

Praxair Material Safety Data Sheet

1. Chemical Product and Company Identification

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|---|---|
| Product Name: 1-Hexene (MSDS No. P-6237-B) | Trade Names: Hexene |
| Chemical Name: 1-Hexene | Synonyms: n-Hexene, hexane, normal-hexene, hexylene; n-hexylene; alpha-hexylene, butyl ethene, butyl ethylene, |
| Chemical Family: Alkene | Product Grades: Not available. |
| Telephone: | Company Name: Praxair, Inc. |
| Emergencies: 1-800-645-4633* | 39 Old Ridgebury Road |
| CHEMTREC: 1-800-424-9300* | Danbury, CT 06810-5113 |
| Routine: 1-800-PRAXAIR | |

*Call emergency numbers 24 hours a day only for spills, leaks, fire, exposure, or accidents involving this product. For routine information, contact your supplier, Praxair sales representative, or call 1-800-PRAXAIR (1-800-772-9247).

2. Hazards Identification

EMERGENCY OVERVIEW

DANGER! Flammable liquid and vapor.
May form explosive mixtures with air.
May irritate the eyes, skin, and respiratory tract.
Has anesthetic effects in high concentrations.
May cause dizziness and drowsiness.
Self-contained breathing apparatus and protective clothing may be required by rescue workers.
Under ambient conditions, this is a colorless liquid with a sweet odor.

OSHA REGULATORY STATUS: This material is considered hazardous by the OSHA Hazard Communications Standard (29 CFR 1910.1200).

POTENTIAL HEALTH EFFECTS:

Effects of a Single (Acute) Overexposure

Inhalation. Vapors irritate the respiratory tract. High concentrations may act as an anesthetic, first stimulating the central nervous system (CNS), then depressing it to varying degrees. CNS depression is marked by dizziness, drowsiness, and possibly unconsciousness.

Skin Contact. Liquid or vapor may irritate the skin.

Swallowing. Unavailable for 1-Hexene. When children ingest petroleum distillates such as hexene, the effects are similar to those of inhalation: CNS depression and tissue irritation. Lung damage due primarily to inhalation of vomited material has led to coma and death from pulmonary edema (fluid in the lungs).

Eye Contact. Liquid or vapor may irritate the eyes.

Effects of Repeated (Chronic) Overexposure. Repeated or prolonged exposure of the skin may cause cracking and drying due to defatting of tissues.

Other Effects of Overexposure. None known.

Medical Conditions Aggravated by Overexposure. The skin-irritating properties of 1-Hexene may aggravate an existing dermatitis. Respiratory irritation may aggravate an existing asthma or other upper respiratory or pulmonary disease.

CARCINOGENICITY: 1-Hexene is not listed by NTP, OSHA, or IARC.

POTENTIAL ENVIRONMENTAL EFFECTS: None known. For further information, see section 12, Ecological Information

3. Composition/Information on Ingredients

See section 16 for important information about mixtures.

| COMPONENT | CAS NUMBER | CONCENTRATION |
|-----------|------------|---------------|
| 1-Hexene | 592-41-6 | >99%* |

*The symbol > means "greater than."

4. First Aid Measures

INHALATION: Immediately remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, qualified personnel may give oxygen. Call a physician.

SKIN CONTACT: Remove contaminated clothing and shoes, and wash exposed areas with soap and plenty of water. Wash contaminated clothing prior to reuse; discard shoes. Seek medical attention if discomfort persists.

SWALLOWING: Do not induce vomiting. Get immediate medical aid.

EYE CONTACT: Immediately flush eyes thoroughly with water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are thoroughly flushed. Immediately see a physician, preferably an ophthalmologist.

NOTES TO PHYSICIAN: *There is no specific antidote. Treatment of overexposure should be directed at the control of symptoms and the clinical condition of the patient.*

5. Fire Fighting Measures

FLAMMABLE PROPERTIES: Vapor forms explosive mixtures with air and oxidizing agents.

SUITABLE EXTINGUISHING MEDIA: CO₂, dry chemicals, water spray, or fog.

PRODUCTS OF COMBUSTION: Carbon dioxide, carbon monoxide

PROTECTION OF FIREFIGHTERS: DANGER! Flammable liquid and vapor. Evacuate all personnel from danger area. Use self-contained breathing apparatus and protective clothing. Immediately cool surrounding containers with water spray from maximum distance, taking care not to extinguish flames. Avoid spreading burning liquid with water. Remove ignition sources if without risk. If flames are accidentally extinguished, explosive reignition may occur. Reduce vapors with water spray or fog. Stop flow of liquid if without risk, while continuing cooling water spray. Remove all containers from area of fire if without risk. Allow fire to burn out. On-site fire brigades must comply with OSHA 29 CFR 1910.156.

Specific Physical and Chemical Hazards. If escaping vapors catches fire, do not extinguish flames. Flammable and toxic vapors may spread from leak and could explode if reignited by sparks or flames. Vapors are heavier than air and may collect in low spots. Explosive atmospheres may linger. Before entering area, especially confined areas, check with an appropriate device. Although no pressure relief device is required by the DOT, 1-Hexene cylinders generally are equipped with one.

Protective Equipment and Precautions for Firefighters. Firefighters should wear self-contained breathing apparatus and full fire-fighting turnout gear.

6. Accidental Release Measures

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:

DANGER! Flammable liquid and vapor.

Personal Precautions. Vapor forms explosive mixtures with air. (See section 5.) Immediately evacuate all personnel from danger area. Use self-contained breathing apparatus and protective clothing where needed. Remove all sources of ignition if without risk. Reduce vapors with fog or fine water spray, taking care not to spread liquid with water. Shut off flow if without risk. Ventilate area or move container to a well-ventilated area. Flammable vapors may spread from leak and could explode if reignited by sparks or flames. Explosive atmospheres may linger. Before entering area, especially confined areas, check atmosphere with an appropriate device.

Environmental Precautions. Prevent waste from contaminating the surrounding environment. Keep personnel away. Discard any product, residue, disposable container, or liner in an environmentally acceptable manner, in full compliance with federal, state, and local regulations. If necessary, call your local supplier for assistance.

7. Handling and Storage

PRECAUTIONS TO BE TAKEN IN HANDLING: May form explosive mixtures with air. May irritate skin, eyes, and respiratory tract. Use only with adequate ventilation or respiratory protection. Do not get liquid or vapor in eyes, on skin, or on clothing. Have safety showers and eyewash fountains immediately available. Keep away from heat, sparks, and open flame. Use only spark-proof tools and explosion-proof equipment. Protect containers from damage. Use a suitable hand truck to move containers; do not drag, roll, slide, or drop. Electrical equipment must be non-sparking or explosion-proof. For other precautions in using this product, see section 16.

PRECAUTIONS TO BE TAKEN IN STORAGE: Store and use with adequate ventilation. Store in a cool, dry area only in the DOT-approved container in which product was received. Separate containers of this product from oxygen, chlorine, and other oxidizers by at least 20 ft (6.1 m), or use a barricade of noncombustible material. This barricade should be at least 5 ft (1.53 m) high and have a fire resistance rating of at least ½ hour. Post "No Smoking or Open Flames" signs in storage and use areas. There must be no sources of ignition. All electrical equipment in storage areas must be explosion-proof. Storage areas must meet national electric codes for Class 1 hazardous areas. Keep containers closed. Store only where temperature will not exceed 125°F (52°C). Store full and empty containers separately. Use a first-in, first-out inventory system to prevent storing full containers for long periods.

RECOMMENDED PUBLICATIONS: For further information on storage, handling, and use, see NFPA 30, *Flammable and Combustible Liquids Code*, published by the National Fire Protection Association, 1 Batterymarch Park, PO Box 9101, Quincy, MA 02269-9101; 1-800-344-3555; www.nfpa.org.

8. Exposure Controls/Personal Protection

| COMPONENT | OSHA PEL | ACGIH TLV-TWA (2009) |
|-----------|----------|----------------------|
| 1-Hexene | N.E.* | 50 ppm |

*N.E.—Not Established.

TLV-TWAs should be used as a guide in the control of health hazards and not as fine lines between safe and dangerous concentrations.

IDLH = Not available.

ENGINEERING CONTROLS:

Local Exhaust. Use an explosion-proof local exhaust system with sufficient air flow velocity to prevent oxygen deficiency and keep hazardous vapors in the worker's breathing zone below all applicable exposure limits.

Mechanical (General). Under certain conditions, general exhaust ventilation may be acceptable if it can maintain an adequate supply of air and keep hazardous vapors in the worker's breathing zone below all applicable exposure limits.

Special. None

Other. None

PERSONAL PROTECTIVE EQUIPMENT:

Skin Protection. Wear work gloves when handling containers; rubber where contact with product may occur. Metatarsal shoes for cylinder handling. Protective clothing where needed. Select in accordance with OSHA 29 CFR 1910.132 and 1910.133. Regardless of protective equipment, never touch live electrical parts.

Eye/Face Protection. Wear safety glasses when handling containers. Select eye protection in accordance with OSHA 29 CFR 1910.133.

Respiratory Protection. A respiratory protection program that meet OSHA 29 CFR 1910.134, ANSI Z88.2, or MSHA 30 CFR 72.710 (where applicable) requirements must be followed whenever workplace conditions warrant respirator use. Use an air-supplied or air-purifying cartridge if the action level is exceeded. Ensure that the respirator has the appropriate protection factor for the exposure level. If cartridge type respirators are used, the cartridge must be appropriate for the chemical exposure (e.g., an organic vapor cartridge). For emergencies or instances with unknown exposure levels, use a self-contained breathing apparatus.

9. Physical and Chemical Properties

| | |
|------------------------|---|
| APPEARANCE: | Colorless liquid |
| ODOR: | Sweet |
| ODOR THRESHOLD: | 65 ppm |
| PHYSICAL STATE: | Liquid at normal temperature and pressure |
| pH: | Not applicable. |

| | | |
|---|--|--------------------|
| MELTING POINT at 1 atm: | -219.6°F (-139.8°C) | |
| BOILING POINT at 1 atm: | 146.3°F (63.5°C) | |
| FLASH POINT (test method): | -15°F (-26.1°C) CC | |
| EVAPORATION RATE (Butyl Acetate = 1): | Not available. | |
| FLAMMABILITY: | Flammable | |
| FLAMMABLE LIMITS IN AIR , % by volume: | LOWER: 1.20% | UPPER: 6.9% |
| VAPOR PRESSURE at 70°F (21.1°C): | 3.0 psia (20.7 kPa abs) | |
| VAPOR DENSITY at 70°F (21.1°C) and 1 atm: | 0.217 lb/ft ³ (3.48 kg/m ³) (calculated) | |
| SPECIFIC GRAVITY (H ₂ O = 1) at 68/39.2°F (20/4°C): | 0.6734 | |
| SPECIFIC GRAVITY (Air = 1) at 70°F (21.1°C) and 1 atm: | 2.9 | |
| SOLUBILITY IN WATER: | Insoluble | |
| PARTITION COEFFICIENT: n-octanol/water: | Not available. | |
| AUTOIGNITION TEMPERATURE: | 509°F (265°C) | |
| DECOMPOSITION TEMPERATURE: | Not available. | |
| PERCENT VOLATILES BY VOLUME: | 100 | |
| MOLECULAR WEIGHT: | 84.16 | |
| MOLECULAR FORMULA: | CH ₂ :CH(CH ₂) ₃ CH ₃ or C ₆ H ₁₂ | |

10. Stability and Reactivity

CHEMICAL STABILITY: Unstable Stable

CONDITIONS TO AVOID: Exposure to heat, sparks, or flame

INCOMPATIBLE MATERIALS: Oxidizers, such as oxygen, chlorine, and fluorine

HAZARDOUS DECOMPOSITION PRODUCTS: Carbon dioxide, carbon monoxide

POSSIBILITY OF HAZARDOUS REACTIONS: May Occur Will Not Occur

1-Hexene vapor forms explosive mixtures with air and oxidizing agents.

11. Toxicological Information

ACUTE DOSE EFFECTS: None known.

STUDY RESULTS: None known.

12. Ecological Information

ECOTOXICITY: No adverse ecological effects expected.

OTHER ADVERSE EFFECTS: This product does not contain any Class I or Class II ozone-depleting chemicals.

13. Disposal Considerations

WASTE DISPOSAL METHOD: Do not attempt to dispose of residual or unused quantities. Return cylinder to supplier. For emergency disposal, may be burned in a suitable flare or burner if permitted by federal, state, and local regulations.

14. Transport Information

DOT/IMO SHIPPING NAME: 1-Hexene

| HAZARD CLASS: | PACKING GROUP/Zone: | IDENTIFICATION NUMBER: | PRODUCT RQ: |
|---------------|---------------------|------------------------|-------------|
| 3 | II | UN2370 | None |

SHIPPING LABEL(s): FLAMMABLE LIQUID

PLACARD (when required): FLAMMABLE LIQUID

SPECIAL SHIPPING INFORMATION: Cylinders should be transported in a secure position, in a well-ventilated vehicle. Cylinders transported in an enclosed, nonventilated compartment of a vehicle can present serious safety hazards.

Shipment of compressed gas cylinders that have been filled without the owner's consent is a violation of federal law [49 CFR 173.301(b)].

MARINE POLLUTANTS: 1-Hexene is not listed as a marine pollutant by DOT.

15. Regulatory Information

The following selected regulatory requirements may apply to this product. Not all such requirements are identified. Users of this product are solely responsible for compliance with all applicable federal, state, and local regulations.

U.S. FEDERAL REGULATIONS:

EPA (ENVIRONMENTAL PROTECTION AGENCY)

CERCLA: COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT OF 1980 (40 CFR Parts 117 and 302):

Reportable Quantity (RQ): None

SARA: SUPERFUND AMENDMENT AND REAUTHORIZATION ACT:

SECTIONS 302/304: Require emergency planning based on Threshold Planning Quantity (TPQ) and release reporting based on Reportable Quantities (RQ) of Extremely Hazardous Substances (EHS) (40 CFR Part 355):

TPQ: None

EHS RQ (40 CFR 355): None

SECTIONS 311/312: Require submission of MSDSs and reporting of chemical inventories with identification of EPA hazard categories. The hazard categories for this product are as follows:

IMMEDIATE: Yes

DELAYED: No

PRESSURE: No

REACTIVITY: No

FIRE: Yes

SECTION 313: Requires submission of annual reports of release of toxic chemicals that appear in 40 CFR Part 372.

1-Hexene is not subject to reporting under Section 313.

40 CFR 68: RISK MANAGEMENT PROGRAM FOR CHEMICAL ACCIDENTAL RELEASE PREVENTION: Requires development and implementation of risk management programs at facilities that manufacture, use, store, or otherwise handle regulated substances in quantities that exceed specified thresholds.

1-Hexene is not listed as a regulated substance.

TSCA: TOXIC SUBSTANCES CONTROL ACT: 1-Hexene is listed on the TSCA inventory.

OSHA: OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION:

29 CFR 1910.119: PROCESS SAFETY MANAGEMENT OF HIGHLY HAZARDOUS CHEMICALS: Requires facilities to develop a process safety management program based on Threshold Quantities (TQ) of highly hazardous chemicals.

1-Hexene is not listed in Appendix A as a highly hazardous chemical. However, any process that involves a flammable liquid on site in one location in quantities of 10,000 lb (4536 kg) or greater is covered under this regulation unless the liquid is used as a fuel.

STATE REGULATIONS:

CALIFORNIA: 1-Hexene is not listed by California under the SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986 (Proposition 65).

PENNSYLVANIA: 1-Hexene is subject to the PENNSYLVANIA WORKER AND COMMUNITY RIGHT-TO-KNOW ACT (35 P.S. Sections 7301-7320).

16. Other Information

Read and understand all labels and instructions supplied with all containers of this product.

OTHER HAZARDOUS CONDITIONS OF HANDLING, STORAGE, AND USE: *Flammable liquid and vapor.* Use piping and equipment adequately designed to withstand pressures to be encountered. Use a backflow prevention device in any piping. Use only with compatible materials and equipment. Ground all equipment. Store and use with adequate ventilation at all times. Keep away from oxidizing agents and other flammables. Never work on a pressurized system. If there is a leak, close the cylinder valve. Blow down the system in a safe and environmentally sound manner in compliance with all federal, state, and local laws; then repair the leak. Never place a compressed gas cylinder where it may become part of an electrical circuit.

Mixtures. When you mix two or more chemicals, you can create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an industrial hygienist or other trained person when you evaluate the end product. Remember, chemicals have properties that can cause serious injury or death.

HAZARD RATING SYSTEMS:**NFPA RATINGS:**

HEALTH = 1
FLAMMABILITY = 3
INSTABILITY = 0
SPECIAL = None

HMIS RATINGS:

HEALTH = 1
FLAMMABILITY = 3
PHYSICAL HAZARD = 1

STANDARD VALVE CONNECTIONS FOR U.S. AND CANADA:

THREADED: CGA-510 used; no standard connection assigned.

PIN-INDEXED YOKE: Not applicable.

ULTRA-HIGH-INTEGRITY CONNECTION: Not applicable.

Use the proper CGA connections. **DO NOT USE ADAPTERS.** Additional limited-standard connections may apply. See CGA pamphlet V-1 listed below.

Ask your supplier about free Praxair safety literature as referred to in this MSDS and on the label for this product. Further information can be found in the following materials published by the Compressed Gas Association, Inc. (CGA), 4221 Walney Road, 5th Floor, Chantilly, VA 20151-2923, Telephone (703) 788-2700, <http://www.cganet.com/Publication.asp>.

AV-1 *Safe Handling and Storage of Compressed Gases*
P-1 *Safe Handling of Compressed Gases in Containers*
— *Handbook of Compressed Gases, Fourth Edition*

Praxair asks users of this product to study this MSDS and become aware of product hazards and safety information. To promote safe use of this product, a user should (1) notify employees, agents, and contractors of the information in this MSDS and of any other known product hazards and safety information, (2) furnish this information to each purchaser of the product, and (3) ask each purchaser to notify its employees and customers of the product hazards and safety information.

The opinions expressed herein are those of qualified experts within Praxair, Inc. We believe that the information contained herein is current as of the date of this Material Safety Data Sheet. Since the use of this information and the conditions of use of the product are not within the control of Praxair, Inc., it is the user's obligation to determine the conditions of safe use of the product.

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