Ingestion : Get medical attention immediately. Call a poison center or physician. Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Chemical burns must be treated promptly by a physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : Causes serious eye damage.
Inhalation : May give off gas, vapor or dust that is very irritating or corrosive to the respiratory system. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.
Skin contact : Causes severe burns. May cause an allergic skin reaction.
Ingestion : Corrosive to the digestive tract. Causes burns. May cause burns to mouth, throat and stomach.

Over-exposure signs/symptoms

Eye contact : Adverse symptoms may include the following: pain, watering, redness.
Inhalation : Adverse symptoms may include the following: reduced fetal weight, increase in fetal deaths, skeletal malformations.
Skin contact : Adverse symptoms may include the following: pain or irritation, redness, blistering may occur, reduced fetal weight, increase in fetal deaths, skeletal malformations.
Ingestion : Adverse symptoms may include the following: stomach pains, reduced fetal weight, increase in fetal deaths, skeletal malformations.

Indications of immediate medical attention and special treatment needed, if necessary

Notes to physician : In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
Specific treatments : No specific treatment.
Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

See toxicological information (Section 11)

Date of issue/Date of revision : 2015-06-01
Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media: Use dry chemical, CO₂, water spray (fog) or foam.

Unsuitable extinguishing media: Do not use water jet.

Specific hazards arising from the chemical: Flammable liquid and vapor. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. Runoff to sewer may create fire or explosion hazard.

Hazardous thermal decomposition products: Decomposition products may include the following materials: carbon dioxide, carbon monoxide, nitrogen oxides.

Special protective actions for fire-fighters: Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Special protective equipment for fire-fighters: Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Flash point: Closed cup: 52°C (125.6°F) [Pensky-Martens.]

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel: No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Do not breathe vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders: If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions: Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill: Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Large spill: Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.
Section 7. Handling and storage

Precautions for safe handling

Protective measures: Put on appropriate personal protective equipment (see Section 8). Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Avoid exposure - obtain special instructions before use. Avoid exposure during pregnancy. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use only non-sparking tools. Take precautionary measures against electrostatic discharges. Empty containers retain product residue and can be hazardous. Do not reuse container.

Advice on general occupational hygiene: Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities: Store in accordance with local regulations. Store in a segregated and approved area. Store in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Store locked up. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

<table>
<thead>
<tr>
<th>Ingredient name</th>
<th>Exposure limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>naphthalene</td>
<td>ACGIH TLV (United States, 4/2014). Absorbed through skin. TWA: 10 ppm, 0 times per shift, 8 hours. TWA: 52 mg/m³, 0 times per shift, 8 hours. OSHA PEL 1989 (United States, 3/1989). TWA: 10 ppm, 0 times per shift, 8 hours. TWA: 50 mg/m³, 0 times per shift, 8 hours. STEL: 15 ppm, 0 times per shift, 15 minutes. STEL: 75 mg/m³, 0 times per shift, 15 minutes. NIOSH REL (United States, 10/2013). TWA: 10 ppm, 0 times per shift, 10 hours. TWA: 50 mg/m³, 0 times per shift, 10 hours. STEL: 15 ppm, 0 times per shift, 15 minutes. STEL: 75 mg/m³, 0 times per shift, 15 minutes. OSHA PEL (United States, 2/2013). TWA: 10 ppm, 0 times per shift, 8 hours. TWA: 50 mg/m³, 0 times per shift, 8 hours. AIIHA WEEL (United States, 10/2011). Absorbed through skin. Skin sensitizer. TWA: 5 mg/m³ 8 hours.</td>
</tr>
<tr>
<td>Proprietary</td>
<td></td>
</tr>
</tbody>
</table>

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Section 8. Exposure controls/personal protection

Appropriate engineering controls: Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

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 will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures: Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eye wash stations and safety showers are close to the workstation location.

Eye/face protection: Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles and/or face shield. If inhalation hazards exist, a full-face respirator may be required instead.

Skin protection

Hand protection: Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Body protection: Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. When there is a risk of ignition from static electricity, wear anti-static protective clothing. For the greatest protection from static discharges, clothing should include anti-static overalls, boots and gloves.

Other skin protection: Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection: Use a properly fitted, air-purifying or supplied-air respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

Physical state: Liquid.
Color: DarkRed.
Odor: Aromatic.
Odor threshold: Not available.
\( pH \): Not available.
Melting point: Not available.
Boiling point: Lowest known value: 158.89 to 170°C (318 to 338°F)(Solvent naphtha (petroleum), light arom.). Weighted average: 181.22°C (358.2°F)
Flash point: Closed cup: 52°C (125.6°F) [Pensky-Martens.]

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Section 9. Physical and chemical properties

Evaporation rate: Highest known value: 0.3 (Solvent naphtha (petroleum), light arom.) Weighted average: 0.27 compared with butyl acetate.

Flammability (solid, gas): Not available.

Lower and upper explosive (flammable) limits: Greatest known range: Lower: 0.6% Upper: 7% (Solvent naphtha (petroleum), heavy arom.).

Vapor pressure: Highest known value: 0.3 kPa (2.1 mm Hg) (at 20°C) (Solvent naphtha (petroleum), light arom.). Weighted average: 0.26 kPa (1.95 mm Hg) (at 20°C).

Vapor density: Highest known value: 4.6 to 5.5 (Air = 1) (Solvent naphtha (petroleum), heavy arom.). Weighted average: 4.55 (Air = 1).

Specific gravity: 0.907 [ASTM D 4052]

Density: 7.57 lbs/gal

Solubility: Insoluble in the following materials: cold water, hot water.

Partition coefficient: n-octanol/water: Not available.


Decomposition temperature: Not available.

Viscosity: Not available.

Section 10. Stability and reactivity

Reactivity: No specific test data related to reactivity available for this product or its ingredients.

Chemical stability: The product is stable.

Possibility of hazardous reactions: Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid: Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.

Incompatible materials: Reactive or incompatible with the following materials:
- oxidizing materials

Hazardous decomposition products: Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Test</th>
<th>Species</th>
<th>Result</th>
<th>Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solvent naphtha (petroleum), light arom.</td>
<td>-</td>
<td>Rat</td>
<td>LD50 Oral</td>
<td>8400 mg/kg</td>
</tr>
<tr>
<td>N,N'-di-sec-butyl-p-phenylenediamine</td>
<td>-</td>
<td>Guinea pig</td>
<td>LD50 Dermal</td>
<td>5000 mg/kg</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>Rabbit</td>
<td>LD50 Dermal</td>
<td>2806 mg/kg</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>Rat - Male, Female</td>
<td>LD50 Dermal</td>
<td>756 mg/kg</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>Rat - Male, Female</td>
<td>LD50 Oral</td>
<td>271 mg/kg</td>
</tr>
<tr>
<td>OECD 402 Acute Dermal Toxicity</td>
<td>-</td>
<td>Rat</td>
<td>LC50 Inhalation Vapor</td>
<td>&gt;590 mg/m³</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>Rabbit</td>
<td>LD50 Dermal</td>
<td>&gt;2 mL/kg</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>Rabbit</td>
<td>LD50 Dermal</td>
<td>2000 mg/kg</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>Rat</td>
<td>LDLo Oral</td>
<td>5 mL/kg</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>Rat</td>
<td>LC50 Inhalation Vapor</td>
<td>16000 ppm</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>Rabbit</td>
<td>LD50 Dermal</td>
<td>12900 mg/kg</td>
</tr>
</tbody>
</table>

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# Section 11. Toxicological information

| naphthalene | - | Rat | LD50 Oral | 4560 mg/kg |
| - | - | Rat | LC50 Inhalation Vapor | >340 mg/m³ |
| Proprietary | - | Rabbit | LD50 Dermal | >2000 mg/kg |
| - | - | Rat | LD50 Dermal | >2500 mg/kg |
| - | - | Rat | LD50 Oral | 490 mg/kg |
| - | - | Rat | LD50 Dermal | 1260 mg/kg |
| - | - | Rat | LD50 Oral | 2100 to 3990 mg/kg |

## Potential chronic health effects

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Test</th>
<th>Species</th>
<th>Result</th>
<th>Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proprietary</td>
<td>-</td>
<td>Rat</td>
<td>Sub-chronic LOAEL Oral</td>
<td>43 mg/kg</td>
</tr>
<tr>
<td>-</td>
<td>Rabbit</td>
<td>Sub-chronic LOAEL Dermal</td>
<td>50 mg/kg</td>
<td></td>
</tr>
</tbody>
</table>

## Irritation/Corrosion

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Test</th>
<th>Species</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solvent naphtha (petroleum), light arom.</td>
<td>-</td>
<td>Rabbit Eyes</td>
<td>Mild irritant</td>
</tr>
<tr>
<td>N,N'-di-sec-butyl-p-phenylenediamine</td>
<td>-</td>
<td>Rabbit</td>
<td>Eyes - Severe irritant</td>
</tr>
<tr>
<td>Solvent naphtha (petroleum), heavy arom.</td>
<td>-</td>
<td>Rabbit</td>
<td>Skin - Mild irritant</td>
</tr>
<tr>
<td>Proprietary</td>
<td>-</td>
<td>Rabbit</td>
<td>Eyes - Severe irritant</td>
</tr>
<tr>
<td>Proprietary</td>
<td>-</td>
<td>Rabbit</td>
<td>Skin - Severe irritant</td>
</tr>
</tbody>
</table>

## Sensitization

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Test</th>
<th>Species</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>N,N'-di-sec-butyl-p-phenylenediamine</td>
<td>-</td>
<td>Guinea pig</td>
<td>Sensitizing</td>
</tr>
<tr>
<td>Proprietary</td>
<td>-</td>
<td>Guinea pig</td>
<td>Sensitizing</td>
</tr>
</tbody>
</table>

## Mutagenicity

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Test</th>
<th>Experiment</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proprietary</td>
<td>-</td>
<td>Experiment: In vivo Subject: Mammalian-Animal</td>
<td>Negative</td>
</tr>
</tbody>
</table>

## Carcinogenicity

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>OSHA</th>
<th>IARC</th>
<th>NTP</th>
</tr>
</thead>
<tbody>
<tr>
<td>naphthalene</td>
<td>-</td>
<td>2B</td>
<td>Reasonably anticipated to be a human carcinogen.</td>
</tr>
</tbody>
</table>

## Reproductive toxicity

**Date of issue/Date of revision:** 2015-06-01
Section 11. Toxicological information

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Test</th>
<th>Species</th>
<th>Result</th>
<th>Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proprietary</td>
<td>-</td>
<td>Mammal - species unspecified</td>
<td>-</td>
<td>Oral: 970 NOAEL</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>Mammal - species unspecified</td>
<td>-</td>
<td>Dermal: 161 NOAEL</td>
</tr>
</tbody>
</table>

**Teratogenicity**
Not available.

**Specific target organ toxicity (single exposure)**

<table>
<thead>
<tr>
<th>Name</th>
<th>Category</th>
<th>Route of exposure</th>
<th>Target organs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solvent naphtha (petroleum), heavy arom.</td>
<td>Category 3</td>
<td>Not applicable.</td>
<td>Narcotic effects</td>
</tr>
</tbody>
</table>

**Specific target organ toxicity (repeated exposure)**
Not available.

**Aspiration hazard**

<table>
<thead>
<tr>
<th>Name</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solvent naphtha (petroleum), light arom.</td>
<td>ASPIRATION HAZARD - Category 1</td>
</tr>
<tr>
<td>Solvent naphtha (petroleum), heavy arom.</td>
<td>ASPIRATION HAZARD - Category 1</td>
</tr>
</tbody>
</table>

Section 12. Ecological information

**Toxicity**

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Result</th>
<th>Species</th>
<th>Exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>N,N’-di-sec-butyl-p-phenylenediamine</td>
<td>Acute EC50 0.0958 mg/l</td>
<td>Algae</td>
<td>72 hours</td>
</tr>
<tr>
<td></td>
<td>Acute EC50 0.939 mg/l</td>
<td>Algae</td>
<td>72 hours</td>
</tr>
<tr>
<td></td>
<td>Acute EC50 0.54 mg/l</td>
<td>Algae</td>
<td>48 hours</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 0.13 mg/l</td>
<td>Daphnia</td>
<td>96 hours</td>
</tr>
<tr>
<td></td>
<td>Chronic NOEC 0.0029 mg/l</td>
<td>Fish</td>
<td>21 days</td>
</tr>
<tr>
<td></td>
<td>Chronic NOEC 0.0037 mg/l</td>
<td>Daphnia</td>
<td>41 days</td>
</tr>
<tr>
<td></td>
<td>Acute EC50 1 to 3 mg/l</td>
<td>Algae</td>
<td>72 hours</td>
</tr>
<tr>
<td>Solvent naphtha (petroleum), heavy arom.</td>
<td>Acute EC50 3 to 10 mg/l</td>
<td>Daphnia</td>
<td>48 hours</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 2 to 5 mg/l</td>
<td>Fish</td>
<td>96 hours</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 7.8 mg/l</td>
<td>Fish</td>
<td>96 hours</td>
</tr>
<tr>
<td>phenol, 2,2’-[(1-methyl-1,2-ethanediyl)bis(nitrilomethyldyne)]bis-naphthalene</td>
<td>Acute EC50 1.96 mg/l Fresh water</td>
<td>Daphnia - Daphnia magna</td>
<td>48 hours</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 2350 µg/l Marine water</td>
<td>Crustaceans - Palaemonetes pugio</td>
<td>48 hours</td>
</tr>
<tr>
<td>Proprietary</td>
<td>Acute LC50 1.6 mg/l</td>
<td>Fish</td>
<td>96 hours</td>
</tr>
<tr>
<td></td>
<td>Acute EC50 6.8 mg/l</td>
<td>Algae</td>
<td>72 hours</td>
</tr>
<tr>
<td></td>
<td>Acute EC50 24.1 mg/l</td>
<td>Daphnia</td>
<td>48 hours</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 420 mg/l</td>
<td>Fish</td>
<td>96 hours</td>
</tr>
<tr>
<td></td>
<td>Acute NOEC 0.5 mg/l</td>
<td>Algae</td>
<td>-</td>
</tr>
</tbody>
</table>

**Persistence and degradability**

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Test</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>N,N’-di-sec-butyl-p-phenylenediamine</td>
<td>OECD 301C Ready Biodegradability - Modified MITI Test (l)</td>
<td>12 % - 28 days</td>
</tr>
</tbody>
</table>

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Section 12. Ecological information

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Aquatic half-life</th>
<th>Photolysis</th>
<th>Biodegradability</th>
</tr>
</thead>
<tbody>
<tr>
<td>N,N’-di-sec-butyl-p-phenylenediamine</td>
<td>Fresh water 9.6 days Fresh water 0.22 days Fresh water 0.0625 days</td>
<td>50%; &lt; 28 day(s)</td>
<td>Not readily</td>
</tr>
<tr>
<td>Solvent naphtha (petroleum), heavy arom. Proprietary</td>
<td>-</td>
<td>-</td>
<td>Inherent</td>
</tr>
<tr>
<td>N,N’-di-sec-butyl-p-phenylenediamine</td>
<td>3.5</td>
<td>99.42</td>
<td>low</td>
</tr>
<tr>
<td>Solvent naphtha (petroleum), heavy arom.</td>
<td>-</td>
<td>&lt;100</td>
<td>low</td>
</tr>
<tr>
<td>Naphthalene</td>
<td>3.3</td>
<td>&gt;100</td>
<td>low</td>
</tr>
<tr>
<td>Proprietary</td>
<td>-3.16</td>
<td>-</td>
<td>low</td>
</tr>
</tbody>
</table>

Bioaccumulative potential

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>LogPow</th>
<th>BCF</th>
<th>Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solvent naphtha (petroleum), light arom.</td>
<td>-</td>
<td>10 to 2500</td>
<td>high</td>
</tr>
<tr>
<td>N,N’-di-sec-butyl-p-phenylenediamine</td>
<td>3.5</td>
<td>99.42</td>
<td>low</td>
</tr>
<tr>
<td>Solvent naphtha (petroleum), heavy arom.</td>
<td>-</td>
<td>&lt;100</td>
<td>low</td>
</tr>
<tr>
<td>Naphthalene</td>
<td>3.3</td>
<td>&gt;100</td>
<td>low</td>
</tr>
<tr>
<td>Proprietary</td>
<td>-3.16</td>
<td>-</td>
<td>low</td>
</tr>
</tbody>
</table>

Section 13. Disposal considerations

The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

<table>
<thead>
<tr>
<th>DOT Classification</th>
<th>IMDG</th>
<th>IATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN number</td>
<td>NA1993</td>
<td>UN1993</td>
</tr>
<tr>
<td>UN proper shipping name</td>
<td>Combustible liquid, n.o.s. (Solvent naphtha (petroleum), light arom.). Marine pollutant (Solvent naphtha (petroleum), light arom., N,N’-di-sec-butyl-p-phenylenediamine) RQ (naphthalene, xylene)</td>
<td>FLAMMABLE LIQUID, N.O.S. (Solvent naphtha (petroleum), light arom.). Marine pollutant (Solvent naphtha (petroleum), light arom., N,N’-di-sec-butyl-p-phenylenediamine)</td>
</tr>
<tr>
<td>Transport hazard class(es)</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Packing group</td>
<td>III</td>
<td>III</td>
</tr>
<tr>
<td>Environmental hazards</td>
<td>Yes.</td>
<td>Yes.</td>
</tr>
</tbody>
</table>

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### Section 14. Transport information

| Additional information | Non-bulk packages (less than or equal to 119 gal) of combustible liquids, that are marine pollutants, are not regulated as hazardous materials in package sizes less than the product reportable quantity, unless transported by vessel.  

The marine pollutant mark is not required when transported on inland waterways in sizes of ≤5 L or ≤5 kg or by road, rail, or inland air in non-bulk sizes. | The marine pollutant mark is not required when transported in sizes of ≤5 L or ≤5 kg.  

**Emergency schedules (EmS)**  
F-E, _S-E_  
**Special provisions**  
223, 274, 955 | The environmentally hazardous substance mark may appear if required by other transportation regulations.  
**Passenger and Cargo Aircraft**  
Quantity limitation: 60 L  
Packaging instructions: 355  
**Cargo Aircraft Only**  
Quantity limitation: 220 L  
Packaging instructions: 366  
**Limited Quantities - Passenger Aircraft**  
Quantity limitation: 10 L  
Packaging instructions: Y344  
**Special provisions**  
A3 |

| Reportable quantity | 8928.6 lbs / 4053.6 kg [1180.6 gal / 4469.2 L]  

Package sizes shipped in quantities less than the product reportable quantity are not subject to the RQ (reportable quantity) transportation requirements. |  

**Limited quantity**  
Yes.  
**Packaging instruction**  
**Passenger aircraft**  
Quantity limitation: 60 L  
**Cargo aircraft**  
Quantity limitation: 220 L  
**Special provisions**  
IB3,T1, T4, TP1 |

| Special precautions for user | Transport within user’s premises: always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage. |

### Section 15. Regulatory information

| U.S. Federal regulations | United States inventory (TSCA 8b): All components are listed or exempted.  

**Clean Water Act (CWA) 307**: naphthalene; ethylbenzene; phenol |

| Clean Air Act Section 112 | Listed  

**(b) Hazardous Air Pollutants (HAPs)**  
SARA 302/304  
**Composition/information on ingredients** |

| Date of issue/Date of revision | 2015-06-01 |
Section 15. Regulatory information

<table>
<thead>
<tr>
<th>Name</th>
<th>%</th>
<th>EHS</th>
<th>SARA 302 TPQ (lbs)</th>
<th>SARA 304 RQ (gallons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>o-Cresol phenol</td>
<td>0 - 0.09</td>
<td>Yes. Yes.</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**SARA 311/312**

Classification: Fire hazard
Immediate (acute) health hazard
Delayed (chronic) health hazard

**Composition/information on ingredients**

<table>
<thead>
<tr>
<th>Name</th>
<th>%</th>
<th>Fire hazard</th>
<th>Sudden release of pressure</th>
<th>Reactive</th>
<th>Immediate (acute) health hazard</th>
<th>Delayed (chronic) health hazard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solvent naphtha (petroleum), light arom.</td>
<td>30 - 60</td>
<td>Yes.</td>
<td>No.</td>
<td>No.</td>
<td>Yes.</td>
<td>No.</td>
</tr>
<tr>
<td>phenol, 2,2'-(1-methyl-1,2-ethanediyl)bis(nitrilomethylidyne)bis-naphthalene</td>
<td>0.99 - 4.99</td>
<td>No.</td>
<td>No.</td>
<td>No.</td>
<td>Yes.</td>
<td>Yes.</td>
</tr>
</tbody>
</table>

**SARA 313**

<table>
<thead>
<tr>
<th>Product name</th>
<th>CAS number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>naphthalene</td>
<td>91-20-3</td>
<td>0.99 - 4.99</td>
</tr>
</tbody>
</table>

SARA 313 notifications must not be detached from the SDS and any copying and redistribution of the SDS shall include copying and redistribution of the notice attached to copies of the SDS subsequently redistributed.

**State regulations**

**Massachusetts**: The following components are listed: NAPHTHALENE; N,N'-DI-SEC-BUTYL-P-PHENYLENEDIAMINE

**New York**: The following components are listed: Naphthalene

**New Jersey**: The following components are listed: NAPHTHALENE; MOTH FLAKES

**Pennsylvania**: The following components are listed: NAPHTHALENE; 1,4-BENZENEDIAMINE, N,N'-BIS(1-METHYLPROPYL)-

**California Prop. 65**: WARNING: This product contains a chemical known to the State of California to cause cancer.

<table>
<thead>
<tr>
<th>Ingredient name</th>
<th>Cancer</th>
<th>Reproductive</th>
<th>No significant risk level</th>
<th>Maximum acceptable dosage level</th>
<th>Contains</th>
</tr>
</thead>
<tbody>
<tr>
<td>naphthalene ethylbenzene</td>
<td>Yes. Yes.</td>
<td>No. No.</td>
<td>Yes. 41 µg/day (ingestion) 54 µg/day (inhalation)</td>
<td>No. No.</td>
<td>0.99 - 4.99 &lt;100ppm</td>
</tr>
</tbody>
</table>

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Section 15. Regulatory information

International lists
National inventory
Australia inventory (AICS) : All components are listed or exempted.
Canada inventory : All components are listed or exempted.
China inventory (IECSC) : All components are listed or exempted.
Europe inventory : All components are listed or exempted.
Japan inventory (ENCS) : All components are listed or exempted.
New Zealand Inventory of Chemicals (NZIoC) : All components are listed or exempted.
Philippines inventory (PICCS) : All components are listed or exempted.
Korea inventory (KECI) : All components are listed or exempted.
Taiwan inventory (TCSI) : All components are listed or exempted.
United States inventory (TSCA 8b) : All components are listed or exempted.

Our REACH (pre-) registrations DO NOT cover the following:
1. The manufacture of these products by our company outside the EU unless covered by the Only Representative provisions, and
2. The importation of these products into Europe by other companies. Re-importation by other companies is not covered by our (pre-) registrations

Customers and other third parties importing and/or re-importing our products into Europe will need either:
- Their own (pre-) registration for substances contained in the imported product, or constituent monomers (imported above 1 tonne per year and >2% by weight) in the case of imported polymers, or
- In the case of importation only, to make use of the "Only Representative" provisions, if available.

Section 16. Other information

Hazardous Material Information System (U.S.A.)

<table>
<thead>
<tr>
<th>Health</th>
<th>Flammability</th>
<th>Physical hazards</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on SDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.)

Flammability
Health 2
Instability/Reactivity 0
Special

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Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

Classification according to Directive 67/548/EEC [DSD] or Classification according to Directive 1999/45/EC [DPD]

Risk phrases : R10- Flammable.
               R40- Limited evidence of a carcinogenic effect.
               R60- May impair fertility.
               R61- May cause harm to the unborn child.
               R48/20/21- Also harmful: danger of serious damage to health by prolonged exposure through inhalation and in contact with skin.
               R34- Causes burns.
               R43- May cause sensitization by skin contact.

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Section 16. Other information

Safety phrases
- S53: Avoid exposure - obtain special instructions before use.
- S26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
- S36/37/39: Wear suitable protective clothing, gloves and eye/face protection.
- S45: In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
- S61: Avoid release to the environment. Refer to special instructions/safety data sheet.

History
- Date of printing: 2015-06-01
- Date of issue/Date of revision: 2015-06-01
- Date of previous issue: 2015-05-22
- Version: 1.01

Key to abbreviations
- ATE = Acute Toxicity Estimate
- BCF = Bioconcentration Factor
- GHS = Globally Harmonized System of Classification and Labelling of Chemicals
- IATA = International Air Transport Association
- IBC = Intermediate Bulk Container
- IMDG = International Maritime Dangerous Goods
- LogPow = logarithm of the octanol/water partition coefficient
- UN = United Nations

Indicates information that has changed from previously issued version.

Notice to reader
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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.