SECTION 1: Identification

1.1. Product identifier

Identification of the substance/preparation

n-Heptanoic acid

CAS-No 111-14-8

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the Substance / Preparation

Intermediate

1.3. Details of the supplier of the safety data sheet

Supplier

OXEA Corporation
1505 West LBJ Freeway, Suite 400
Dallas, TX 75234
USA
Phone: +1 972 481 2700

Product Information

Product Stewardship
FAX: +49 (0)208 693 2053
email: psq@oxea-chemicals.com

1.4. Emergency telephone number

Emergency telephone number

in USA, call 800 424 9300
outside USA, call 703 527 3887, collect calls accepted
available 24/7

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

This substance is classified in accordance with paragraph (d) of §1910.1200 (GHS-US classification).

Acute inhalation toxicity Category 4, H332
Skin corrosion/irritation Category 1B, H314
Serious eye damage/eye irritation Category 1, H318
Target Organ Systemic Toxicant - Single exposure Category 3, H335

OSHA Specified Hazards

Not applicable.

2.2. Label elements
SAFETY DATA SHEET

n-Heptanoic acid
10520

Labeling according to §1910.1200 (GHS-US labeling).

Hazard symbol(s)

Signal word
Danger

Hazard statements
H332: Harmful if inhaled.
H314: Causes severe skin burns and eye damage.
H335: May cause respiratory irritation.

Precautionary statements

Prevention
P280: Wear protective gloves/protective clothing/eye protection/face protection.
P260: Do not breathe gas/mist/vapours.
P271: Use only outdoors or in a well-ventilated area.
P264: Wash hands thoroughly after handling.

Response
P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P301 + P330 + P331: IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P363: Wash contaminated clothing before reuse.
P310: Immediately call a POISON CENTER/doctor.

Storage
P403 + P233: Store in a well-ventilated place. Keep container tightly closed.
P405: Store locked up.

Disposal
P501: Dispose of contents/container in accordance with local regulation.

2.3. Other hazards
Components of the product may be absorbed into the body by inhalation

SECTION 3: Composition/information on ingredients

3.1. Substances

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No</th>
<th>Concentration (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heptanoic acid</td>
<td>111-14-8</td>
<td>&gt; 98,5</td>
</tr>
</tbody>
</table>

Emergency telephone number in USA, call 800 424 9300; outside USA, call USA 703 527 3887, collect calls accepted
USA (A-US)
SECTION 4: First aid measures

4.1. Description of first aid measures

Inhalation
Keep at rest. Aerate with fresh air. Symptoms of poisoning may develop many hours after exposure. Call a physician immediately.

Eyes
Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Remove contact lenses. Immediate medical attention is required.

Skin
Wash off immediately with soap and plenty of water. When symptoms persist or in all cases of doubt seek medical advice.

Ingestion
Call a physician immediately. Do not induce vomiting without medical advice.

4.2. Most important symptoms and effects, both acute and delayed

Main symptoms
cough, headache, nausea, shortness of breath, vomiting, convulsions.

Special hazard
Lung irritation, Lung oedema.

4.3. Indication of any immediate medical attention and special treatment needed

General advice
Remove contaminated, soaked clothing immediately and dispose of safely. First aider needs to protect himself.

Treat symptomatically. If ingested, flush stomach and compensate acidosis.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media
foam, dry chemical, carbon dioxide (CO2), water spray

Extinguishing media which must not be used for safety reasons
Do not use a solid water stream as it may scatter and spread fire.

5.2. Special hazards arising from the substance or mixture
Under conditions giving incomplete combustion, hazardous gases produced may consist of:
carbon monoxide (CO)
carbon dioxide (CO2)
Combustion gases of organic materials must in principle be graded as inhalation poisons
Vapours are heavier than air and may spread along floors

5.3. Advice for firefighters

Special protective equipment for firefighters
Fire fighter protection should include a self-contained breathing apparatus (NIOSH-approved or EN 133) and full fire-fighting turn out gear.

Precautions for firefighting
Cool containers / tanks with water spray. Water run-off and vapor cloud may be corrosive. Dike and collect water used to fight fire. Keep people away from and upwind of fire.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Avoid contact with skin and eyes. Avoid breathing vapors or mists. Keep people away from and upwind of spill/leak. Ensure adequate ventilation, especially in confined areas. Keep away from heat and sources of ignition. For emergency responders: Personal protection see section 8.

6.2. Environmental precautions

Prevent further leakage or spillage. Do not discharge product into the aquatic environment without pretreatment (biological treatment plant).

6.3. Methods and material for containment and cleaning up

Methods for containment
Stop the flow of material, if possible without risk. Dike spilled material, where this is possible.

Methods for cleaning up
Soak up with inert absorbent material. Keep in suitable, closed containers for disposal. If liquid has been spilt in large quantities clean up promptly by scoop or vacuum. Dispose of in accordance with local regulations. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapours).

6.4. Reference to other sections

For personal protective equipment see section 8.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Advice on safe handling
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product. Provide sufficient air exchange and/or exhaust in work rooms.
Hygiene measures
When using, do not eat, drink or smoke. Take off all contaminated clothing immediately. Wash hands before breaks and immediately after handling the product.

Advice on the protection of the environment
See Section 8: Environmental exposure controls.

Incompatible products
- bases
- amines

7.2. Conditions for safe storage, including any incompatibilities

Advice on protection against fire and explosion
Keep away from sources of ignition - No smoking. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapours). In case of fire, emergency cooling with water spray should be available. Ground and bond containers when transferring material.

Technical measures/Storage conditions
Keep containers tightly closed in a cool, well-ventilated place. Handle and open container with care. Keep at temperatures between 0 and 38 °C (32 and 100 °F).

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Exposure limits United States of America
No exposure limits established regarding ACGIH, OSHA Z-1 and OSHA Z-2.

8.2. Exposure controls

Appropriate Engineering controls
General or dilution ventilation is frequently insufficient as the sole means of controlling employee exposure. Local ventilation is usually preferred. Explosion-proof equipment (for example fans, switches, and grounded ducts) should be used in mechanical ventilation systems.

Individual protection measures, such as personal protective equipment

General industrial hygiene practice
Avoid contact with skin, eyes and clothing. Do not breathe vapours or spray mist. Ensure that eyewash stations and safety showers are close to the workstation location.

Hygiene measures
When using, do not eat, drink or smoke. Take off all contaminated clothing immediately. Wash hands before breaks and immediately after handling the product.

Emergency telephone number
in USA, call 800 424 9300; outside USA, call USA 703 527 3887, collect calls accepted
USA (A-US)

Version / Revision 2.00
SAFETY DATA SHEET

n-Heptanoic acid
10520

Eye protection
Tightly fitting safety goggles. In addition to goggles, wear a face shield if there is a reasonable chance for splash to the face.

Hand protection
Wear protective gloves. Recommendations are listed below. Other protective material may be used, depending on the situation, if adequate degradation and permeation data is available. If other chemicals are used in conjunction with this chemical, material selection should be based on protection for all chemicals present.

<table>
<thead>
<tr>
<th>Suitable material</th>
<th>nitrile rubber</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaluation</td>
<td>according to EN 374: level 6</td>
</tr>
<tr>
<td>Glove thickness</td>
<td>approx 0.55 mm</td>
</tr>
<tr>
<td>Break through time</td>
<td>&gt; 480 min</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Suitable material</th>
<th>polyvinylchloride / nitrile rubber</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaluation</td>
<td>according to EN 374: level 6</td>
</tr>
<tr>
<td>Glove thickness</td>
<td>approx 0.9 mm</td>
</tr>
<tr>
<td>Break through time</td>
<td>&gt; 480 min</td>
</tr>
</tbody>
</table>

Skin and body protection
Impervious clothing. Wear face-shield and protective suit for abnormal processing problems.

Respiratory protection
Respirator with filter for organic vapour. Use the indicated respiratory protection if the occupational exposure limit is exceeded and/or in case of product release (dust). Equipment should conform to NIOSH.

Environmental exposure controls
If possible use in closed systems. If leakage can not be prevented, the substance needs to be suck off at the emersion point, if possible without danger. If recycling is not practicable, dispose of in compliance with local regulations. Inform the responsible authorities in case of leakage into the atmosphere, or of entry into waterways, soil or drains.

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>Appearance</td>
<td>liquid</td>
</tr>
<tr>
<td>Colour</td>
<td>colourless</td>
</tr>
<tr>
<td>Odour</td>
<td>pungent</td>
</tr>
<tr>
<td>Odour threshold</td>
<td>0.6 - 10.4 ppm</td>
</tr>
<tr>
<td>pH</td>
<td>4.8 @ 20 °C (68 °F)</td>
</tr>
<tr>
<td>Melting point/range</td>
<td>18 °F (-8 °C)</td>
</tr>
<tr>
<td>Boiling point/range</td>
<td>433 °F (223 °C) @ 1 atm (101.3 kPa)</td>
</tr>
<tr>
<td>Flash point</td>
<td>243 °F (117 °C)</td>
</tr>
<tr>
<td>Method</td>
<td>DIN EN ISO 3679</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>No data available</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>Does not apply, the substance is a liquid</td>
</tr>
<tr>
<td>Lower explosion limit</td>
<td>1.09 Vol %</td>
</tr>
<tr>
<td>Upper explosion limit</td>
<td>10.1 Vol %</td>
</tr>
</tbody>
</table>

Emergency telephone number
in USA, call 800 424 9300; outside USA, call USA 703 527 3887, collect calls accepted
6 / 12
USA (A-US)
SAFETY DATA SHEET

n-Heptanoic acid
10520

Vapour pressure

<table>
<thead>
<tr>
<th>Values [hPa]</th>
<th>Values [kPa]</th>
<th>Values [atm]</th>
<th>@ °C</th>
<th>@ °F</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.013</td>
<td>0.0013</td>
<td>&lt; 0.001</td>
<td>20</td>
<td>68</td>
<td></td>
</tr>
<tr>
<td>0.2</td>
<td>0.02</td>
<td>&lt; 0.001</td>
<td>50</td>
<td>122</td>
<td></td>
</tr>
</tbody>
</table>

Vapour density 4.5 (Air = 1) @ 20 °C (68 °F)

Relative density

<table>
<thead>
<tr>
<th>Values</th>
<th>@ °C</th>
<th>@ °F</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.92</td>
<td>20</td>
<td>68</td>
<td></td>
</tr>
</tbody>
</table>

Solubility  No data available
Water solubility 2 - 5 g/l @ 77 °F (25 °C)
log Pow 2.54 (calculated) KOW WIN
Autoignition temperature 527 °F (275 °C)
Method EU A.15
Decomposition temperature No data available
Viscosity 3.4 mPa*s @ 86 °F (30 °C)

9.2. Other information

Molecular weight 130.19
Molecular formula C7 H14 O2
log Koc 1.143
Oxidizing properties Does not apply, substance is not oxidising. There are no chemical groups associated with oxidizing properties
Refractive Index 1.422 @ 68 °F (20 °C)
Explosive properties Does not apply, substance is not explosive. There are no chemical groups associated with explosive properties

SECTION 10: Stability and reactivity

10.1. Reactivity
The reactivity of the product corresponds to the typical reactivity shown by the substance group as described in any text book on organic chemistry.

10.2. Chemical stability
Stable under recommended storage conditions.

10.3. Possibility of hazardous reactions
Hazardous polymerisation does not occur.

10.4. Conditions to avoid
Avoid contact with heat, sparks, open flame and static discharge. Avoid any source of ignition.

10.5. Incompatible materials
bases, amines.

10.6. Hazardous decomposition products

No decomposition if stored and applied as directed.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Likely routes of exposure Ingestion, Inhalation, Eye contact, Skin contact

Heptanoic acid, CAS: 111-14-8
Main symptoms cough, headache, nausea, shortness of breath, vomiting, convulsions.

Target Organ Systemic Toxicant - Single exposure
The available data lead to the classification given in section 2

Target Organ Systemic Toxicant - Repeated exposure
Due to lack of data, a classification is not possible for:
STOT RE

Acute toxicity

<table>
<thead>
<tr>
<th>Heptanoic acid (111-14-8)</th>
<th>Routes of Exposure</th>
<th>Endpoint</th>
<th>Values</th>
<th>Species</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inhalative</td>
<td>LC50</td>
<td>&gt; 4,6 mg/l (4h)</td>
<td>rat, male/female</td>
<td>OECD 403</td>
</tr>
</tbody>
</table>

Heptanoic acid, CAS: 111-14-8
Assessment
The available data lead to the classification given in section 2
Dermal acute toxicity data were not determined, because of the corrosive properties of the substance

Irritation and corrosion

<table>
<thead>
<tr>
<th>Heptanoic acid (111-14-8)</th>
<th>Target Organ Effects</th>
<th>Species</th>
<th>Result</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Skin</td>
<td>rabbit</td>
<td>corrosive</td>
<td>OECD 404</td>
</tr>
</tbody>
</table>

Heptanoic acid, CAS: 111-14-8
Assessment
The available data lead to the classification given in section 2
Available skin corrosion data suffice for classification of eye corrosion without further testing
For respiratory irritation, no data are available

Sensitization

<table>
<thead>
<tr>
<th>Heptanoic acid (111-14-8)</th>
<th>Target Organ Effects</th>
<th>Species</th>
<th>Evaluation</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Skin</td>
<td>guinea pig</td>
<td>not sensitizing</td>
<td>OECD 406</td>
</tr>
</tbody>
</table>

Heptanoic acid, CAS: 111-14-8
SAFETY DATA SHEET

n-Heptanoic acid
10520

Assessment
Based on available data, the classification criteria are not met for:
Skin sensitization
For respiratory sensitization, no data are available

Heptanoic acid, CAS: 111-14-8
Assessment
Due to lack of data, a classification is not possible for:
STOT RE

Carcinogenicity, Mutagenicity, Reproductive toxicity
Heptanoic acid (111-14-8)

<table>
<thead>
<tr>
<th>Type</th>
<th>Dose</th>
<th>Species</th>
<th>Evaluation</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mutagenicity</td>
<td></td>
<td>Salmonella typhimurium</td>
<td>negative</td>
<td>OECD 471 (Ames)</td>
</tr>
<tr>
<td>Developmental Toxicity</td>
<td>NOAEL 1000 mg/kg/d</td>
<td>rat</td>
<td></td>
<td>OECD 414, Oral</td>
</tr>
<tr>
<td>Developmental Toxicity</td>
<td>NOAEL 1000 mg/kg/d</td>
<td>rat</td>
<td></td>
<td>OECD 414, Oral</td>
</tr>
</tbody>
</table>

Heptanoic acid, CAS: 111-14-8
CMR Classification
The available data on CMR properties are summarized in the table above. They do not indicate a classification into categories 1A or 1B.
Evaluation
In vitro tests did not show mutagenic effects.

Heptanoic acid, CAS: 111-14-8
Aspiration toxicity
no data available
Other adverse effects
Components of the product may be absorbed into the body by inhalation.

Note
Handle in accordance with good industrial hygiene and safety practice. Further details on substance data can be found in the registration dossier under the following link: http://apps.echa.europa.eu/registered/registered-sub.aspx.

SECTION 12: Ecological information

12.1. Toxicity

Acute aquatic toxicity
Heptanoic acid (111-14-8)

<table>
<thead>
<tr>
<th>Species</th>
<th>Exposure time</th>
<th>Dose</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daphnia magna (Water flea)</td>
<td>48h</td>
<td>EC50: 860 mg/l</td>
<td>OECD 202</td>
</tr>
<tr>
<td>Pimephales promelas (fathead minnow)</td>
<td>96h</td>
<td>LC50: &gt; 92 mg/l</td>
<td>OECD 203</td>
</tr>
<tr>
<td>green algae</td>
<td>96h</td>
<td>EC50: 122,7 mg/l (Growth rate)</td>
<td>ECOSAR</td>
</tr>
</tbody>
</table>

Emergency telephone number in USA, call 800 424 9300; outside USA, call USA 703 527 3887, collect calls accepted USA (A-US)
SAFETY DATA SHEET

n-Heptanoic acid
10520

Version / Revision 2.00

<table>
<thead>
<tr>
<th>Pseudomonas putida</th>
<th>17 h</th>
<th>EC50: &gt; 1000 mg/l (Growth inhibition)</th>
<th>DIN 38412, part 8</th>
</tr>
</thead>
</table>

12.2. Persistence and degradability

Heptanoic acid, CAS: 111-14-8
Biodegradation
98.7% (11 d), Sewage, domestic, non-adapted, aerobic, OECD 301 A / ISO 7827.

12.3. Bioaccumulative potential

log Pow 2.54 (calculated) KOW WIN

12.4. Mobility in soil

log Koc 1.143

12.5 Other adverse effects

Heptanoic acid, CAS: 111-14-8
No data available

Note
Avoid release to the environment.

SECTION 13: Disposal considerations

Product Information
Disposal required in compliance with all waste management related state and local regulations. The choice of the appropriate method of disposal depends on the product composition by the time of disposal as well as the local statutes and possibilities for disposal.

Uncleaned empty packaging
Contaminated packaging should be emptied as far as possible and after appropriate cleansing may be taken for reuse.

SECTION 14: Transport information

D.O.T. (49CFR)

14.1. UN number UN 3265
14.2. UN proper shipping name Corrosive liquid, acidic, organic, n.o.s. (n-Heptanoic acid)
14.3. Transport hazard class(es) 8
14.4. Packing group II
14.5. Environmental hazards no

Emergency telephone number in USA, call 800 424 9300; outside USA, call USA 703 527 3887, collect calls accepted
10 / 12 USA (A-US)
SAFETY DATA SHEET

n-Heptanoic acid
10520

Version / Revision 2.00

14.6. Special precautions for user

Emergency Response Guide 153

ICAO/IATA

14.1. UN number UN 3265
14.2. UN proper shipping name Corrosive liquid, acidic, organic, n.o.s. (n-Heptanoic acid)
14.3. Transport hazard class(es) 8
14.4. Packing group II
14.5. Environmental hazards no
14.6. Special precautions for user no data available

IMDG

14.1. UN number UN 3265
14.2. UN proper shipping name Corrosive liquid, acidic, organic, n.o.s. (n-Heptanoic acid)
14.3. Transport hazard class(es) 8
14.4. Packing group II
14.5. Environmental hazards no
14.6. Special precautions for user EmS F-A, S-B

14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code

Product name n-Heptanoic acid
Ship type 3
Pollution category Z

SECTION 15: Regulatory information

Federal and State Regulations
Components of the product are listed in the quoted regulations. For details please refer to the regulations directly. This list is not exhaustive, please check for other applicable regulations.

Federal Regulations
This product is listed on the TSCA inventory

International Inventories

Heptanoic acid, CAS: 111-14-8
AICS (AU) 11
DSL (CA) 12
IECSC (CN)
SAFETY DATA SHEET

n-Heptanoic acid
10520

SECTION 16: Other information

Revision Date 05-May-2015
Issuing date 05-May-2015

Hazard Rating Systems

NFPA (National Fire Protection Association)
- Health Hazard 3
- Fire Hazard 1
- Reactivity 0

HMIS (Hazardous Material Information System)
- Health Hazard 3
- Flammability 1
- Physical Hazard 0

Training advice
For effective first-aid, special training / education is needed.

Sources of key data used to compile the datasheet
Information contained in this safety data sheet is based on Oxea owned data and public sources deemed valid or acceptable. The absence of data elements required by ANSI or Annex II, Regulation 1907/2006/EC indicates, that no data meeting these requirements is available.

Further information for the safety data sheet
Changes against the previous version are marked by ***. Observe national and local legal requirements. For more information, other material safety data sheets or technical data sheets please consult the Oxea homepage (www.oxea-chemicals.com).

Disclaimer
For industrial use only. The information contained herein is accurate to the best of our knowledge. We do not suggest or guarantee that any hazards listed herein are the only ones which exist. Oxea makes no warranty of any kind, express or implied, concerning the safe use of this material in your process or in combination with other substances. User has the sole responsibility to determine the suitability of the materials for any use and the manner of use contemplated. User must meet all applicable safety and health standards.

End of Safety Data Sheet