FLINN SCIENTIFIC, INC.
Material Safety Data Sheet (MSDS)

MSDS #: 387.00
Revision Date: July 13, 1996

SECTION 1 — CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Hexamethylenediamine

Flinn Scientific, Inc. P.O. Box 219 Batavia, IL· 60510 (800) 452-1261
CHEMTREC Emergency Phone Number: (800) 424-9300

SECTION 2 — COMPOSITION, INFORMATION ON INGREDIENTS

Hexamethylenediamine (124-09-4) 80-95%, Water (7732-18-5) 5-20%
Synonyms: 1,6 Hexanediamine
CAS#: None established

SECTION 3 — HAZARDS IDENTIFICATION

Yellow liquid. Ammonia-like odor.
Corrosive to body tissues. Moderately toxic by ingestion. Avoid all body contact.
Combustible liquid.

FLINN AT-A-GLANCE
Health-2
Flammability-1
Reactivity-1
Exposure-2
Storage-0
0 is low hazard, 3 is high hazard

SECTION 4 — FIRST AID MEASURES

Call a physician, seek medical attention for further treatment, observation and support after first aid.
Inhalation: Remove to fresh air at once. If breathing has stopped give artificial respiration immediately.
Eye: Immediately flush with fresh water for 15 minutes.
External: Wash continuously with fresh water for 15 minutes.
Internal: Give large quantities of water. Call a physician or poison control at once.

SECTION 5 — FIRE FIGHTING MEASURES

Combustible liquid.
Flash Point: 178 F (OC) Upper: 6.3% Lower: 0.7%
When heated to decomposition, emits toxic fumes of ammonia, hydrogen cyanide and nitrogen oxides.
Fire Fighting Instructions: Use triclass, dry chemical fire extinguisher. Firefighters should wear PPE and SCBA with full facepiece operated in positive pressure mode.

NFPA CODE
None Established

SECTION 6 — ACCIDENTAL RELEASE MEASURES

Restrict unprotected personnel from area. Remove all ignition sources and ventilate area. Contain spill with sand and absorbent material; deposit in sealed bag or container. See Sections 8 and 13 for further information.

SECTION 7 — HANDLING AND STORAGE

Flinn Suggested Chemical Storage Pattern: Organic #2. Store with alcohols, glycols, amines and amides.
Store in a cool dry place. Use and dispense in a hood.

SECTION 8 — EXPOSURE CONTROLS, PERSONAL PROTECTION

Avoid contact with eyes, skin and clothing. Wear chemical splash goggles, chemical-resistant gloves and chemical-resistant apron. Use ventilation to keep airborne concentrations below exposure limits. Always wear a NIOSH-approved respirator with proper cartridges or a positive pressure, air-supplied respirator when handling this material in emergency situations (spill or fire).
Exposure guidelines: TWA .5 ppm, (ACGIH)

SECTION 9 — PHYSICAL AND CHEMICAL PROPERTIES

Colorless liquid.
Solubility: Soluble in water; slightly in alcohol.

Formula: H2N(CH2)6NH2
Formula Weight: .91 g/cm3

SECTION 10 — STABILITY AND REACTIVITY

Avoid contact with acids, oxidizers, isocyanates, aldehydes, ketones, anhydrides, phenols, nitrates and halogenated compounds.
Shelf life: Indefinite.

SECTION 11 — TOXICOLOGICAL INFORMATION

Acute effects: Corrosive
Chronic effects: N.A.
Target organs: N.A.

ORL-RAT LD50: 750 mg/kg
IHL-RAT LC50: >0.95 mg/L/4h
SKN-RBT LD50: 1110 mg/kg

N.A. = Not available, not all health aspects of this substance have been fully investigated.

SECTION 12 — ECOLOGICAL INFORMATION

48-hr LC50 Daphnia magna: 50 mg/L, slightly toxic.

SECTION 13 — DISPOSAL CONSIDERATIONS

Please consult with state and local regulations.
Flinn Suggested Disposal Method #26b is one option.

SECTION 14 — TRANSPORT INFORMATION

Shipping Name: Hexamethylenediamine, solid
Hazard Class: 8, Corrosive
UN Number: UN2280
N/A = Not applicable

SECTION 15 — REGULATORY INFORMATION

TSCA-listed, EINECS-listed (204-679-6).

SECTION 16 — OTHER INFORMATION

This Material Safety Data Sheet (MSDS) is for guidance and is based upon information and tests believed to be reliable. Flinn Scientific, Inc. makes no guarantee of the accuracy or completeness of the data and shall not be liable for any damages relating thereto. The data is offered solely for your consideration, investigation, and verification. The data should not be confused with local, state, federal or insurance mandates, regulations, or requirements and CONSTITUTE NO WARRANTY. Any use of this data and information must be determined by the science instructor to be in accordance with applicable local, state or federal laws and regulations. The conditions or methods of handling, storage, use and disposal of the product(s) described are beyond the control of Flinn Scientific, Inc. and may be beyond our knowledge. FOR THIS AND OTHER REASONS, WE DO NOT ASSUME RESPONSIBILITY AND EXPRESSLY DISCLAIM LIABILITY FOR LOSS, DAMAGE OR EXPENSE ARISING OUT OF OR IN ANY WAY CONNECTED WITH THE HANDLING, STORAGE, USE OR DISPOSAL OF THIS PRODUCT(S).

Consult your copy of the Flinn Chemical Catalog/Reference Manual for additional information about laboratory chemicals

HEXANES

Material Safety Data Sheet

Mallinckrodt Chemical, Inc.
P.O. Box 800
Paris, Kentucky 40362

Emergency Telephone Number
314-539-1600

Effective Date: 02-17-95 Supersedes 11-09-92

PRODUCT IDENTIFICATION:

Synonyms: n-Hexane

Formula CAS No.: 110-54-3

Molecular Weight: 86.18

Hazardous Ingredients:
n-Hexane 3-Methylpentane

Chemical Formula: $CH_3(CH_2)_4CH_3$

PRECAUTIONARY MEASURES

DANGER! EXTREMELY FLAMMABLE. HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. AFFECTS THE CENTRAL AND PERIPHERAL NERVOUS SYSTEMS.

Keep away from heat, sparks and flame.
Keep container closed.
Use with adequate ventilation.
Wash thoroughly after handling.
Avoid breathing vapor.
Avoid contact with eyes, skin and clothing.

EMERGENCY FIRST AID

Aspiration hazard. If swallowed, DO NOT INDUCE VOMITING! Give large quantities of water or milk if available. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. In all cases call a physician.
SEE SECTION 5.

Physical Data — SECTION 1

Appearance: Faint odor.

Odor: Odorless.

Solubility: Insoluble in water.

Boiling Point: ca. 68 C (154 F).

Vapor Density (Air=1):3.0

Melting Point: ca. -95 C (-139 F)

Vapor Pressure (mm Hg):124 @ 20 C (68 F)

Specific Gravity: ca. 0.7

Evaporation Rate:No information found.

NFPA Ratings: Health: 1 Flammability: 3 Reactivity: 0

Fire and Explosion Information — SECTION 2

Fire: Extremely Flammable. Dangerous fire hazard when exposed to heat or flame. Flashpoint: -22 to -26 C (-7 to -15 F). Autoignition temperature: 240-260 C (464-500 F). Flammable limits in air, % by volume: lel: 1.1; uel: 7.5.

Explosion: Above flash point, vapor-air mixtures are explosive within flammable limits noted above. Contact with oxidizing materials may cause extremely violent combustion.

Fire Extinguishing Media: Dry chemical, foam or carbon dioxide. Water spray may be used to keep fire exposed containers cool.

Special Information: In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Water spray may be used to keep fire exposed containers cool. Use chemical safety goggles. Contact lenses should not be worn when working with this material. Vapors can flow along surfaces to distant ignition source and flash back.

Reactivity Data — SECTION 3

Stability: Stable under ordinary conditions of use and storage. Heat will contribute to instability.

Hazardous Decomposition Products: Toxic gases and vapors may be released if involved in a fire.

Hazardous Polymerization: This substance does not polymerize.

Incompatibilities: Strong oxidizers.

Leak/Spill Disposal Information — SECTION 4

Ventilate area of leak or spill. Remove all sources of ignition. Clean-up personnel require protective clothing and respiratory protection from vapors. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect as hazardous waste and atomize in a suitable RCRA approved combustion chamber, or absorb with vermiculite, dry sand, earth or similar material for disposal as hazardous waste in a RCRA approved facility. Do not flush to sewer!
Reportable Quantity (RQ)(CWA/CERCLA) : 1 lb.
Ensure compliance with local, state and federal regulations.

Health Hazard Information — SECTION 5

A. Exposure/Health Effects

Inhalation: Inhalation of vapors irritates the respiratory tract. Overexposure may cause lightheadedness, nausea, headache, and blurred vision. Greater exposure may cause muscle weakness, numbness of the extremities, unconsciousness and death.

Ingestion: May produce abdominal pain, nausea. Aspiration into lungs can produce severe lung damage. Other symptoms expected to parallel inhalation.

Skin Contact: May cause redness, irritation, with dryness, cracking.

Eye Contact: Vapors may cause irritation. Splashes may cause redness and pain.

Chronic Exposure: Repeated or prolonged skin contact may defat the skin and produce irritation and dermatitis. Chronic inhalation may cause peripheral nerve disorders.

Aggravation of Pre-existing Conditions: Persons with pre-existing skin disorders or eye problems or impaired respiratory function may be more susceptible to the effects of the substance. May affect the developing fetus.

B. FIRST AID

Inhalation: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

Ingestion: Aspiration hazard. If swallowed, DO NOT induce vomiting. Give large quantities of water or milk if available. Call a physician immediately. Never give anything by mouth to an unconscious person.

Skin Exposure: Remove any contaminated clothing. Wipe off excess from skin. Wash skin with soap and water for at least 15 minutes. Get medical attention if irritation develops or persists.

Eye Exposure: Wash eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

C. TOXICITY (RTECS, 1994)

Hexane: Oral rat LD50: 28710 mg/kg. Irritation eye rabbit 10 mg mild Investigated as a tumorigen, mutagen and reproductive effector.

Occupational Control Measures SECTION 6

Airborne Exposure Limits: n-Hexane [110-54-3]: -OSHA Permissible Exposure Limit (PEL): 50 ppm (TWA) -ACGIH Threshold Limit Value (TLV): 50 ppm (TWA)

Ventilation System: A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, "Industrial Ventilation, A Manual of Recommended Practices", most recent edition, for details.

Personal Respirators (NIOSH Approved) If the TLV is exceeded a full facepiece chemical cartridge respirator may be worn, in general, up to the maximum use concentration specified by the respirator supplier. Alternatively, a supplied air full facepiece respirator or airlined hood may be worn.

Skin Protection: Gloves and lab coat, apron or coveralls.

Eye Protection: Use chemical safety goggles and/or a full face shield where splashing is possible. Contact lenses should not be worn when working with this material. Maintain eye wash fountain and quick-drench facilities in work area.

Storage and Special Information SECTION 7

Protect against physical damage. Store in a cool, dry well-ventilated location, away from direct sunlight and any area where the fire hazard may be acute. Store in tightly closed containers (preferably under nitrogen atmosphere).Outside or detached storage is preferred. Inside storage should be

in a standard flammable liquids storage room or cabinet. Separate from oxidizing materials. Containers should be bonded and grounded for transfers to avoid static sparks. Storage and use areas should be No Smoking areas. Use non-sparking type tools and equipment.

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Addendum to Material Safety Data Sheet

REGULATORY STATUS

This Addendum Must Not Be
Detached from the MSDS
Identifies SARA 313 substance(s)

Any copying or redistribution of the MSDS
must include a copy of this addendum

Hazard Categories for SARA Section 311/312 Reporting

Acute	Chronic	Fire	Pressure	Reactive
X	X	X		

Product or Components of Product:	SARA EHS Sec. 302 RQ	SARA EHS Sec. 302 TPQ	SARA Sec. 313 Chemicals Name List	SARA Sec. 313 Chemicals Chemical Category	CERCLA Sec.103 RQ lbs	RCRA Sec. 261.33
HEXANES						
Hexane (110-54-3) > 95%	No	No	No	No	1	No
3-Methylpentane (96-14-0) < 1.2%	No	No	No	No	No	No

SARA Section 302 EHS RQ:
Reportable Quantity of Extremely Hazardous Substance, listed at 40 CFR 355.

SARA Section 302 EHS TPQ:
Threshold Planning Quantity of Extremely Hazardous substance. An asterisk (*) following a Threshold Planning Quantity signifies that if the material is a solid and has a particle size equal to or larger than 100 micrometers, the Threshold Planning Quantity = 10,000 LBS.

SARA Section 313 Chemicals:
Toxic Substances subject to annual release reporting requirements listed at 40 CFR 372.65.

CERCLA Sec. 103:
Comprehensive Environmental Response, Compensation and Liability Act (Superfund) Releases to air, land or water of these hazardous substances which exceed the Reportable Quantity (RQ) must be reported to the National Response Center, (800-424-8802); Listed at 40 CFR 302.4

RCRA:

Resource Conservation and Recovery Act. Commercial chemical product wastes designated as acute hazards or toxic under 40 CFR 261.33

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