

Praxair Material Safety Data Sheet

1. Chemical Product and Company Identification

Product Name: Pentanes (MSDS No. P-6229)	Trade Name: n-Pentane
Chemical Name: n-Pentane	Synonyms: normal-Pentane, amyl hydride
Formula: n-C ₅ H ₁₂	Chemical Family: Alkane
Telephone:	Company Name: Praxair, Inc. 39 Old Ridgebury Road Danbury, CT 06810-5113
Emergencies: 1-800-645-4633*	
CHEMTREC: 1-800-424-9300*	
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. Composition/Information on Ingredients

For custom mixtures of this product, request an MSDS for each component. See section 16 for important information about mixtures.

INGREDIENT	CAS NUMBER	CONCENTRATION	OSHA PEL	ACGIH TLV-TWA (1999)
n-Pentane	109-66-0	>99%*	1000 ppm	600 ppm

* The symbol ">" means "greater than"; the symbol "<," "less than."

3. 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 may be required by rescue workers.
Odor: Paraffinic**

THRESHOLD LIMIT VALUE: TLV-TWA 600 ppm (ACGIH, 1999). TLV-TWAs should be used as a guide in the control of health hazards and not as fine lines between safe and dangerous concentrations.

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 pentane. When children ingest petroleum distillates such as pentane, 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 on 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 pentane may aggravate an existing dermatitis. Respiratory irritation may aggravate an existing asthma or other upper respiratory or pulmonary disease.

SIGNIFICANT LABORATORY DATA WITH POSSIBLE RELEVANCE TO HUMAN HEALTH HAZARD EVALUATION: None known.

CARCINOGENICITY: This product is not listed by NTP, OSHA, or IARC.

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. 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 flushed thoroughly. See a physician, preferably an ophthalmologist, immediately.

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

FLASH POINT (test method):	-57°F (-49.4°C) CC	
AUTOIGNITION TEMPERATURE:	588°F (309°C)	
FLAMMABLE LIMITS IN AIR, % by volume:	LOWER: 1.5%	UPPER: 7.8%

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

SPECIAL FIRE FIGHTING PROCEDURES: DANGER! Flammable liquid and vapor. Evacuate all personnel from danger area. Use self-contained breathing apparatus. 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.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Vapor forms explosive mixtures with air and oxidizing agents. If leaking gas 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.

HAZARDOUS COMBUSTION PRODUCTS: Carbon monoxide, carbon dioxide

6. Accidental Release Measures

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: DANGER! Flammable liquid and vapor. Vapor forms explosive mixtures with air. (See section 5.) Immediately evacuate all personnel from danger area. Use self-contained breathing apparatus 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. Vapors are heavier than air and may collect in low spots. Explosive atmospheres may linger. Before entering area, especially confined areas, check atmosphere with an appropriate device.

WASTE DISPOSAL METHOD: Prevent waste from contaminating the surrounding environment. Keep personnel away. Take up material with sand or other compatible, noncombustible absorption material and place into containers for later disposal. 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 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 cylinders containing 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.

PRECAUTIONS TO BE TAKEN IN HANDLING: 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.

8. Exposure Controls/Personal Protection

VENTILATION/ENGINEERING CONTROLS:

LOCAL EXHAUST—Use an explosion-proof local exhaust system with sufficient air flow velocity to prevent oxygen deficiency and keep hazardous vapors below the TLV in the worker’s breathing zone.

MECHANICAL (general)—Under certain conditions, general exhaust ventilation may be acceptable if it can maintain an adequate supply of air and keep hazardous vapors below the TLV in the worker’s breathing zone.

SPECIAL—None

OTHER—None

RESPIRATORY PROTECTION: Respirators must be acceptable to MSHA and NIOSH. Respiratory protection must conform to OSHA rules as specified in 29 CFR 1910.134.

SKIN PROTECTION: Wear work gloves when handling containers; rubber where contact with product may occur.

EYE PROTECTION: Wear safety glasses when handling containers. Select eye protection in accordance with OSHA 29 CFR 1910.133.

OTHER PROTECTIVE EQUIPMENT: 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.

9. Physical and Chemical Properties

MOLECULAR WEIGHT:	72.15
SPECIFIC GRAVITY (H ₂ O = 1):	0.6262
SPECIFIC GRAVITY (Air = 1) at 70°F (21.1°C) and 1 atm:	2.48
VAPOR PRESSURE at 100°F (37.8°C):	15 psia (103.4 kPa abs)
SOLUBILITY IN WATER vol/vol at 32°F (0°C) and 1 atm:	Negligible
PERCENT VOLATILES BY VOLUME:	100
EVAPORATION RATE (Butyl Acetate = 1):	28.6
BOILING POINT at 1 atm:	97°F (36.1°C)
FREEZING POINT at 1 atm:	-201.5°F (-129.7°C)
APPEARANCE, ODOR, AND STATE: Colorless liquid; paraffinic odor	

10. Stability and Reactivity

STABILITY:	<input type="checkbox"/> Unstable	<input checked="" type="checkbox"/> Stable
INCOMPATIBILITY (materials to avoid): Oxidizers, such as oxygen, chlorine, and fluorine.		
HAZARDOUS DECOMPOSITION PRODUCTS: CO, CO ₂		
HAZARDOUS POLYMERIZATION:	<input type="checkbox"/> May Occur	<input checked="" type="checkbox"/> Will Not Occur
CONDITIONS TO AVOID: Heat, sparks, or flame		

11. Toxicological Information

See section 3.

12. Ecological Information

No adverse ecological effects expected. This product does not contain any Class I or Class II ozone-depleting chemicals. This product is not listed as a marine pollutant by DOT.

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: Pentanes

HAZARD CLASS:	IDENTIFICATION NUMBER:	PRODUCT RQ:
3	UN 1265	None

SHIPPING LABEL(s): FLAMMABLE LIQUID

PLACARD (when required): FLAMMABLE LIQUID

SPECIAL SHIPPING INFORMATION: Containers should be transported in a secure position, in a well-ventilated vehicle. Containers 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)].

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 (40 CFR Part 355):

Threshold Planning Quantity (TPQ): None

Extremely Hazardous Substances (40 CFR 355): None

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

IMMEDIATE: Yes

PRESSURE: No

DELAYED: No

REACTIVITY: No

FIRE: Yes

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

This product does not require 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.

Pentane is listed as a regulated substance in quantities of 10,000 lb (4536 kg) or greater.

TSCA: TOXIC SUBSTANCES CONTROL ACT: This product 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.

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

STATE REGULATIONS:

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

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

16. Other Information

Be sure to 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. May irritate skin, eyes, and respiratory tract. Use only with adequate ventilation or respiratory protection. (See section 8.) Do not get liquid or vapor in eyes, on skin, or on clothing. (See section 3.) Have safety showers and eyewash fountains immediately available. Use piping and equipment adequately designed to withstand pressures to be encountered. Use only with compatible materials and equipment. *May form explosive mixtures with air.* Keep away from heat, sparks, and open flame. Use only spark-proof tools and explosion-proof 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 the system down 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 gases or liquefied gases, 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, gases and liquids have properties that can cause serious injury or death.

HAZARD RATING SYSTEMS:**NFPA RATINGS:**

HEALTH = 1
FLAMMABILITY = 4
REACTIVITY = 0
SPECIAL = None

HMIS RATINGS:

HEALTH = 1
FLAMMABILITY = 4
REACTIVITY = 0

Ask your supplier about free Praxair safety literature as referred in this MSDS and on the label for this product. Further information about this product can be found in the following pamphlets published by the Compressed Gas Association, Inc. (CGA), 1725 Jefferson Davis Highway, Arlington, VA 22202-4102, Telephone (703) 412-0900.

- AV-1 *Safe Handling and Storage of Compressed Gases*
- P-1 *Safe Handling of Compressed Gases in Containers*
- V-1 *Compressed Gas Cylinder Valve Inlet and Outlet Connections*
- V-7 *Standard Method of Determining Cylinder Valve Outlet Connections for Industrial Gas Mixtures*
- *Handbook of Compressed Gases, Third 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.

Praxair MSDSs are furnished on sale or delivery by Praxair or the independent distributors and suppliers who package and sell our products. To obtain current Praxair MSDSs for these products, contact your Praxair sales representative or local distributor or supplier. If you have questions regarding Praxair MSDSs, would like the form number and date of the latest MSDS, or would like the names of the Praxair suppliers in your area, phone or write the Praxair Call Center (**Phone:** 1-800-PRAXAIR; **Address:** Praxair Call Center, Praxair, Inc., PO Box 44, Tonawanda, NY 14150-7891).

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Praxair, Inc.
39 Old Ridgebury Road
Danbury, CT 06810-5113