SECTION 1: Identification

1.1. Identification
Trade name: Hop Oil "Type NOBLE"
Chemical name: hop oil
CAS-No.: 8007-04-3

1.2. Recommended use and restrictions on use
Use of the substance/mixture: Manufacturing of food

1.3. Supplier
Supplier/Importer
S. S. Steiner, Inc.
725 5th Ave. 23 rd Floor
New York, NY 10022 - USA
T +1 212 838 8900

Manufacturer/Supplier
Simon H. Steiner, Hopfen, GmbH
Auhofstr. 18
Mainburg, 84048 - Germany
T +49-(0)8751-8605-0 - F +49-(0)8751-8605-80

Email competent person
sds@kft.de

1.4. Emergency telephone number
Emergency number: S. S. Steiner, Inc.
Phone: +1 212 838 8900 (Monday – Friday 08.00 – 17.00, Eastern Time Zone)

Simon H. Steiner, Hopfen, GmbH
Tel.: +49-8751-8605-0 (Monday – Friday 08:00 – 17:00, Central European Time)

Steiner Hops Ltd.
Phone: +44 1992 572 331 (Monday – Friday 08.00 – 17.00, Greenwich Mean Time)

SECTION 2: Hazard(s) identification

2.1. Classification of the substance or mixture
GHS-US classification
Flammable liquids H226 Flammable liquid and vapor
Category 3
Skin corrosion/irritation H315 Causes skin irritation
Category 2
Serious eye damage/eye irritation Category 2 H319 Causes serious eye irritation
Skin sensitization, Category 1 H317 May cause an allergic skin reaction
Aspiration hazard Category 1 H304 May be fatal if swallowed and enters airways

Full text of H statements: see section 16

2.2. GHS Label elements, including precautionary statements
GHS-US labeling
Hazard pictograms (GHS-US):

Signal word (GHS-US): Danger
Hazard statements (GHS-US):
H226 - Flammable liquid and vapor
H304 - May be fatal if swallowed and enters airways
H315 - Causes skin irritation
H317 - May cause an allergic skin reaction
H319 - Causes serious eye irritation
Precautionary statements (GHS-US) : P210 - Keep away from heat, hot surfaces, sparks, open flames. - No smoking
P273 - Avoid release to the environment
P280 - Wear protective gloves, eye protection
P301+P330+P331 - If swallowed: rinse mouth. Do NOT induce vomiting
P302+P352 - If on skin: Wash with plenty of water
P391 - Collect spillage

2.3. Other hazards which do not result in classification
Other hazards not contributing to the classification : Toxic to aquatic life with long lasting effects. Very toxic to aquatic life with long lasting effects.

2.4. Unknown acute toxicity (GHS US)
Not applicable

SECTION 3: Composition/Information on ingredients

3.1. Substances

<table>
<thead>
<tr>
<th>Name</th>
<th>Product identifier</th>
<th>%</th>
<th>GHS-US classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>7-methyl-3-methyleneocta-1,6-diene (Component)</td>
<td>(CAS-No.) 123-35-3</td>
<td>&lt;30</td>
<td>Flam. Liq. 3, H226 Skin Irrit. 2, H315 Eye Irrit. 2, H319 Asp. Tox. 1, H304</td>
</tr>
<tr>
<td>Linalool (Component)</td>
<td>(CAS-No.) 78-70-6</td>
<td>&lt;15</td>
<td>Flam. Liq. 4, H227 Skin Irrit. 2, H315 Eye Irrit. 2A, H319 Skin Sens. 1B, H317</td>
</tr>
<tr>
<td>Caryophyllene (Component)</td>
<td>(CAS-No.) 87-44-5</td>
<td>&lt;5</td>
<td>Asp. Tox. 1, H304</td>
</tr>
<tr>
<td>(E)-7,11-dimethyl-3-methylenedodeca-1,6,10-triene (Component)</td>
<td>(CAS-No.) 18794-84-8</td>
<td>&lt;2</td>
<td>Asp. Tox. 1, H304</td>
</tr>
</tbody>
</table>

Full text of hazard classes and H-statements : see section 16

3.2. Mixtures

Not applicable

SECTION 4: First-aid measures

4.1. Description of first aid measures

First-aid measures general : Call a physician immediately.
First-aid measures after inhalation : Remove person to fresh air and keep comfortable for breathing.
First-aid measures after skin contact : Rinse skin with water/shower. Remove/Take off immediately all contaminated clothing. If skin irritation or rash occurs: Get medical advice/attention.
First-aid measures after eye contact : Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.
First-aid measures after ingestion : Do not induce vomiting. Call a physician immediately.

4.2. Most important symptoms and effects (acute and delayed)

Symptoms/effects after skin contact : Irritation. May cause an allergic skin reaction.
Symptoms/effects after eye contact : Eye irritation.
Symptoms/effects after ingestion : Risk of lung edema.

4.3. Immediate medical attention and special treatment, if necessary

Treat symptomatically.

SECTION 5: Fire-fighting measures

5.1. Suitable (and unsuitable) extinguishing media

Unsuitable extinguishing media : Strong water jet.

5.2. Specific hazards arising from the chemical

Fire hazard : Flammable liquid and vapor.
Reactivity : Flammable liquid and vapor.
5.3. Special protective equipment and precautions for fire-fighters
Firefighting instructions: Cool closed containers exposed to fire with water spray.
Protection during firefighting: Do not attempt to take action without suitable protective equipment. Self-contained breathing apparatus. Complete protective clothing.
Other information: Do not allow run-off from fire fighting to enter drains or water courses. Disposal must be done according to official regulations.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures
6.1.1. For non-emergency personnel
Emergency procedures: Ventilate spillage area. Avoid breathing mist, vapors, spray. No open flames, no sparks, and no smoking. Avoid contact with skin and eyes.

6.1.2. For emergency responders
Protective equipment: Do not attempt to take action without suitable protective equipment. For further information refer to section 8: "Exposure controls/personal protection".

6.2. Environmental precautions
Avoid sub-soil penetration. Prevent entry to sewers and public waters. Notify authorities if product enters sewers or public waters.

6.3. Methods and material for containment and cleaning up
For containment: Collect spillage.
Methods for cleaning up: Cover spill with non combustible material, e.g.: sand/earth. Take up mechanically (sweeping, shoveling) and collect in suitable container for disposal. Notify authorities if product enters sewers or public waters.
Other information: Disposal must be done according to official regulations.

6.4. Reference to other sections
Information for safe handling. See section 7. Concerning personal protective equipment to use, see section 8. For further information refer to section 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling
Precautions for safe handling: Ensure good ventilation of the work station. Avoid breathing mist, vapors, spray. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Ground/bond container and receiving equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Flammable vapors may accumulate in the container. Use explosion-proof equipment. Wear personal protective equipment. Avoid contact with skin and eyes.
Hygiene measures: Wash contaminated clothing before reuse. Contaminated work clothing should not be allowed out of the workplace. Do not eat, drink or smoke when using this product. Always wash hands after handling the product.

7.2. Conditions for safe storage, including any incompatibilities
Technical measures: Ground/bond container and receiving equipment.
Storage conditions: Store in a well-ventilated place. Keep cool. Keep container tightly closed. Store locked up.
Maximum storage period: ≥ 2 year(s)
Storage temperature: < 50 °F
Information about storage in one common storage facility: Keep away from food, drink and animal feeding stuffs.
Packaging materials: Aluminum.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters
No additional information available.

8.2. Appropriate engineering controls
Appropriate engineering controls: Ensure good ventilation of the work station.
Environmental exposure controls: Avoid release to the environment.

8.3. Individual protection measures/Personal protective equipment
Hand protection:
In case of repeated or prolonged contact wear gloves. Choosing the proper glove is a decision that depends not only on the type of material, but also on other quality features, which differ for each manufacturer. Please follow the instructions related to the permeability and the penetration time provided by the manufacturer. Gloves must be replaced after each use and whenever signs of wear or perforation appear.

Eye protection:
Wear closed safety glasses.

Skin and body protection:
Wear suitable protective clothing.

Respiratory protection:
Accidental release measures. Filter type: P1.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>Liquid</td>
</tr>
<tr>
<td>Appearance</td>
<td>clear</td>
</tr>
<tr>
<td>Color</td>
<td>colorless to slightly yellow</td>
</tr>
<tr>
<td>Odor</td>
<td>characteristic</td>
</tr>
<tr>
<td>Odor threshold</td>
<td>No data available</td>
</tr>
<tr>
<td>pH</td>
<td>No data available</td>
</tr>
<tr>
<td>Melting point</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Freezing point</td>
<td>No data available</td>
</tr>
<tr>
<td>Boiling point</td>
<td>&gt; 160 °F</td>
</tr>
<tr>
<td>Flash point</td>
<td>~ 107 °F</td>
</tr>
<tr>
<td>Relative evaporation rate (butyl acetate=1)</td>
<td>No data available</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>No data available</td>
</tr>
<tr>
<td>Relative vapor density at 20 °C</td>
<td>No data available</td>
</tr>
<tr>
<td>Relative density</td>
<td>No data available</td>
</tr>
<tr>
<td>Specific gravity / density</td>
<td>1 g/cm² (68°F)</td>
</tr>
<tr>
<td>Solubility</td>
<td>No data available</td>
</tr>
<tr>
<td>Log Pow</td>
<td>No data available</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity, kinematic</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity, dynamic</td>
<td>46 mPa.s (77°F)</td>
</tr>
<tr>
<td>Explosion limits</td>
<td>No data available</td>
</tr>
<tr>
<td>Explosive properties</td>
<td>Product is not explosive. Explosive vapor/air mixtures may be formed.</td>
</tr>
<tr>
<td>Oxidizing properties</td>
<td>No data available</td>
</tr>
</tbody>
</table>

9.2. Other information
Other properties: No additional information available.

SECTION 10: Stability and reactivity

10.1. Reactivity
Flammable liquid and vapor.

10.2. Chemical stability
Stable under normal conditions. To avoid thermal decomposition, do not overheat.

10.3. Possibility of hazardous reactions
No dangerous reactions known under normal conditions of use.
10.4. Conditions to avoid
Avoid contact with hot surfaces. Heat. No flames, no sparks. Eliminate all sources of ignition.

10.5. Incompatible materials
No additional information available

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

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Not classified  
(Based on available data, the classification criteria are not met)

Skin corrosion/irritation : Causes skin irritation.

Serious eye damage/irritation : Causes serious eye irritation.

Respiratory or skin sensitization : May cause an allergic skin reaction.

Germ cell mutagenicity : Not classified  
(Based on available data, the classification criteria are not met)

Carcinogenicity : Not classified  
(Based on available data, the classification criteria are not met)

Reproductive toxicity : Not classified 
(Based on available data, the classification criteria are not met)

Specific target organ toxicity – single exposure : Not classified  
(Based on available data, the classification criteria are not met)

Specific target organ toxicity – repeated exposure : Not classified  
(Based on available data, the classification criteria are not met)

Aspiration hazard : May be fatal if swallowed and enters airways.

Symptoms/effects after skin contact : Irritation. May cause an allergic skin reaction.

Symptoms/effects after eye contact : Eye irritation.

Symptoms/effects after ingestion : Risk of lung edema.

SECTION 12: Ecological information

12.1. Toxicity
Ecology - general : Very toxic to aquatic life with long lasting effects.

Linalool (78-70-6)
LC50 fish 1 27.8 mg/l (96h; Oncorhynchus mykiss; OECD Guideline 203)
EC50 Daphnia 1 59 mg/l (48h; Daphnia magna; OECD Guideline 202)
NOEC (acute) 25 mg/l (48h; Daphnia magna; OECD Guideline 202)

7-methyl-3-methylenocta-1,6-diene (123-35-3)
EC50 Daphnia 1 1.47 mg/l (48h; Daphnia magna; OECD 202 method)

(E)-7,11-dimethyl-3-methylenedodeca-1,6,10-triene (18794-84-8)
NOEC (chronic) 54 µg/L (21d; Daphnia magna; OECD 211 method)
NOEC chronic fish 66 µg/L (32d; Pimephales promelas; OECD 210 method)

12.2. Persistence and degradability

Linalool (78-70-6)
Persistence and degradability Readily biodegradable.

7-methyl-3-methylenocta-1,6-diene (123-35-3)
Biodegradation 76 % (28d; OECD 301D method)
12.3. Bioaccumulative potential

<table>
<thead>
<tr>
<th>Compound</th>
<th>Log Pow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linalool (78-70-6)</td>
<td>2.9 (68°F)</td>
</tr>
<tr>
<td>7-methyl-3-methyleneocta-1,6-diene (123-35-3)</td>
<td>4.82 (pH 6.5; 86°F; (OECD 117 method))</td>
</tr>
</tbody>
</table>

12.4. Mobility in soil

<table>
<thead>
<tr>
<th>Compound</th>
<th>Log Koc</th>
</tr>
</thead>
<tbody>
<tr>
<td>(E)-7,11-dimethyl-3-methyleneocta-1,6,10-triene (18794-84-8)</td>
<td>4.69 (OECD 121 method)</td>
</tr>
</tbody>
</table>

12.5. Other adverse effects

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other adverse effects</td>
<td>No additional information available.</td>
</tr>
<tr>
<td>Effect on the global warming</td>
<td>No known effects from this product.</td>
</tr>
<tr>
<td>GWPmix comment</td>
<td>No known effects from this product.</td>
</tr>
</tbody>
</table>

SECTION 13: Disposal considerations

13.1. Disposal methods

| Waste treatment methods          | Disposal must be done according to official regulations. Do not dispose of with domestic waste. Do not discharge into drains or the environment. |
| Additional information           | Flammable vapors may accumulate in the container. |

SECTION 14: Transport information

**Department of Transportation (DOT)**

In accordance with DOT

| Transport document description   | UN1197 Extracts, flavoring, liquid, 3, III |
| UN-No. (DOT)                    | UN1197                                    |
| Proper Shipping Name (DOT)      | Extracts, flavoring, liquid               |
| Class (DOT)                     | 3 - Class 3 - Flammable and combustible liquid 49 CFR 173.120 |
| Packing group (DOT)             | III - Minor Danger                        |
| Hazard labels (DOT)             | 3 - Flammable liquid                      |

| DOT Packaging Non Bulk (49 CFR 173.xxx) | 203 |
| DOT Packaging Bulk (49 CFR 173.xxx)     | 242 |
DOT Special Provisions (49 CFR 172.102) : B1 - If the material has a flash point at or above 38 C (100 F) and below 93 C (200 F), then the bulk packaging requirements of 173.241 of this subchapter are applicable. If the material has a flash point of less than 38 C (100 F), then the bulk packaging requirements of 173.242 of this subchapter are applicable.
IB3 - Authorized IBCs: Metal (31A, 31B and 31N); Rigid plastics (31H1 and 31H2); Composite (31HZ1 and 31HA2, 31HB2, 31HN2, 31HD2 and 31HH2). Additional Requirement: Only liquids with a vapor pressure less than or equal to 110 kPa at 50 C (1.1 bar at 122 F), or 130 kPa at 55 C (1.3 bar at 131 F) are authorized, except for UN2672 (also see Special Provision IP8 in Table 2 for UN2672).
T2 - 1.5 178.274(d)(2) Normal............. 178.275(d)(3)
TP1 - The maximum degree of filling must not exceed the degree of filling determined by the following: Degree of filling = 97 / 1 + a (tr - tf) Where: tr is the maximum mean bulk temperature during transport, and tf is the temperature in degrees celsius of the liquid during filling.

DOT Packaging Exceptions (49 CFR 173.xxx) : 150
DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27) : 60 L
DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75) : 220 L
DOT Vessel Stowage Location : A - The material may be stowed “on deck” or “under deck” on a cargo vessel and on a passenger vessel.
Emergency Response Guide (ERG) Number : 127
Other information : No supplementary information available.

TDG
Not applicable

Transport by sea
Transport document description (IMDG) : UN 1197 EXTRACTS, FLAVOURING, LIQUID, 3, III, MARINE POLLUTANT/ENVIRONMENTALLY HAZARDOUS
UN-No. (IMDG) : 1197
Proper Shipping Name (IMDG) : EXTRACTS, FLAVORING, LIQUID
Class (IMDG) : 3 - Flammable liquids
Packing group (IMDG) : III - substances presenting low danger
Limited quantities (IMDG) : 5 L

Air transport
Transport document description (IATA) : UN 1197 Extracts, flavouring, liquid, 3, III, ENVIRONMENTALLY HAZARDOUS
UN-No. (IATA) : 1197
Proper Shipping Name (IATA) : Extracts, flavouring, liquid
Class (IATA) : 3 - Flammable Liquids
Packing group (IATA) : III - Minor Danger

SECTION 15: Regulatory information

15.1. US Federal regulations
All components of this product are listed, or excluded from listing, on the United States Environmental Protection Agency Toxic Substances Control Act (TSCA) inventory
This product or mixture is not known to contain a toxic chemical or chemicals in excess of the applicable de minimis concentration as specified in 40 CFR §372.38(a) subject to the reporting requirements of section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

15.2. International regulations
No additional information available.

15.3. US State regulations
California Proposition 65 - This product contains, or may contain, trace quantities of a substance(s) known to the state of California to cause cancer, developmental and/or reproductive harm.

09/05/2017 US-OSHA - en
7-methyl-3-methyleneocta-1,6-diene (123-35-3)

<table>
<thead>
<tr>
<th>U.S. - California - Proposition 65 - Carcinogens List</th>
<th>U.S. - California - Proposition 65 - Developmental Toxicity</th>
<th>U.S. - California - Proposition 65 - Reproductive Toxicity - Female</th>
<th>U.S. - California - Proposition 65 - Reproductive Toxicity - Male</th>
<th>No significant risk level (NSRL)</th>
<th>Maximum allowable dose level (MADL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

SECTION 16: Other information

Revision date: 09/05/2017
Data sources: Information provided by the manufacturer.
Department issuing data specification sheet: KFT Chemieservice GmbH
Im Leuschnerpark, 3 64347 Griesheim
Postfach 1451 64345 Griesheim
Germany
Phone: +49 6155-8981-400 Fax: +49 6155 8981-500
Safety Data Sheet Service: +49 6155 8981-522
Contact person: Stefanie Zgorzelski

Full text of H-phrases:

| H226 | Flammable liquid and vapor |
| H227 | Combustible liquid |
| H304 | May be fatal if swallowed and enters airways |
| H315 | Causes skin irritation |
| H317 | May cause an allergic skin reaction |
| H319 | Causes serious eye irritation |

Abbreviations and acronyms:

| EC50 | Median effective concentration |
| IATA | International Air Transport Association |
| IMDG | International Maritime Dangerous Goods |
| LC50 | Median lethal concentration |
| NOEC | No-Observed Effect Concentration |
| OECD | Organisation for Economic Co-operation and Development |
| SDS | Safety Data Sheet |

Indication of changes:
General revision. Identification.

KFT SDS US 00

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.