1 Identification

Product identifier

Product name: Cyclohexylamine

Stock number: A15851
CAS Number: 108-91-8
EC number: 203-629-0
Index number: 612-050-00-8

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

Identified use: SU24 Scientific research and development

Details of the supplier of the safety data sheet

Manufacturer/Supplier:
Alfa Aesar
Thermo Fisher Scientific Chemicals, Inc.
30 Bond Street
Ward Hill, MA 01835-8099
Tel: 800-343-0660
Fax: 800-322-4757
Email: tech@alfa.com
www.alfa.com

Information Department: Health, Safety and Environmental Department

Emergency telephone number:
During normal business hours (Monday-Friday, 8am-7pm EST), call (800) 343-0660. After normal business hours, call Carechem 24 at (866) 928-0789.

2 Hazard(s) identification

Classification of the substance or mixture in accordance with 29 CFR 1910 (OSHA HCS)

GHS02 Flame
Flam. Liq. 3 H226 Flammable liquid and vapour.

GHS08 Health hazard
Repr. 2 H361 Suspected of damaging fertility or the unborn child.

GHS05 Corrosion
Skin Corr. 1B H314 Causes severe skin burns and eye damage.

GHS07
Acute Tox. 4 H302 Harmful if swallowed.
Acute Tox. 4 H312 Harmful in contact with skin.

Hazards not otherwise classified No information known.

Label elements

GHS label elements The product is classified and labeled in accordance with 29 CFR 1910 (OSHA HCS)

Hazard pictograms

GHS02 GHS05 GHS07 GHS08

Signal word Danger

Hazard statements
H226 Flammable liquid and vapour.
H302+H312 Harmful if swallowed or in contact with skin.
H314 Causes severe skin burns and eye damage.
H361 Suspected of damaging fertility or the unborn child.

Precautionary statements
P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P260 Do not breathe dust/fume/gas/mist/vapours/spray.
P303+P361+P335 If on skin (or hair): Take all immediately all contaminated clothing. Rinse skin with water/shower.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P405 Store locked up.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

WHMIS classification
B2 - Flammable liquid
D2A - Very toxic material causing other toxic effects
E - Corrosive material

Classification system

HMIS ratings (scale 0-4)
(Hazardous Materials Identification System)

<table>
<thead>
<tr>
<th>Health (acute effects)</th>
<th>3</th>
</tr>
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<tbody>
<tr>
<td>Flammability</td>
<td>3</td>
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<tr>
<td>Physical Hazard</td>
<td>1</td>
</tr>
</tbody>
</table>

(Contd. on page 2)
Product name: Cyclohexylamine

3 Composition/information on ingredients

Chemical characterization: Substances
CAS# Description:
108-91-8 Cyclohexylamine

4 First-aid measures

Description of first aid measures
General information: Immediately remove any clothing soiled by the product.
After inhalation: Supply fresh air. If required, provide artificial respiration. Keep patient warm. Seek immediate medical advice.
After skin contact: Immediately wash with water and soap and rinse thoroughly. Seek immediate medical advice.
After eye contact: Rinse opened eye for several minutes under running water. Then consult a doctor.
Information for doctor:
Most important symptoms and effects, both acute and delayed: Causes severe skin burns. Causes serious eye damage.
Indication of any immediate medical attention and special treatment needed: No further relevant information available.

5 Fire-fighting measures

Extinguishing media:
Suitable extinguishing agents: Carbon dioxide, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
Special hazards arising from the substance or mixture:
If this product is involved in a fire, the following can be released:
Carbon monoxide and carbon dioxide
Nitrogen oxides (NOx)
Advice for firefighters:
Protective equipment: Wear self-contained respirator.
Wear fully protective impervious suit.

6 Accidental release measures

Personal precautions, protective equipment and emergency procedures:
Wear protective equipment. Keep unprotected persons away.
Ensure adequate ventilation.
Keep away from ignition sources.
Environmental precautions:
Do not allow product to reach sewage system or any water course.
Methods and material for containment and cleaning up:
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
Use neutralizing agent.
Dispose of contaminated material as waste according to section 13.
Ensure adequate ventilation.
Prevention of secondary hazards:
Keep away from ignition sources.
Reference to other sections:
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

7 Handling and storage

Handling:
Precautions for safe handling:
Handle under dry protective gas.
Keep container tightly sealed.
Store in cool, dry place in tightly closed containers.
Ensure good ventilation at the workplace.
Information about protection against explosions and fires:
Protect against electrostatic charges.
Fumes can combine with air to form an explosive mixture.
Keep ignition sources away.
Conditions for safe storage, including any incompatibilities:
Storage:
Requirements to be met by storerooms and receptacles: No special requirements.
Information about storage in one common storage facility:
Store away from air. Do not store together with acids.
Store away from oxidizing agents.
Further information about storage conditions:
Store under dry inert gas.
This product is air sensitive. Keep container tightly sealed.
Store in cool, dry conditions in well sealed containers.
Specific end use(s): No further relevant information available.

8 Exposure controls/personal protection

Additional information about design of technical systems:
Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.
Control parameters

Components with limit values that require monitoring at the workplace:

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td></td>
<td>REL (USA)</td>
<td>Long-term value: 40 mg/m³, 10 ppm</td>
</tr>
<tr>
<td></td>
<td>TLV (USA)</td>
<td>Long-term value: 41 mg/m³, 10 ppm</td>
</tr>
<tr>
<td></td>
<td>EL (Canada)</td>
<td>Long-term value: 10 ppm</td>
</tr>
<tr>
<td></td>
<td>EV (Canada)</td>
<td>Long-term value: 40 mg/m³, 10 ppm</td>
</tr>
</tbody>
</table>

Additional information: No data

Exposure controls

Personal protective equipment

General protective and hygienic measures

The usual precautionary measures for handling chemicals should be followed. Keep away from foodstuffs, beverages and feed. Remove all soiled and contaminated clothing immediately. Wash hands before breaks and at the end of work. Avoid contact with the eyes and skin. Maintain an ergonomically appropriate working environment.

Breathing equipment: Use suitable respirator when high concentrations are present. Recommended filter device for short term use:

Use a respirator with multi-purpose combination (US) or type ABEK (EN 14387) as a backup to engineering controls. Risk assessment should be performed to determine if air-purifying respirators are appropriate. Only use equipment tested and approved under appropriate government standards such as NIOSH (USA) or CEN (EU).

Protection of hands:

Impervious gloves

Check protective gloves prior to each use for their proper condition. The selection of suitable gloves not only depends on the material, but also on quality. Quality will vary from manufacturer to manufacturer.

Material of gloves: Fluorocarbon rubber (Viton)

Penetration time of glove material (in minutes) 480

Glove thickness: 0.7 mm

Eye protection:

Tightly sealed goggles

Full face protection

Body protection: Protective work clothing.

9 Physical and chemical properties

Information on basic physical and chemical properties

General information

Appearance:

Form: Liquid

Color: Colorless

Odor: Not determined

Odor threshold: Not determined

pH-value: Not determined

Change in condition

Melting point/Melting range: -18 °C (-0 °F)

Boiling point/Boiling range: 133-134 °C (271-273 °F)

Sublimation temperature / start: Not determined

Flash point: 27 °C (81 °F)

Flammability (solid, gaseous): Not determined

Ignition temperature: 265 °C (509 °F)

Decomposition temperature: Not determined

Auto igniting: Not determined

Danger of explosion: Product is not explosive. However, formation of explosive air/vapor mixtures is possible.

Explosion limits:

Lower: 1.6 Vol %

Upper: 9.4 Vol %

Vapor pressure at 20 °C (68 °F): 13 hPa (10 mm Hg)

Density at 20 °C (68 °F): 0.86 g/cm³ (7.177 lbs/gal)

Relative density: Not determined

Vapor density: Not determined

Evaporation rate: Not determined

Solubility in / Miscibility with

Water at 20 °C (68 °F): Fully miscible

Partition coefficient (n-octanol/water): Not determined

Viscosity:

dynamic: Not determined

kinematic: Not determined

Other information: No further relevant information available.

10 Stability and reactivity

Reactivity: No information known.

Chemical stability: Stable under recommended storage conditions.

Thermal decomposition / conditions to be avoided: Decomposition will not occur if used and stored according to specifications.

Possibility of hazardous reactions: Reacts with strong oxidizing agents

Conditions to avoid: No further relevant information available.

Incompatible materials:

Acids

Air

Oxidizing agents

Hazardous decomposition products:

Carbon monoxide and carbon dioxide

Nitrogen oxides

(Contd. on page 2)
11 Toxicological information
Information on toxicological effects
Acute toxicity:
Harmful in contact with skin.
Harmful if swallowed.
Danger through skin absorption.
Swallowing will lead to a strong corrosive effect on mouth and throat and to the danger of perforation of esophagus and stomach.
The Registry of Toxic Effects of Chemical Substances (RTECS) contains acute toxicity data for this substance.

LD/LEC50 values that are relevant for classification:

<table>
<thead>
<tr>
<th>Route</th>
<th>LD50</th>
<th>LC50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral</td>
<td>224 mg/kg (mouse)</td>
<td></td>
</tr>
<tr>
<td>Dermal</td>
<td>277 mg/kg (rabbit)</td>
<td></td>
</tr>
</tbody>
</table>

Skin irritation or corrosion: Causes severe skin burns.
Eye irritation or corrosion: Causes serious eye damage.
Sensitization: No sensitizing effects known.
Germ cell mutagenicity: The Registry of Toxic Effects of Chemical Substances (RTECS) contains mutation data for this substance.
Carcinogenicity:
IARC-3: Not classifiable as to carcinogenicity to humans.
ACGIH A4: Not classifiable as a human carcinogen: Inadequate data on which to classify the agent in terms of its carcinogenicity in humans and/or animals.
Reproductive toxicity:
Suspected of damaging fertility or the unborn child.
The Registry of Toxic Effects of Chemical Substances (RTECS) contains reproductive data for this substance.
Specific target organ system toxicity - repeated exposure: No effects known.
Specific target organ system toxicity - single exposure: No effects known.
Aspiration hazard: No effects known.
Subacute to chronic toxicity: The Registry of Toxic Effects of Chemical Substances (RTECS) contains multiple dose toxicity data for this substance.

Additional toxicological information: To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.

12 Ecological information
Toxicity
Aquatic toxicity: No further relevant information available.
Persistence and degradability: No further relevant information available.
Bioaccumulative potential: No further relevant information available.
Mobility in soil: No further relevant information available.

Additional ecological information:
General notes:
Do not allow undiluted product or large quantities to reach ground water, water course or sewage system.
Avoid transfer into the environment.
Results of PBT and vPvB assessment
PBT: Not applicable.
vPvB: Not applicable.

Other adverse effects: No further relevant information available.

13 Disposal considerations
Waste treatment methods
Recommendation: Consult state, local or national regulations to ensure proper disposal.

Uncleaned packagings:
Recommendation: Disposal must be made according to official regulations.

Recommended cleansing agent: Water, if necessary with cleansing agents.

14 Transport information
UN-Number
DOT, IMDG, IATA UN2357

UN proper shipping name
DOT Cyclohexylamine
IMDG, IATA CYCLOHEXYLAMINE

Transport hazard class(es)
DOT
Class 8 Corrosive substances.
Label 8+3
8 (CF1) Corrosive substances
8+3

IMDG, IATA
Class 8 Corrosive substances.
Label 8+3

Packing group
DOT, IMDG, IATA II

Environmental hazards:
Not applicable.

Special precautions for user
Warning: Corrosive substances
EMS Number: F-E-S-Č

Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code
Not applicable.

Transport/Additional information:
DOT Marine Pollutant (DOT): No
UN “Model Regulation”: UN2357, Cyclohexylamine, 8 (3), II
Product name: Cyclohexylamine

15 Regulatory information
Safety, health and environmental regulations/legislation specific for the substance or mixture
GHS label elements The product is classified and labeled in accordance with 29 CFR 1910 (OSHA HCS)

Hazard pictograms
GHS02 GHS05 GHS07 GHS08

Signal word Danger

Hazard statements
H226 Flammable liquid and vapour.
H302+H312 Harmful if swallowed or in contact with skin.
H314 Causes severe skin burns and eye damage.
H361 Suspected of damaging fertility or the unborn child.

Precautionary statements
P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P260 Do not breathe dust/fume/gas/mist/vapours/spray.
P303+P361+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P405 Store locked up.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

National regulations
All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.
All components of this product are listed on the Canadian Domestic Substances List (DSL).
SARA Section 313 (specific toxic chemical listings) Substance is not listed.

California Proposition 65
Prop 65 - Chemicals known to cause cancer Substance is not listed.
Prop 65 - Developmental toxicity, female Substance is not listed.
Prop 65 - Developmental toxicity, male Substance is not listed.

Information about limitation of use: For use only by technically qualified individuals.

Other regulations, limitations and prohibitive regulations
Substance is not listed.

The conditions of restrictions according to Article 67 and Annex XVII of the Regulation (EC) No 1907/2006 (REACH) for the manufacturing, placing on the market and use must be observed.
Substance is not listed.

Annex XIV of the REACH Regulations (requiring Authorisation for use) Substance is not listed.

Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

16 Other information
Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

Department issuing SDS: Global Marketing Department
Date of preparation / last revision 11/23/2015 / -

Abbreviations and acronyms:
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
EINECS: European Inventory of Existing Commercial Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
HMIS: Hazardous Materials Identification System (USA)
WHMIS: Workplace Hazardous Materials Information System (Canada)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
vPvB: very Persistent and very Bioaccumulative
ACGIH: American Conference of Governmental Industrial Hygienists (USA)
OSHA: Occupational Safety and Health Administration (USA)
NTP: National Toxicology Program (USA)
IARC: International Agency for Research on Cancer
EPA: Environmental Protection Agency (USA)