



MATERIAL SAFETY DATA SHEET

MSDS Number: 00164
Product Name: n-Propyl Bromide

Effective Date: 04/28/2006
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SECTION I - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: n-Propyl Bromide
Supplier: Chemtura USA Corporation
Address: 199 Benson Road **City:** Middlebury
State: Connecticut **Zip:** 06749
Emergency Telephone Number: 1-800-949-5167
Information Telephone Number: 1-765-497-6100 **Fax:** 1-765-497-6123
Chemtrec Phone: 1-800-424-9300; **Internationally call 703-527-3887**
Effective Date: 04/28/2006 **Supersede Date:** 01/18/2006
MSDS Prepared By: Chemtura Product Safety Group
Synonyms: 1-Bromopropane, Propyl bromide
Product Use: Chemical intermediate
Chemical Name: n-Propyl bromide
Chemical Family: Halogenated alkane

Additional Information

Manufacturer:
Great Lakes Chemical Corporation, A Chemtura Company
P.O. Box 2200
West Lafayette, Indiana 47996-2200

SECTION II - COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENT NAME	CAS No.	%	EXPOSURE LIMITS
n-Propyl bromide	106945	>99	Y (Hazardous) Not established (OSHA PEL TWA) Not established (OSHA PEL STEL) Not established (OSHA PEL CEIL) 10 ppm (50 mg/m ³) (ACGIH TLV TWA) Not established (ACGIH TLV STEL) Not established (ACGIH TLV CEIL)

*Indented chemicals are components of previous ingredient.

Additional Information

Other Recommended Exposure Limits:
Great Lakes Chemical Corporation WEL = 10 ppm (8 hour TWA)

SECTION III - HAZARDS IDENTIFICATION

Emergency Overview: Colorless to pale yellow liquid
Strong characteristic odor
Causes eye irritation.
Causes skin irritation.
Causes mucous membrane and upper respiratory tract irritation.
Contact can result in chemical burns.

Relevant Routes of Exposure: Ingestion, inhalation and skin absorption

Signs and Symptoms of Overexposure: Irritation of the eyes and skin ranging from general reddening to burns, irritation to mucous membranes and respiratory tract, coughing, wheezing, laryngitis, shortness of breath, headache, nausea and vomiting, diarrhea, muscle weakness, giddiness, ataxia, confusion, delirium

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SECTION III - HAZARDS IDENTIFICATION

Medical Conditions Generally Aggravated By Exposure:

Dermatitis
Liver disorders
Kidney disorders
Respiratory disorders
Central and peripheral nervous system disorders

Potential Health Effects: See Section XI for additional information.

Eyes: Causes eye irritation.
Chemical burns are possible.

Skin: Causes skin irritation.
Chemical burns are possible.

Ingestion: Not expected to be a hazard in normal industrial use.

Inhalation: Causes mucous membrane and respiratory tract irritation. Chemical burns are possible.

Chronic Health Effects: Repeated inhalation of high concentrations may cause lung, kidney, liver, urinary, blood, bone marrow, heart, eye, central nervous system, reproductive, developmental, and fertility effects. See Section XI.

Carcinogenicity:

NTP: No

ACGIH: No

IARC: No

OTHER: No

OSHA: No

Additional Information

No information available

SECTION IV - FIRST AID MEASURES

Eyes: Flush with large volumes of water for at least 15 minutes. Get medical attention.

Skin: Wash with large volumes of soap and water for at least 15 minutes. If irritation develops, get medical attention.

Ingestion: If conscious, give person 1 to 2 glasses of water. Get medical attention immediately.

Inhalation: Remove person to fresh air. Get medical attention.

Antidotes: No information available

Notes to Physicians and/or Protection for First-Aiders: No information available

Additional Information

No information available

SECTION V - FIRE FIGHTING MEASURES

Flammable Limits in Air (% by Volume):

4.0-7.8

Flash Point:

None (Tag Closed Cup; ASTM D56)

Autoignition Temperature:

490 degrees C

Extinguishing Media:

All conventional media are suitable.
Water may not be an effective extinguishing agent unless used under favorable conditions by experienced fire fighters.

Fire Fighting Instructions:

Wear a self-contained breathing apparatus and protective clothing to prevent skin and eye contact in fire situations.

Unusual Fire and Explosion Hazards:

Containers can explode in fire situations. Use water spray to cool containers exposed to heat.
Under fire conditions, toxic and irritating fumes may be emitted.
This material forms flammable mixtures with air in a narrow flammability range.
See Flammable Limits in Air.

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SECTION V - FIRE FIGHTING MEASURES

Flammability Classification: Non-flammable liquid
Known or Anticipated Hazardous Products of Combustion: Hydrogen bromide and/or bromine
Carbon monoxide and carbon dioxide

Additional Information

No information available

SECTION VI - ACCIDENTAL RELEASE MEASURES

Accidental Release Measures: Shut off all sources of ignition.
Contain spill.
Wearing appropriate personal protective equipment, collect spill with the aid of an inert absorbent and place in suitable labeled containers for disposal.
Wash spill area after pick-up is complete, collecting all clean up water for appropriate disposal.

Personal Precautions: See Section VIII.

Environmental Precautions: No information available

Additional Information

No information available

SECTION VII - HANDLING AND STORAGE

Handling: Use appropriate personal protection equipment.
Avoid eye, skin and clothing contact.
Do not breathe mist or vapor.
Avoid repeated and prolonged contact.
Keep away from heat, sparks and flame.
Use only in a well ventilated area.

Storage: Store in a cool, dry, well-ventilated area away from incompatible materials.
Keep container tightly closed.
Store away from heat, sparks, and flame.

Other Precautions: All equipment should be properly grounded.

Additional Information

No information available

SECTION VIII - EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls: Adequate general ventilation is recommended when handling to control airborne levels.

Ventilation Requirements: Use local exhaust to minimize misting and vapor.
Use mechanical ventilation for general area control.

Personal Protective Equipment:

Eye/Face Protection: Chemical safety glasses with side shields or chemical safety goggles

Skin Protection: Gloves - Viton or Norfoil are recommended. Nitrile and butyl rubber provide splash protection only.
Clothing designed to minimize skin contact

Respiratory Protection: Wear a NIOSH/MSHA approved organic/acid gas cartridge respirator if misting or vapor occurs.
Consult the OSHA respiratory protection information located at 29CFR 1910.134 and the American National Standard Institute's Practices of Respiratory Protection Z88.2.

Other Protective Clothing or Equipment: No information available

Exposure Guidelines: See Section II.

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SECTION VIII - EXPOSURE CONTROLS/PERSONAL PROTECTION

Work Hygienic Practices: Wash thoroughly after handling.
Wash contaminated clothing before reuse.

Additional Information

No information available

SECTION IX - PHYSICAL & CHEMICAL PROPERTIES

Appearance:	Colorless to pale yellow liquid	Percent Volatile:	100
Boiling Point:	70 degrees C	pH Value:	Not applicable
Bulk Density:	Not applicable	pH Concentration:	Not applicable
Color:	Colorless to pale yellow	Physical State:	Liquid
Decomposition Temperature:	Not available	Reactivity in Water:	Not water reactive
Evaporation Rate:	6 (n-Butyl acetate)	Saturated Vapor Concentration:	~740 mg/L
Freezing Point:	<-60 degrees C	Softening Point:	Not applicable
Heat Value:	See Notes Below	Solubility in Water:	0.25 g/100 ml at 20 degrees C
Melting Point:	-110 degrees C	Specific Gravity or Density (Water=1):	1.353 at 20 degrees C
Molecular/Chemical Formula:	C3H7Br	Vapor Density:	4.25
Molecular Weight:	123	Vapor Pressure:	~111 mmHg at 20 degrees C
Octanol/Water Partition Coefficient:	Not available	Viscosity:	~0.57 cp at 20 degrees C
Odor:	Strong characteristic odor	Volatile Organic Compounds:	100%
Odor Threshold:	Not available	Water/Oil Distribution Coefficient:	Not available
Particle Size:	Not applicable	Weight Per Gallon:	11.3 pounds

Additional Information

Latent Heat of Vaporization = ~58 cal/g

SECTION X - STABILITY AND REACTIVITY

Stability: Stable under normal conditions of handling and use.

Conditions to Avoid: Ignition sources

Incompatibility With Other Materials: Strong oxidizers
Strong bases

Hazardous Decomposition Products: Thermal decomposition may produce the following:
Hydrogen bromide and/or bromine
Carbon monoxide and carbon dioxide

Hazardous Polymerization: Will not occur

Conditions to Avoid: None

Additional Information

No information available

SECTION XI - TOXICOLOGICAL INFORMATION

VALUE (LD50 OR LC50)	ANIMAL	ROUTES	COMPONENTS
253 g/m3/30 minutes	Rat	Acute Inhalation	n-Propyl bromide
7000 ppm/ 4H	Rat	Acute Inhalation	n-Propyl Bromide
14,374 ppm/4H	Rat	Acute Inhalation	n-Propyl Bromide
2,530 mg/kg	Mouse	Acute Intraperitoneal	n-Propyl bromide
4,260 mg/kg	Rat	Acute Oral	n-Propyl Bromide

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SECTION XI - TOXICOLOGICAL INFORMATION

2,950 mg/kg	Rat	Acute Intraperitoneal	n-Propyl bromide
>2,000 mg/kg	Rat	Acute Dermal	n-Propyl Bromide

Toxicological Information:

The toxicological properties of this material have not been fully determined.

RTECS offers the following selected information: the oral TDLO in the rat is 2 g/kg; the oral LDLO in the rat is 4 g/kg.

This component is irritating to the skin, eyes, mucous membranes and upper respiratory tract, possibly resulting in chemical burns. In a reported primary skin irritation study, a mean erythema score of 2.0 was reported. No further information was given.

Chronic overexposure to this component by ingestion, inhalation or dermal absorption may be harmful. Long term exposure may cause lung, liver, kidney, central nervous system, developmental and reproductive effects. n-Propyl bromide gave negative results in a Mag Klig skin sensitization study.

In a 28 day whole-body inhalation study using rats with exposure to vapors for 6 hours each day for 5 days per week, significant mortality was seen at chamber concentrations of 8.0 mg/L. Chamber concentrations of 5.0 to 8.0 mg/L produced deteriorating condition, decreased food consumption, decreased body weights, abnormal gait, increases in liver and kidney weights, and decrease in brain weight. Histopathological lesions were found in the central nervous system, urinary system, nasal cavities, sternal bone marrow, lymphoid tissues and male reproductive system.

In a 13 week whole-body inhalation study using rats with exposure to vapors for 6 hours each day for 5 days per week at chamber concentrations between 0.5 and 3.0 mg/L, no clinical observations were produced. At concentrations of 2.0 and 3.0 mg/L, histopathological lesions were found in the liver. The No Effect Level was established at 1.0 mg/L.

Several in vitro studies have given positive mutagenicity results. However, the more conclusive in vivo mouse micronucleus assay has shown n-propyl bromide not to be a mutagen.

Other acute and chronic health hazards, as well as target organs, are not known.

Additional Information

No information available

SECTION XII - ECOLOGICAL INFORMATION

Ecological Information:

The following ecological information is offered:
The atmospheric lifetime of n-propyl bromide is approximately 15 days.
The ozone depletion potential of n-propyl bromide has been determined to be 0.0019-0.027.

Avoid releasing to the environment.

Additional Information

No information available

SECTION XIII - DISPOSAL CONSIDERATIONS

Disposal Considerations:

Dispose of waste at an approved chemical disposal facility in compliance with all current Local, State/Province, Federal/Canadian laws and regulations.

Additional Information

No information available

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SECTION XIV - TRANSPORT INFORMATION

U.S. DOT

Proper Shipping Name:	Not regulated	ID Number:	N/A
Hazard Class:	N/A	Labels:	N/A
Packing Group:	N/A	Packaging Exceptions:	N/A
Special Provisions:	N/A	Bulk Packaging:	N/A
Non-Bulk Packaging:	N/A	Air Cargo Limit:	N/A
Passenger Air/Rail Limit:	N/A	Other Stowage:	N/A
Vessel Stowage:	N/A		
Reportable Quantity:	N/A		

AIR - ICAO OR IATA

Proper Shipping Name:	Not regulated	ID Number:	N/A
Hazard Class:	N/A	Packing Group:	N/A
Subsidiary Risk:	N/A	Packing Instructions:	N/A
Hazard Labels:	N/A	Packing Instruction -	
Air Passenger Limit Per Package:	N/A	Cargo:	N/A
Air Cargo Limit Per Package:	N/A	Special Provisions Code:	N/A

WATER - IMDG

Proper Shipping Name:	Not regulated	ID Number:	N/A
Hazard Class:	N/A	Subsidiary Risk:	N/A
Packing Group:	N/A		
Medical First Aid Guide Code:	N/A		

Additional Information

No information available

SECTION XV - REGULATORY INFORMATION

U.S. Federal Regulations:

The components of this product are either on the TSCA Inventory or exempt (i.e. impurities, a polymer complying with the exemption rule at 40 CFR 723.250) from the Inventory.

Users of this product as an Ozone Depleting Chemical replacement are responsible for obtaining EPA SNAP approvals. Consult 40 CFR Part 82.170 for approved SNAP uses or contact Great Lakes Chemical Corporation.

State Regulations:

Massachusetts Substance List

Pennsylvania Hazardous Substance List (1% reporting limit)

California Proposition 65: WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.

International Regulations:

This material (or each component) is listed on the following inventories:

Canada - DSL

EU - EINECS

Australia - AICS

Japan - ENCS

Korea - ECL

Philippines - PICCS

China - List I

Canadian WHMIS Hazard Class and Division = D.2.b

SARA Hazards:

Acute:	Yes	Chronic:	Yes
Reactive:	No	Fire:	No
Pressure:	No		

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SECTION XV - REGULATORY INFORMATION

Additional Information

The above regulatory information represents only selected regulations and is not meant to be a complete list.

SECTION XVI - OTHER INFORMATION

NFPA Codes:

Health: NR

Reactivity: NR

Flammability: NR

Other: NR

HMIS Codes:

Health: 2*

Reactivity: 0

* indicates chronic health hazard.

Flammability: 1

Protection: X

Label Statements:

Not available

Other Information:

Abbreviations:

(L) = Loose bulk density in g/ml

LOEC = Lowest observed effect concentration

MATC = Maximum acceptable toxicant concentration

NA = Not available

N/A = Not applicable

NL = Not limited

NOAEL = No observable adverse effect level

NOEC = No observed effect concentration

NOEL = No observable effect level

NR = Not rated

(P) = Packed bulk density in g/ml

PNOR = Particulates Not Otherwise Regulated

PNOS = Particulates Not Otherwise Specified

REL = Recommended exposure limit

TS = Trade secret

Additional Information

Information on this form is furnished solely for the purpose of compliance with OSHA's Hazard Communication Standard, 29CFR 1910.1200 and the Canadian Hazardous Products Act and associated Controlled Products Regulations and shall not be used for any other purpose.

Revision Information:

Section XIV - Air and Water transportation classification

Description

ABZOL cleaners are proprietary cleaning solvents with very low ozone depletion potential (ODP of 0.013 - 0.018) and short atmospheric lifetime (16 days) suitable for use in a variety of cleaning equipment. They can be used for precision and general-purpose cleaning in a vapor degreaser or an ultrasonic bath. Their solvency properties make removal of many different types of soils, such as polyester, mineral oil, greases, etc., possible.

The Albemarle Workplace Exposure Guideline (AWEG) for ABZOL cleaners is 25 ppm.

Applications

ABZOL VG cleaner: degreasing, vapor cleaning, cold cleaning metal parts
ABZOL JG cleaner: degreasing, vapor cleaning, cold cleaning metal parts
ABZOL EG cleaner: electronics, PCs, ionics removal
ABZOL JEG cleaner: electronics, PCs, ionics removal

Typical Properties

	ABZOL VG	ABZOL EG
Appearance	clear, colorless	clear, colorless
Suspended matter	none	none
Nonvolatile residue, wt % max.	0.001	0.001
APHA color, max.	15	15
Water content, ppm max.	150	250
Acidity, reported as wt % HCl, max.	0.001	0.001
Acid acceptance, as wt % NaOH, min.	0.15	0.15
Free halogen	passes test	passes test
Metal corrosion, MIL-T-81533A	passes	passes ¹
Accelerated oxidation, MIL-T-81533A	passes ²	passes ²
Flash point, °C (TCC, TOC, COC)	none	none
Flammability limits, 25 °C, vol % in air	3 - 8	4 - 8
Specific gravity, 25/25 °C	1.328	1.304
Boiling point, °C	71	70

	ABZOL JG	ABZOL JEG
Appearance	clear, colorless	clear, colorless
Suspended matter	none	none
Nonvolatile residue, wt % max.	0.001	0.001
APHA color, max.	15	15
Water content, ppm max.	150	250
Acidity, reported as wt % HCl, max.	0.001	0.001
Acid acceptance, as wt % NaOH, min.	0.15	0.15
Free halogen	passes test	passes test
Metal corrosion, MIL-T-81533A	passes	passes ¹
Accelerated oxidation, MIL-T-81533A	passes ²	n/a
Flash point, °C (TCC, TOC, COC)	none	none
Flammability limits, 25 °C, vol % in air	3 - 8	4 - 8
Specific gravity, 25/25 °C	1.339	1.280
Boiling point, °C	71	70

1. Passes with stainless steel and active metals. Marginal with C1010 carbon steel.
 May discolor copper with extended exposure.
 2. In the presence of C1010 carbon steel.

Materials Compatibility

Plastics

Epoxy glass (Acculam®).....	acceptable
High density polyethylene (Alathon®)	marginal
Polycarbonate (Lexan®)	unacceptable
Polypropylene	marginal
Polytetrafluoroethylene (Teflon®)	acceptable
Polyvinylidene fluoride (Kynar®).....	acceptable

Acceptable – no blistering or delamination, < 3% weight gain, < 1% weight loss, < 10% volume increase, < 3% volume decrease, < 10% hardness change

Unacceptable – definite blistering or delamination, > 15% weight gain, > 3% weight loss, > 20% volume increase, > 5% volume decrease, > 20% hardness change

Elastomers

Fluoroelastomer (Viton® A)	marginal
Polyurethane (Adiprene®)	marginal
Butadiene acrylonitrile (Buna-N®)	unacceptable
Nitrile rubber (NBR)	marginal

Acceptable – no blistering or delamination, < 10% weight gain, < 1% weight loss, < 30% volume increase, < 5% volume decrease, < 10% hardness increase, < 15% hardness decrease

Unacceptable – definite blistering or delamination, > 40% weight gain, > 3% weight loss, > 50% volume increase, > 7% volume decrease, > 20% hardness increase, > 40% hardness decrease

Exposure:

3 days at reflux (immersion and vapor phase) or 2 months at 110 °F (immersion)

Note:

This information is to be used as a guide only. Laboratory studies do not always accurately simulate actual field conditions and applications. It is recommended that the materials be tested under actual use conditions.

Shipping Information

Container Information

Shipments are made in bulk and 55-gallon drums.

Shipping Classification

DOT proper shipping name: not regulated for transportation

Safety and Handling Information

For specific safety and handling information, please refer to the material safety data sheet, which is available upon request.

The information presented herein is believed to be accurate and reliable, but is presented without guarantee or responsibility on the part of Albemarle Corporation. It is the responsibility of the user to comply with all applicable laws and regulations and to provide for a safe workplace. The user should consider any health or safety hazards or information contained herein only as a guide, and should take those precautions which are necessary or prudent to instruct employees and to develop work practice procedures in order to promote a safe work environment. Further, nothing contained herein shall be taken as an inducement or recommendation to manufacture or use any of the herein materials or processes in violation of existing or future patents.



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