SAFETY DATA SHEET

Preparation Date: 6/29/15  Revision date: 07/17/2019  Revision Number: G2

1. IDENTIFICATION

Product identifier

Product code: SP127
Product Name: CYCLOHEXANE, SPECTROPHOTOMETRIC GRADE, REAGENT, ACS

Other means of identification

Synonyms: Benzene, hexahydro-
Hexahydrobenzene
Hexamethylene
Hexanaphthene
Ciclohexano (Spanish)

CAS #: 110-82-7
RTECS #: GU6300000
CI#: Not available

Recommended use of the chemical and restrictions on use

Recommended use: Solvent.
Uses advised against: No information available

Supplier: Spectrum Chemical Mfg. Corp
14422 South San Pedro St.
Gardena, CA  90248
(310) 516-8000

Order Online At: https://www.spectrumchemical.com
Emergency telephone number: Chemtrec 1-800-424-9300
Contact Person: Tom Tyner (USA - West Coast)
Contact Person: Ibad Tirmiz (USA - East Coast)

2. HAZARDS IDENTIFICATION

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Considered a dangerous substance or mixture according to the Globally Harmonized System (GHS)

<table>
<thead>
<tr>
<th>Acute toxicity - Inhalation (Vapors)</th>
<th>Category 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin corrosion/irritation</td>
<td>Category 2</td>
</tr>
<tr>
<td>Serious eye damage/eye irritation</td>
<td>Category 2B</td>
</tr>
<tr>
<td>Specific target organ toxicity (single exposure)</td>
<td>Category 3</td>
</tr>
<tr>
<td>Aspiration toxicity</td>
<td>Category 1</td>
</tr>
<tr>
<td>Flammable liquids</td>
<td>Category 2</td>
</tr>
</tbody>
</table>

Label elements
Danger

Hazard statements
Harmful if inhaled
Causes skin irritation
Causes eye irritation
May cause drowsiness or dizziness
May be fatal if swallowed and enters airways
Highly flammable liquid and vapor

Precautionary Statements - Prevention
Avoid breathing mist or vapors
Use only outdoors or in a well-ventilated area
Wash face, hands and any exposed skin thoroughly after handling
Keep away from heat/sparks/open flames/hot surfaces. — No smoking
Keep container tightly closed
Ground container and receiving equipment
Use explosion-proof equipment
Use only non-sparking tools
Take precautionary measures against static discharge
Keep cool
Wear protective gloves
Wear eye/face protection

Precautionary Statements - Response
In case of fire: Use CO2, dry chemical, or foam to extinguish.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical attention.
If skin irritation occurs: Get medical attention
IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water
Wash contaminated clothing before reuse
IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or physician if you feel unwell.
IF SWALLOWED: Immediately call a POISON CENTER or physician
Do NOT induce vomiting

Precautionary Statements - Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed

Precautionary Statements - Disposal
Dispose of contents and container to an approved waste disposal plant in accordance with local, regional, national and international regulations as applicable

3. COMPOSITION/INFORMATION ON INGREDIENTS

Product code:  SP127  Product name:  CYCLOHEXANE, SPECTROPHOTOMETRIC GRADE, REAGENT, ACS
4. FIRST AID MEASURES

First aid measures

General Advice: National Capital Poison Center in the United States can provide assistance if you have a poison emergency and need to talk to a poison specialist. Call 1-800-222-1222.

Skin Contact: Wash off immediately with soap and plenty of water removing all contaminated clothing and shoes. Get medical attention. If skin irritation persists, call a physician.

Eye Contact: Flush eyes with water for 15 minutes. Get medical attention if irritation occurs.

Inhalation: Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Get medical attention.

Ingestion: Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person. Consult a physician if necessary.

Most important symptoms and effects, both acute and delayed

Symptoms
- Causes skin irritation
- Causes eye irritation
- May cause drowsiness or dizziness
- Aspiration hazard if swallowed - can enter the lungs and cause damage
- May cause digestive (gastrointestinal) tract irritation
- Ingestion may cause nausea, vomiting, and diarrhea
- May cause chemical pneumonitis
- Central nervous system effects
- It may affect the kidneys
- May affect the liver

Indication of any immediate medical attention and special treatment needed

Notes to Physician: Treat symptomatically.

Protection of first-aiders

First-Aid Providers: Avoid exposure to blood or body fluids. Wear gloves and other necessary protective clothing. Dispose of contaminated clothing and equipment as bio-hazardous waste.

5. FIRE-FIGHTING MEASURES

Extinguishing Media

Suitable Extinguishing Media: Carbon dioxide (CO2). Dry chemical. Water spray mist or foam.

Unsuitable Extinguishing Media: Do not use a solid (straight) water stream as it may scatter and spread fire.

Specific hazards arising from the chemical

Hazardous combustion products: Carbon monoxide. Carbon dioxide (CO2).
Specific hazards

Highly flammable. May be ignited by heat, sparks or flames. Container explosion may occur under fire conditions or when heated. Vapor may travel considerable distance to source of ignition and flash back. Vapors may form explosive mixtures with air. Most vapors are heavier than air. They will spread along the ground and collect in low or confined areas (sewers, basements, tanks). Fire may produce irritating, corrosive and/or toxic gases.

Special Protective Actions for Firefighters

Specific Methods: No information available

Special Protective Equipment for Firefighters: As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal Precautions: Ensure adequate ventilation. Keep people away from and upwind of spill/leak. Avoid contact with skin, eyes and clothing. Use personal protective equipment. Remove all sources of ignition. Pay attention to flashback. All equipment used when handling the product must be grounded. Use spark-proof tools and explosion-proof equipment. In case of large spill, water spray or vapor suppressing foam may be used to reduce vapors, but may not prevent ignition in closed spaces.

Environmental precautions Prevent further leakage or spillage if safe to do so. Prevent product from entering drains. Do not let this chemical enter the environment. Prevent entry into waterways, sewers, basements or confined areas.

Methods and material for containment and cleaning up

Methods for containment Stop leak if you can do it without risk. Absorb spill with inert material (e.g. vermiculite, dry sand or earth). In case of large spill, dike if needed. Dike far ahead of liquid spill for later disposal.

Methods for cleaning up Use appropriate tools to put the spilled material in a suitable chemical waste disposal container. Use only non-sparking tools. Clean contaminated surface thoroughly.

7. HANDLING AND STORAGE

Precautions for safe handling

Technical Measures/Precautions: Provide sufficient air exchange and/or exhaust in work rooms. Remove all sources of ignition. To avoid ignition of vapors by static electricity discharge, all metal parts of the equipment must be grounded. Keep away from incompatible materials.

Safe Handling Advice: Wear personal protective equipment. Use only in well-ventilated areas. Avoid contact with skin, eyes and clothing. Keep away from heat and sources of ignition. Take precautionary measures against static discharges. Do not breathe vapors or spray mist. Do not ingest. When using do not smoke. Handle in accordance with good industrial hygiene and safety practice.

Conditions for safe storage, including any incompatibilities

Product code: SP127  Product name: CYCLOHEXANE, SPECTROPHOTOMETRIC GRADE, REAGENT, ACS
Technical Measures/Storage Conditions:
Keep container tightly closed in a dry and well-ventilated place. Store at room temperature in the original container. Keep away from heat and sources of ignition. Store in a segregated and approved area. Store away from incompatible materials.

Incompatible Materials:
Oxidizing agents
Dinitrogen tetraoxide

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

National occupational exposure limits

United States

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<th>Component</th>
<th>CAS No</th>
<th>OSHA</th>
<th>NIOSH</th>
<th>ACGIH</th>
<th>AIHA WEEL</th>
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Canada

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<th>Canada - Ontario</th>
<th>Canada - Quebec</th>
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Australia and Mexico

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<td>300 ppm STEL 1050 mg/m³ STEL 100 ppm TWA 350 mg/m³ TWA</td>
<td>100 ppm TWA</td>
</tr>
</tbody>
</table>

Appropriate engineering controls

Engineering measures to reduce exposure: Ensure adequate ventilation. Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors and mist below their respective threshold limit value.

Individual protection measures, such as personal protective equipment

Personal Protective Equipment

Eye protection: Goggles
Skin and body protection: Chemical resistant apron Long sleeved clothing Gloves
Respiratory protection: Vapor respirator. Be sure to use an approved/certified respirator or equivalent.
Hygiene measures: Avoid contact with skin, eyes and clothing. When using, do not eat, drink or smoke. Wash hands before breaks and immediately after handling the product.

Product code: SP127
Product name: CYCLOHEXANE, SPECTROPHOTOMETRIC GRADE, REAGENT, ACS
9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state: Liquid
Appearance: No information available.
Color: Clear. Colorless.

Taste: No information available.
Formula: C6-H12

Molecular/Formula weight (g/mole): 84.16
Flammability (solid, gas): no data available
Flash Point Tested according to: Closed cup
Autoignition Temperature (°C/°F): 245 °C/473 °F
Upper Explosion Limit (%): 8.4%
Melting point/range(°C/°F): 6.47 °C/43.6 °F
Boiling point/range(°C/°F): 80.7 °C/177.3 °F
Bulk density: No information available
Specific gravity: 0.7781
pH: No information available
Evaporation rate: 6.1 (butyl acetate = 1)
Vapor density: 2.98
2.6 (ether = 1)
Odor threshold (ppm): 25
Partition coefficient (n-octanol/water): 3.44
Miscibility: Miscible with olive oil
Solubility: Insoluble in water Soluble in Ether Soluble in hot alcohol Soluble in Acetone
Miscibility: Solubility:
Vapor pressure @ 20°C (kPa): 10.3-12.9
VOC content (g/L): 778-784
Viscosity: No information available

10. STABILITY AND REACTIVITY

Reactivity
It can react vigorously, violently or explosively with oxidizers
When mixed hot with liquid dinitrogen tetraoxide an explosion can result

Chemical stability
Stability: Stable under recommended storage conditions.
Possibility of Hazardous Reactions: Hazardous polymerization does not occur
Incompatible Materials: Oxidizing agents Dinitrogen tetraoxide
Hazardous decomposition products: Carbon monoxide. Carbon dioxide. When heated to decomposition it emits acrid smoke and irritating fumes.

Product code: SP127 Product name: CYCLOHEXANE, SPECTROPHOTOMETRIC GRADE, REAGENT, ACS
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Other Information
Corrosivity:  No information available

Special Remarks on Corrosivity:  No information available

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Principal Routes of Exposure:
Ingestion. Skin. Inhalation.

Acute Toxicity

Component Information

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<th>CAS No</th>
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<tr>
<td></td>
<td>110-82-7</td>
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</tbody>
</table>

LD50/oral/rat = 12705 mg/kg Oral LD50 Rat(LOLI); >5000 mg/kg (RTECS)
LD50/oral/mouse = 813 mg/kg
LD50/dermal/rabbit = >2000 mg/kg Dermal LD50 Rabbit
LD50/dermal/rat = No information available
LC50/inhalation/rat = 13.9 mg/L Inhalation LC50 Rat 4 h
LC50/inhalation/mouse = 70000 mg/m³ 2 h
Other LD50 or LC50 information =  No information available

Product Information

LD50/oral/rat =
Value - Acute Toxicity = > 5000 mg/kg

LD50/oral/mouse =
Value - Acute Tox = 813 mg/kg

LD50/dermal/rabbit
Value - Acute Toxicity = > 2000 mg/kg

LD50/dermal/rat
VALUE - Acute Tox = No information available

LC50/inhalation/rat
VALUE-Vapor = 13.9 mg/l (4-hr)
VALUE-Gas = No information available
VALUE-Dust/Mist = No information available

LC50/Inhalation/mouse
VALUE-Vapor = 70000 mg/m³ 2 h
VALUE - Gas = No information available
VALUE - Dust/Mist = No information available

Symptoms

Skin Contact:  Causes skin irritation. It may be absorbed through the skin.

Product code:  SP127  Product name:  CYCLOHEXANE, SPECTROPHOTOMETRIC GRADE, REAGENT, ACS
Eye Contact:
Causes eye irritation.

Inhalation
May cause irritation of respiratory tract. Inhalation of high concentrations of vapors may cause dizziness or suffocation. May cause nausea and headache. It may affect respiration (respiratory depression, respiratory paralysis). It may affect behavior/central nervous system (ataxia, general anesthetic, drowsiness). It may affect behavior/central nervous system (convulsions/seizures). May affect behavior/central nervous system (central nervous system depression, somnolence, analgesia, headache, dizziness, weakness, fatigue, loss of coordination, personality changes and passing out). May affect vision (blurred vision). May affect the brain.

Ingestion
Aspiration hazard if swallowed. Aspiration into the lungs can cause chemical pneumonitis. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea. It may affect behavior/central nervous system (drowsiness). May affect urinary system (kidneys).

Aspiration hazard
May be fatal if swallowed and enters airways.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Chronic Toxicity
Prolonged skin contact may defat the skin and produce dermatitis. Prolonged or repeated inhalation may affect the liver. Prolonged or repeated inhalation may affect the kidneys. Prolonged or repeated ingestion may affect the kidneys. Prolonged or repeated inhalation may cause central nervous system effects.

Sensitization:
No information available.

Mutagenic Effects:
May affect genetic material
Experiments with bacteria and/or yeast have shown mutagenic effects

Carcinogenic effects:
Not considered carcinogenic.

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS No</th>
<th>IARC</th>
<th>ACGIH - Carcinogens</th>
<th>NTP</th>
<th>OSHA HCS - Carcinogens</th>
<th>Australia - Notifiable Carcinogenic Substances</th>
<th>Australia - Prohibited Carcinogenic Substances</th>
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<td>110-82-7</td>
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<td>Not listed</td>
<td>Not listed</td>
<td>Not listed</td>
<td>Not listed</td>
<td>Not listed</td>
</tr>
</tbody>
</table>

ACGIH (American Conference of Governmental Industrial Hygienists)
IARC (International Agency for Research on Cancer)
NTP (National Toxicology Program)
OSHA (Occupational Safety and Health Administration of the US Department of Labor)

Reproductive toxicity
No data is available

Reproductive Effects:
No information available
Developmental Effects:
No information available
Teratogenic Effects:
No information available

Specific Target Organ Toxicity
STOT - single exposure central nervous system.
STOT - repeated exposure No information available.
Target Organs: Skin, Liver, Kidneys, Central nervous system.

12. ECOLOGICAL INFORMATION

Ecotoxicity

Ecotoxicity effects: Aquatic environment.

*Cyclohexane - 110-82-7*

**Algae/aquatic plants**
EC50: >500mg/L (72h, Desmodesmus subspicatus)

**Fish**
LC50: 3.96 - 5.18mg/L (96h, Pimephales promelas)
LC50: 23.03 - 42.07mg/L (96h, Pimephales promelas)
LC50: 24.99 - 44.69mg/L (96h, Lepomis macrochirus)
LC50: 48.87 - 68.76mg/L (96h, Poecilia reticulata)

**Crustacea**
EC50: >400mg/L (24h, Daphnia magna)

Persistence and degradability: It is highly resistant to biodegradation

Bioaccumulative potential: Potential for bioconcentration in aquatic organisms is moderate.

Mobility in soil: No information available

Other adverse effects: No information available.

13. DISPOSAL CONSIDERATIONS

Disposal Methods

Waste from residues / unused products:
Waste must be disposed of in accordance with Federal, State and Local regulation.

Contaminated packaging:
Empty containers should be taken for local recycling, recovery or waste disposal

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</thead>
<tbody>
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<td>Cyclohexane</td>
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<td>None</td>
<td>None</td>
<td>None</td>
<td>U056 ignitable waste</td>
</tr>
</tbody>
</table>

14. TRANSPORT INFORMATION

DOT

UN-No: UN1145
Proper Shipping Name: Cyclohexane
Hazard Class: 3
Subsidiary Class: No information available
Packing group: II
Emergency Response Guide Number: 128

Marine Pollutant: No data available
DOT RQ (lbs): 1000
Special Provisions: IB2, T4, TP1
Symbol(s): [DOT]: (R4) - Identifies a material that is a hazardous substance that has a reportable quantity (RQ) of 1000 pounds (454 Kilograms).
Description: UN1145, Cyclohexane, 3, II

TDG (Canada)

Product code: SP127
Product name: CYCLOHEXANE, SPECTROPHOTOMETRIC GRADE, REAGENT, ACS

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15. REGULATORY INFORMATION

International Inventories

Product code: SP127  Product name: CYCLOHEXANE, SPECTROPHOTOMETRIC GRADE, REAGENT, ACS
Component | CAS No | U.S. TSCA | KOREA KECL | Philippines (PICCS) | Japan ENCS | China IECSC | Australia (AICS) | EINECS-No.
--- | --- | --- | --- | --- | --- | --- | --- | ---
Cyclohexane | 110-82-7 | Present | Present | Present | Present | Present | Present | Present 203-806-2

**U.S. Regulations**

**Cyclohexane**

**Massachusetts RTK:** Present

**New Jersey RTK Hazardous Substance List:** 0565

**New Jersey (EHS) List:** 0565 500 lb TPQ

**New Jersey - Discharge Prevention - List of Hazardous Substances:** Present

**Pennsylvania RTK:** Environmental hazard

**Pennsylvania RTK - Environmental Hazard List:** Present

**Minnesota - Hazardous Substance List:** Present

**New York Release Reporting - List of Hazardous Substances:**

- 1000 lb RQ
- 1 lb RQ
- Louisana Reportable Quantity List for Pollutants: 1000lb final RQ
- 454kg final RQ

**California Directors List of Hazardous Substances:** Present

**FDA - 21 CFR - Total Food Additives**

175.105, 176.200, 178.3620, 73.1

- List Sourced from EAFUS

**California Prop. 65: Safe Drinking Water and Toxic Enforcement Act of 1986.**

**Chemicals Known to the State of California to Cause Cancer:**

This product does not contain a chemical requiring a warning under California Prop. 65. (See table below)

**Chemicals Known to the State of California to Cause Reproductive Toxicity:**

This product does not contain a chemical requiring a warning under California Prop. 65. (See table below)

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<thead>
<tr>
<th>Component</th>
<th>CAS No</th>
<th>Carcinogen</th>
<th>Developmental Toxicity</th>
<th>Male Reproductive Toxicity</th>
<th>Female Reproductive Toxicity</th>
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**CERCLA/SARA**

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS No</th>
<th>CERCLA - Hazardous Substances and their Reportable Quantities</th>
<th>Section 302 Extremely Hazardous Substances and TPQs</th>
<th>Section 302 Extremely Hazardous Substances and RQs</th>
<th>Section 313 - Chemical Category</th>
<th>Section 313 - Reporting de minimis</th>
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<tr>
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<td>1000 lb final RQ 454 kg final RQ</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>1.0 % de minimis concentration</td>
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**U.S. TSCA**

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<th>Component</th>
<th>CAS No</th>
<th>TSCA Section 5(a)2 - Chemicals With Significant New Use Rules (SNURS)</th>
<th>TSCA 8(d) - Health and Safety Reporting</th>
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**Canada**

**WHIMIS 2015 - GHS Classifications**

WHIMIS 2015 Hazard Classification Information:

**Product code:** SP127  **Product name:** CYCLOHEXANE, SPECTROPHOTOMETRIC GRADE, REAGENT, ACS  **Page** 11 / 13
Component

Cyclohexane

110-82-7 (100)

WHMIS 2015 Hazard Classification

Flammable liquids - Category 2: H225 Highly flammable liquid and vapour.; Skin corrosion/irritation - Category 2: H315 Causes skin irritation.; Aspiration hazard - Category 1: H304 May be fatal if swallowed and enters airways.

Canada Hazardous Products Regulation

This product has been classified according to the hazard criteria of the HPR (Hazardous Products Regulation) and the SDS contains all of the information required by the HPR

DSL/NDSL

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EU Classification

EU GHS - SV - CLP 1272/2008

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<td>110-82-7</td>
<td>Flammable liquids - Flam. Liq. 2: H225 Highly flammable liquid and vapour.; Skin corrosion/irritation - Skin Irrit. 2: H315 Causes skin irritation.; Specific target organ toxicity - Single exposure - STOT SE 3: H336 May cause drowsiness or dizziness.; Aspiration hazard - Asp. Tox. 1: H304 May be fatal if swallowed and enters airways.; Hazardous to aquatic environment - acute hazard - Aquatic Acute 1: H400 Very toxic to aquatic life.; Hazardous to aquatic environment - chronic hazard - Aquatic Chronic 1: H410 Very toxic to aquatic life with long lasting effects.601-017-00-1</td>
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</table>

EU - CLP (1272/2008)

R-phrase(s)

R11 - Highly flammable
R38 - Irritating to skin
R65 - Harmful: may cause lung damage if swallowed
R67 - Vapors may cause drowsiness and dizziness.
R50/53 - Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

S-phrase(s)

S 9 - Keep container in a well-ventilated place.
S16 - Keep away from sources of ignition - No smoking
S25 - Avoid contact with eyes
S33 - Take precautionary measures against static discharges
S60 - This material and its container must be disposed of as hazardous waste
S61 - Avoid release to the environment. Refer to special instructions/safety data sheets.

Product code: SP127
Product name: CYCLOHEXANE, SPECTROPHOTOMETRIC GRADE, REAGENT, ACS

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S62 - If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS No</th>
<th>Classification</th>
<th>Concentration Limits:</th>
<th>Safety Phrases</th>
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<td>110-82-7</td>
<td>F; R11</td>
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<td>S9  S16  S25  S33</td>
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<td>Xi; R38</td>
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<td>S60  S61  S62</td>
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The product is classified in accordance with Annex VI to Directive 67/548/EEC

**Indication of danger:**
F - Highly flammable
Xn - Harmful
Xi - Irritant
N - Dangerous for the environment

**16. OTHER INFORMATION**

<table>
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<tr>
<th>Preparation Date:</th>
<th>6/29/15</th>
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<td>Revision date</td>
<td>07/17/2019</td>
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<tr>
<td>Prepared by:</td>
<td>Sonia Owen</td>
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End of Safety Data Sheet