

CODING FORMS FOR SRC INDEXING

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Date Produced	03/16/84	Date Received	07/26/94
		TSCA Section	FYI
Submitting Organization	ETHYL CORP		
Contractor			
Document Title	INITIAL SUBMISSION: LETTER FROM ETHYL CORP TO USEPA REGARDING HEXENE-1 WITH ATTACHMENTS, DATED 03/16/84		
Chemical Category	HEXENE-1		

CODING FORM FOR GLOBAL INDEXING

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ETHYL CORPORATION

TOXICOLOGY AND INDUSTRIAL HYGIENE DEPARTMENT

ETHYL TECHNICAL CENTER
6088 OBRH AVENUE
BATON ROUGE, LOUISIANA 70809
(504) 288-7717

March 16, 1984

→ W Perry FYI #040284 (1) (2)
ms
File IR-427B

FYI-0794-001109

Mr. Martin Greif, Executive Secretary
Interagency Testing Committee
401 M. Street, S.W.
Washington, DC 20460

Contains No. 001

Dear Mr. Greif:

This is written to correct an error which appeared in my letter to you of February 1, 1984. The subject product is as follows:

<u>Product Name</u>	<u>CAS No.</u>	<u>Trade Name</u>
Hexene-1	592-41-6	C ₆ Alpha Olefin

The error appeared under the heading Production. Instead of 704 MM lbs., Ethyl's annual production capacity should be shown as 100 MM lbs., based on Stanford Research Institute data.

Any questions you have on this and other Ethyl chemicals should be directed to me at the following address:

Dr. R. L. Smith, Manager
Regulatory Affairs
Ethyl Corporation
Ethyl Technical Center
P. O. Box 14799
Baton Rouge, LA 70898

Sincerely,

Robert L. Smith
Robert L. Smith, Ph.D.
Manager, Regulatory Affairs

RLS:imc

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→ W. Perry COU

ETHYL CORPORATION

TECHNOLOGY AND INDUSTRIAL HYGIENE DEPARTMENT

ETHYL TECHNICAL CENTER

6000 BONE AVENUE

BATON ROUGE, LOUISIANA 70809

(504) 285-7717

February 1, 1984

Mr. Martin Grief, Executive Secretary
Interagency Testing Committee
401 M Street, S. W.
Washington, D. C. 20460

- ① IR-409B
- ② IR-443
- ③ IR-427B
- ④ IR-427D
- ⑤ IR-427A
- ⑥ IR-405
- ⑦ IR-412B

Dear Mr. Grief:

The documents and information contained herein are submitted in response to the November 9, 1983, Federal Register notice and your letter of November 18, 1983, concerning pentabromoethyl benzene and decabromodiphenyl ether to Saytech, Inc.

Effective January 3, 1984, Saytech, Inc., was merged with Ethyl Corporation, a Virginia corporation with headquarters in Richmond, Virginia. The information included herein is submitted by Ethyl Corporation to cover the above two compounds along with a package of information on hexene-1, decene-1 and dodecene-1. Separately, we will be submitting to you shortly additional information to cover tetrabromobisphenol A and 2,6-di-tert-butylphenol.

All correspondence or notices concerning these chemicals should be directed to:

Dr. R. L. Smith
Manager, Regulatory Affairs
Ethyl Corporation
Ethyl Technical Center
P. O. Box 14799
Baton Rouge, LA 70898

The attached information on the chemicals covered is submitted as 'separate' packets. None of the material is considered to be of a confidential nature and may be used by the Interagency Testing Committee (ITC) in preparing their assessment of priority considerations for testing rules under section 4 (a) of TSCA. As additional information becomes available to us, this will be sent along to you. Any questions you have should be directed to me. Thanks for your helpful input on these information requests.

Robert L. Smith

Robert L. Smith
Manager, Regulatory Affairs

RLS:nh

Product Name: Decabromodiphenyl ether
CAS No.: 1163-19-5
Trade Name: SAYTEX 102
SAYTEX 102E

● Attached

- Technical Bulletin for SAYTEX 102
- Technical Bulletin for SAYTEX 102E
- Toxicological Evaluation Summary
- Material Safety Data Sheet

● Production

Annual production is considered confidential information and is based on market trends and demands.

● Worker Exposure

Employees exposed to decabromodiphenyl ether are monitored by Ethyl Corporation's Industrial Hygiene Department. Concentrations of total dust are determined through area and personal monitoring. At the present time we do not have an analytical procedure established to determine the amount of decabromodiphenyl ether included in the total dust concentrations detected. To date, all of the levels detected at the present manufacturing site have been lower than $5\text{mg}/\text{M}^3$, which is the AIHA, WEEL recommended exposure limit for decabromodiphenyl ether.

The manufacturing process for the subject chemical is a batch operation involving closed vessels during the reaction and drying cycles. The packaging of the chemical is done in a segregated area remote from the manufacturing building. The material, a white powder, is moved from storage hoppers to the packaging feeder via an airlock feeder. The packaging feeder can accommodate both bags and fiber drums. The packaging equipment is serviced by air pollution control devices to minimize release of the chemical into the workplace and/or the environment. The packaging of the subject chemical is not a continuous operation. Employee exposure to the material would be limited to the packaging operation, which utilizes two (2) employees each shift, when needed.

● Use Data

Decabromodiphenyl ether is marketed for use as a flame retardant additive. Recommended uses are listed on the enclosed Technical Bulletins.

● Environmental Data

The subject chemical is not intended for use as an end product. Its environmental fate and/or degradation rates are dependent on the type of use application employed. No attempt has been made to compile this data, but much is available in the literature.

● Toxicological Data

A summary sheet listing all of the toxicological information known to Ethyl Corporation is enclosed. A full listing of published evaluations is readily available from Tox line.

SAYTECH INC.
MATERIAL SAFETY DATA SHEET



Date January, 1980

SECTION 1 - Identification

Product Name SAYTEX - 102 Manufacturer's Name SAYTECH, INC.
Chemical Name Decabromodiphenyl oxide Manufacturer's Address 879 Main Street
Sayreville, NJ 08872
Chemical Family halogenated phenyl Telephone Number (201) 721-2100
ether

SECTION 2 - Hazard Rating

Hazard Classification: Health 1 Flammability 0 Reactivity 1
Composition: Component Concentration N/A Criterion and Value N/A
None

SECTION 3 - Physical Properties

Appearance and Odor Creamy white powder, chemical odor
Boiling Point (°F) _____ Specific Gravity (Water=1) 3.0 Solubility in Water 20 ppb
Vapor Pressure (mm Hg) _____ Vapor Density (Air=1) _____ Evaporation Rate (____=1) _____
Reacts if Exposed to: Light No Air No Heat >300°C Water No Strong Oxidizer yes

SECTION 4 - Fire or Explosion Data

Flash Point (°F) - Autoignition Temperature (°F) N/A LEL (%) N/A UEL (%) N/A
Extinguishing Media water or fog spray

Special Firefighting Procedure High temperatures may liberate toxic gases; self-contained breathing apparatus may be necessary.

Unusual Fire or Explosion Protection _____

SECTION 5 - Health Data

TLV not established Criterion _____
Effects of Overexposure Dust may cause transient eye or skin irritation. Full effects not know.

Emergency and First Aid Procedures

Ingestion If large amounts are ingested, induce vomiting and get medical attention.

Inhalation Remove person to fresh air. Get medical attention.

Skin Wash with warm water and mild soap. Remove contaminated clothing and wash before reuse.

Eye Flush with large amounts of water. Get medical attention.

Irritant: Skin slight response Eye transient irritant Inhalation not determined

Other Data OLD50 = >2000 mg/kg.

SECTION 6 - Reactivity

Stable Unstable _____ Conditions to Avoid temperatures > 300°C
Incompatibility strong oxidizing agents

Hazardous Decomposition Products Hydrogen bromide, bromine

Hazardous Polymerization: No Yes _____ Conditions to Avoid _____

Corrosive: No Yes _____ Materials _____

SECTION 7 - Spills and Leaks

Steps to be Taken in Case Material is Released or Spilled Sweep or shovel into containers for reclaiming or disposal. Do not allow material to enter waterways.

Waste Disposal Precautions Dispose of in accordance with Federal, State and local regulations. If incinerated, system must be equipped with a scrubber designed to effectively handle corrosive off gases.

SECTION 8 - Special Protection

Respirators: No _____ Yes Type 3M #8710 recommended

Ventilation: Use the guidelines recommended by the American Conference of Governmental Industrial Hygienists in the current edition of "Industrial Ventilation", considering the TLV, Lower Explosive (Flammable) Limit and conditions under which this product is used.

Gloves rubber Other clean, body covering clothing

Eye Protection safety glasses w/side shields

SECTION 9 - Special Precautions

Handling and Storage Store in a dry area. Practice reasonable care to avoid skin and eye contact. Avoid breathing dust if generated.

DOT Hazard Label Required: No Yes _____ Specify _____

Other Precautions Avoid contamination of food. Perforate or crush containers before disposal.

APPROVED AS ESSENTIALLY SIMILAR TO OSHA FORM 20 (PREVIOUSLY L 58-005-4)

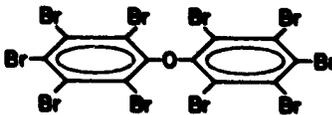
CAS Reg. No. 1163-19-5

LaVerne J. Makfinsky
Prepared By



FLAME RETARDANTS

SAYTEX[®] 102



SAYTEX 102, decabromodiphenyl oxide, is an aromatic bromine-containing additive flame retardant with 83% bromine. It offers these key performance features:

- low addition rate
- excellent heat stability
- low cost

SUGGESTED USES:

high impact polystyrene • thermoset and thermoplastic polyesters • non-drip polypropylene
• crosslinked polyethylene • elastomers

TYPICAL PROPERTIES:

Appearance	off-white free flowing powder
Bromine Content	83%
Initial weight loss by TGA	330°C (648°F)
True density by displacement	3.0 gm/cc
Solubility	insoluble in water, and common organic solvents
Average particle size	3.2 microns

SPECIFICATIONS:

Melting Point Range °C	300-310
Volatiles % @125°C	0.1% maximum
Iron ppm	50 maximum
Particle size avg. F.S.S. μ	5 maximum

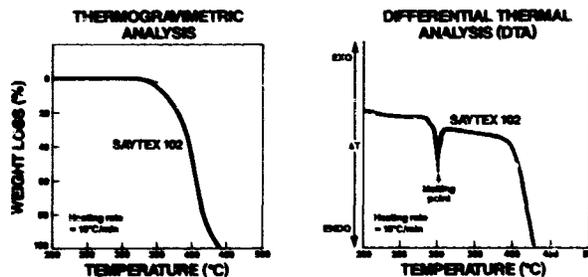
SUGGESTED FORMULATIONS:

The following are practical formulations to obtain the UL-94 test ratings as shown:

	SAYTEX 102 (wt. %)	SAYTEX 102/Sb ₂ O ₃ Ratio	UL-94* Rating
impact polystyrene	10-13	3/1	V-O
LDPE	6	3/1	V-2
thermoplastic polyester	6-8	3/1	V-O
polypropylene talc filled	20	3/1	V-O

Note:

Special bulletins on use of Saytex 102 in various resins and elastomers are available upon request.



SAFETY AND HANDLING:

Although SAYTEX 102 is not considered hazardous within the Federal Hazardous Substances Act, basic handling precautions are recommended. Avoid prolonged or repeated skin contact. Avoid inhalation of dust or contact with eyes. Protective gloves, chemical safety goggles and approved dust respirators should be worn where there is a chance of exposure. Smoking and eating should be avoided when handling the product.

Complete material safety data and a summary of toxicological evaluations are available upon request.

*The data reported above is based upon laboratory flammability tests and should not be used to predict performance under actual fire conditions.

The facts stated and the recommendations made in this publication are based on our own research and the research of others, and are believed to be accurate. However, no guarantee of their accuracy is made because we cannot cover every possible contingency in manufacturing equipment and methods. For the same reason, the products discussed are sold without warranty, express or implied, and on the condition that purchasers shall make their own tests to determine the suitability of such products for their particular purposes. Statements concerning the possible use of our products are not intended as recommendations to use our products in the infringement of any patent.

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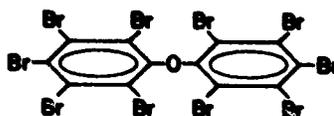
Ethyl Saytech®

Saytech[®]

A Member of the Ethyl Chemicals Group

FLAME RETARDANTS

SAYTEX[®] 102E



Saytex 102E is a special high purity electrical grade of Saytex 102 having inorganic impurities and iron contents substantially lower than normally offered to the industry. SAYTEX 102E, decabromodiphenyl oxide, is an aromatic bromine-containing additive flame retardant with 83% bromine. It offers these key performance features:

- high flame retardant effectiveness
- excellent heat stability
- low inorganic impurities
- low cost

SUGGESTED USES:

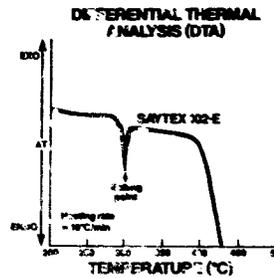
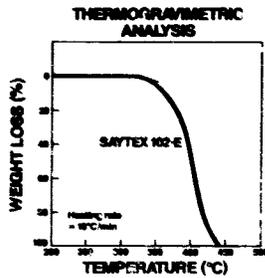
wire and cable insulation of all types

TYPICAL PROPERTIES:

Appearance	off-white free flowing powder
Bromine content	83%
Melting Point (initial)	305°C (579°F)
Initial weight loss by TGA	330°C (648°F)
True density by displacement	3.0 g/cc
Aluminum	32 ppm
Iron	8 ppm
Halide ion	160 ppm
Decahalo BPO	97%
Free halogen	50 ppm
Solubility	insoluble in water and common organic solvents
Average particle size	3.1 microns

SPECIFICATIONS:

Melting Point Range °C	300-310
Volatiles % @125°C	0.05% maximum
Iron ppm	15 maximum
Aluminum ppm	60 maximum
Ionic Halide ppm	200 maximum
Bromine	82% minimum
Particle size avg. FSS, μ	5 maximum



SAFETY AND HANDLING:

Although SAYTEX 102E is not considered hazardous within the Federal Hazardous Substances Act, basic handling precautions are recommended. Avoid prolonged or repeated skin contact. Avoid inhalation of dust or contact with eyes. Protective gloves, chemical safety goggles and approved dust respirators should be worn where there is a chance of exposure. Smoking and eating should be avoided when handling the product. Complete material safety data and a summary of toxicological evaluations are available upon request.

The data reported above is based upon laboratory flameability tests and should not be used to predict performance under actual fire conditions.

The facts stated and the recommendations made in this publication are based on our own research and the research of others, and are believed to be accurate. However, no guarantee of their accuracy is made because we cannot cover every possible contingency in manufacturing equipment and methods. For the same reason, the products discussed are sold without warranty, express or implied, and on the condition that purchasers shall make their own tests to determine the suitability of such products for their particular purposes. Statements concerning the possible use of our products are not intended as recommendations to use our products in the infringement of any patent.

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Saytech

A Member of the Ethyl Chemicals Group

FLAME RETARDANTS

tech talk

SAYTEX-102

Summary: Toxicological Evaluations

	<u>Type of Study</u>	<u>Results</u>
I.	Skin Irritation	Not an irritant
II.	Eye Irritation	Not an irritant
III.	Oral LD ₅₀	>2000mg/kg.
IV.	Mutagenicity (Ames)	Negative response
V.	Sensitization Human	Not a sensitizer
VI.	Dietary 30 day (rat) 2 yr. (rat)	No overt effects No discernible effects
VII.	Excretion	Complete within 2 da.
VIII.	Tissue Distribution	Not detectable - da. 16
IX.	Teratology	No teratogenic response
X.	Comodogenicity	No response

Prepared by: LaVerne J. Makfinsky
Manager, Technical Compliance
October 7, 1982

LJM:lc

The data reported above is based upon laboratory flammability tests and should not be used to predict performance under actual fire conditions.

The facts stated and the recommendations made in this publication are based on our own research and the research of others, and are believed to be accurate. However, no guarantee of their accuracy is made because we cannot cover every possible contingency in manufacturing equipment and methods. For the same reason, the products discussed are sold without warranty, express or implied, and on the condition that purchasers shall make their own tests to determine the suitability of such products for their particular purposes. Statements concerning the possible use of our products are not intended as recommendations to use our products in the infringement of any patent.

Printed in U.S.A.



Saytech Inc.

879 Main Street • Sayreville, New Jersey 08872
(201) 721-2100 • Telex: 833095

<u>Product Name</u>	<u>CAS No.</u>	<u>Trade name</u>
Hexene-1	592-41-6	C ₆ Alpha Olefin
Decene-1	872-05-9	C ₁₀ Alpha Olefin
Dodecene-1	112-41-4	C ₁₂ Alpha Olefin

- Attached

- Technical bulletin for each of the above
- Material Safety Data Sheet for each of the above

- Production

Ethyl's annual production capacity, based on Stanford Research Institute Data:

Hexene-1	-	784 MM lbs.	100 MM
Decene-1	-	175 MM lbs.	
Dodecene-1	-	100 MM lbs.	

- Worker Exposure

Occupational exposure is confined to reactor operators, maintenance people and during loading and off loading of tank trucks or tank cars. Most of these operations are "closed system" in nature.

- Use Data

No non-occupational human exposures are expected since all consumers react these olefins to form new chemical molecules. For example, they are used in the manufacture of polyethylene, linear plasticizers and synthetic heptanoic acid. Most of these operations are "closed system" in nature.

- Environmental Data

Except for accidental spills, none of these alpha olefins are expected to enter the environment directly since all consumers react these olefins to form new chemical molecules.

- Toxicological Data

A summary of the available toxicological information available on these alpha olefins is given in the accompanying technical bulletins and MSDS's. A full listing of published evaluations is readily available from Toxline.

A related chemical which may be considered as offering unreasonable risk of injury to health is normal-hexane, a neurotoxin. However, by contrast, hexene-1 has a labile alpha olefin grouping which makes the two quite different in toxicological characteristics. Hexene-1 has not been reported to have any of the neurotoxicity characteristics attributable to n-hexane.

MATERIAL SAFETY DATA SHEET

(Essentially Similar To Form OSHA-20)
Rev. May 72

Ethyl

SECTION I	
ETHYL CORPORATION	EMERGENCY TELEPHONE NO 504-344-7147
ADDRESS 451 Florida Blvd., Baton Rouge, Louisiana 70801	
COMMON NAME AND SYNONYMS 1-Dodecene	TRADE NAME AND SYNONYMS C ₁₂ Alpha Olefin
CHEMICAL FAMILY Alkene	FORMULA CH ₃ (CH ₂) ₁₀ CHCH ₃

SECTION II - HAZARDOUS INGREDIENTS		
HAZARDOUS LIQUIDS, SOLIDS, OR GASES IN PRODUCT	%	TLV (LHA)

SECTION III - PHYSICAL DATA			
BOILING Range (°F.)	415-421	SPECIFIC GRAVITY (H ₂ O = 1)	.759
VAPOR PRESSURE (mm Hg) at 68°F	0.2	PERCENT VOLATILE BY VOLUME	100
VAPOR DENSITY (AIR = 1)	5.8	EVAPORATION RATE (Butyl Acetate = 1)	<0.1
SOLUBILITY IN WATER	Negligible		
APPEARANCE AND ODOR Water white clear liquid - hydrocarbon odor.			

SECTION IV - FIRE AND EXPLOSION HAZARD DATA			
FLASH POINT (ASTM D93) Tag closed cup 171°F	VOLATILE LIQUID %	LEL 0.4	UEL 4.7
EXTINGUISHING MEDIA Foam, carbon dioxide, dry chemical, water fog.			
SPECIAL FIRE FIGHTING PROCEDURES None			
UNUSUAL FIRE AND EXPLOSION HAZARDS None			

SECTION V - HEALTH HAZARD DATA	
THRESHOLD LIMIT VALUE	None established by OSHA or ACGIH. Recommend 200 ppm for vapors.
EFFECTS OF OVEREXPOSURE	Due to this olefin's low vapor pressure, the inhalation hazard is considered to be small. However, where hot vapors are released, the main toxic effect is anesthesia from inhalation of high vapor concentrations. In poorly ventilated areas, care should be taken to avoid asphyxiation due to lowered oxygen content in vapor-rich situations. Skin and eye irritation are minimal for single contact periods and sensitization has not been demonstrated.
EMERGENCY AND FIRST AID PROCEDURES	For skin or eye contact, flush affected areas with copious amount of water for 15 minutes. For eye contact, seek medical attention. If signs or symptoms occur from breathing vapors, remove to fresh air. Seek medical attention. If breathing stops, apply artificial respiration.

CHEMICAL OR TRADE NAME C₁₂ Alpha Olefin

SECTION VI - REACTIVITY DATA			
STABILITY	UNSTABLE		CONDITIONS TO AVOID Contact with strong oxidizers external to process equipment.
	STABLE	X	
INCOMPATIBILITY (Materials to avoid) Can react with oxidizing materials			
HAZARDOUS DECOMPOSITION PRODUCTS Same as any burning hydrocarbon. CO and CO ₂ .			
HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII - SPILL OR LEAK PROCEDURES	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Avoid overexposure to excessive vapor concentration. Prevent exposure of vapors to source of ignition.	
WASTE DISPOSAL METHOD Clean up as for petroleum distillate.	

SECTION VIII - SPECIAL PROTECTION INFORMATION			
RESPIRATORY PROTECTION (Specify type) If hot vapors are released, use organic vapor respirator.			
VENTILATION	LOCAL EXHAUST At point of release of hot vapors.	SPECIAL	
	MECHANICAL (General) Recommended	OTHER	
PROTECTIVE GLOVES Not required		EYE PROTECTION Chemical safety goggles	
OTHER PROTECTIVE EQUIPMENT Contaminated clothing should be laundered before re-use.			

SECTION IX - SPECIAL PRECAUTIONS	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING Avoid situations where flames or sparks may ignite liquid or vapor. Treat as for petroleum distillate.	
OTHER PRECAUTIONS	

DATE March 9, 1982

MATERIAL SAFETY DATA SHEET

(Essentially Similar To Form OSHA-20)
Rev. May 78



SECTION I	
ETHYL CORPORATION	EMERGENCY TELEPHONE NO. 504-344-7147
451 Florida Blvd., Baton Rouge, Louisiana 70801	
CHEMICAL NAME AND SYNONYMS 1-Hexene	TRADE NAME AND SYNONYMS C₆ Alpha Olefin
CHEMICAL FAMILY Alkene	FORMULA CH₂(CH₂)₄CHCH₃

SECTION II - HAZARDOUS INGREDIENTS		
HAZARDOUS LIQUIDS, SOLIDS, OR GASES IN PRODUCT	%	TLV (Limbs)

SECTION III - PHYSICAL DATA			
SOLID RANGE (°F.)	145-147	SPECIFIC GRAVITY (H ₂ O=1) at 68°F	0.673
VAPOR PRESSURE (mm Hg) at 68°F	140	PERCENT VOLATILE BY VOLUME	100
VAPOR DENSITY (AIR=1)	2.9	EVAPORATION RATE (Butyl Acetate = 1)	9.6
SOLUBILITY IN WATER	Negligible		
APPEARANCE AND ODOR	Water white liquid - hydrocarbon odor		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA				
FLASH POINT (Closed cup) (-15°F)	FLAMMABLE LIMITS Volume %	LEL 1.2	UEL 8.9	
EXTINGUISHING MEDIA Foam, carbon dioxide, dry chemical, and water fog				
SPECIAL FIRE FIGHTING PROCEDURES None				
LABELING FIRE AND EXPLOSION HAZARDS None				

SECTION V - HEALTH HAZARD DATA	
THRESHOLD LIMIT VALUE FOR VAPORS.	None established by OSHA or ACGIH. Recommended 300 ppm
EFFECTS OF OVEREXPOSURE	The main toxic effect is anesthesia from inhalation of high vapor concentrations. In poorly ventilated areas, care should be taken to avoid asphyxiation due to lowered oxygen content in vapor-rich situations. Skin and eye irritation are minimal for single contact periods and sensitization has not been demonstrated.
EMERGENCY AND FIRST AID PROCEDURES	For skin or eye contact, flush affected areas with copious amount of water for 15 minutes. For eye contact, seek medical attention. If signs or symptoms occur from breathing vapors, remove to fresh air. Seek medical attention. If breathing stops, apply artificial respiration.

SECTION VI - REACTIVITY DATA			
STABILITY	UNSTABLE		CONDITIONS TO AVOID Contact with strong oxidizers external to process equipment.
	STABLE	X	
INCOMPATIBILITY (Mixtures to avoid) Can react with oxidizing materials.			
HAZARDOUS DECOMPOSITION PRODUCTS Same as any burning hydrocarbon. CO and CO ₂			
HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII - SPILL OR LEAK PROCEDURES
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Avoid overexposure to excessive vapor concentration. Prevent exposure of vapors to source of ignition.
WASTE DISPOSAL METHOD Clean up as for petroleum distillate.

SECTION VIII - SPECIAL PROTECTION INFORMATION		
RESPIRATORY PROTECTION (Specify type) Organic vapor respirator up to 2000 ppm. Supplied air respirator over 2000 ppm.		
VENTILATION	LOCAL EXHAUST At point of release of vapors.	SPECIAL
	MECHANICAL (General) Recommended	OTHER
PROTECTIVE GLOVES Not required.	EYE PROTECTION Chemical safety goggles.	
OTHER PROTECTIVE EQUIPMENT Contaminated clothing should be laundered before re-use.		

SECTION IX - SPECIAL PRECAUTIONS
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING Avoid situations where flames or sparks may ignite liquid or vapor. Treat as petroleum distillate.
OTHER PRECAUTIONS

DATE March 9, 1982

MATERIAL SAFETY DATA SHEET

(Essentially Similar To Form OSHA-20)
Rev. May 78

Ethyl

SECTION I

ETHYL CORPORATION		EMERGENCY TELEPHONE NO. 504-344-7147
ADDRESS 451 Florida Blvd., Baton Rouge, Louisiana 70801		
CHEMICAL NAME AND SYNONYMS 1-Decene	TRADE NAME AND SYNONYMS C-6 Alpha Olefin	
CHEMICAL FAMILY Alkene	FORMULA CH ₃ (CH ₂) ₇ CHCH ₂	

SECTION II - HAZARDOUS INGREDIENTS

HAZARDOUS LIQUIDS, SOLIDS, OR GASES IN PRODUCT	%	TLV (T ₁₀)

SECTION III - PHYSICAL DATA

BOLING Range (°F.)	338-340	SPECIFIC GRAVITY (H ₂ O-1)	0.741
VAPOR PRESSURE (mm Hg) at 68°F	1.7	PERCENT VOLATILE BY VOLUME	100
VAPOR DENSITY (AIR=1)	4.8	EVAPORATION RATE (Butyl Acetate -1)	<.1
SOLUBILITY IN WATER	Negligible		
APPEARANCE AND ODOR	Water white liquid - hydrocarbon odor		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Closed cup)	114°F	FLAMMABLE LIMITS Volume %	LEL 0.5	UEL 5.4
EXTINGUISHING MEDIA	Foam, carbon dioxide, dry chemical and water fog			
SPECIAL FIRE FIGHTING PROCEDURES	None			
UNUSUAL FIRE AND EXPLOSION HAZARDS	None			

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE	None established by OSHA or ACGIH. Recommend 200 ppm for vapors.	
EFFECTS OF OVEREXPOSURE	Due to this olefin's low vapor pressure, the inhalation hazard is considered to be small. However, where hot vapors are released, the main toxic effect is anesthesia from inhalation of high vapor concentrations. In poorly ventilated areas, care should be taken to avoid asphyxiation due to lowered oxygen content in vapor-rich situations. Skin and eye irritation are minimal for single contact periods and sensitization has not been demonstrated.	
EMERGENCY AND FIRST AID PROCEDURES	For skin or eye contact, flush affected areas with copious amount of water for 15 minutes. For eye contact, seek medical attention. If signs or symptoms occur from breathing vapors, remove to fresh air. Seek medical attention. If breathing stops, apply artificial respiration.	

CHEMICAL OR TRADE NAME C10 Alpha Olefin

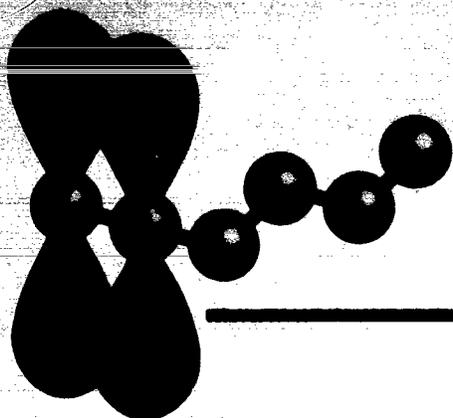
SECTION VI - REACTIVITY DATA			
STABILITY	UNSTABLE		CONDITIONS TO AVOID Contact with strong oxidizers external to process equipment.
	STABLE	X	
INCOMPATIBILITY (Materials to avoid) Can react with oxidizing materials.			
HAZARDOUS DECOMPOSITION PRODUCTS Same as any burning hydrocarbon. CO and CO ₂ .			
HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII - SPILL OR LEAK PROCEDURES	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Avoid overexposure to excessive vapor concentration. Prevent exposure of vapors to source of ignition.	
WASTE DISPOSAL METHOD	

SECTION VIII - SPECIAL PROTECTION INFORMATION		
RESPIRATORY PROTECTION (Specify type) If hot vapors are released, use organic vapor respirator.		
VENTILATION	LOCAL EXHAUST	SPECIAL
	MECHANICAL (General)	OTHER
PROTECTIVE GLOVES Not required		EYE PROTECTION Chemical safety goggles
OTHER PROTECTIVE EQUIPMENT Contaminated clothing should be laundered before re-use.		

SECTION IX - SPECIAL PRECAUTIONS	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING Avoid situations where flames or sparks may ignite liquid or vapor. Treat as petroleum distillate.	
OTHER PRECAUTIONS	

DATE March 9, 1982



ALPHA OLEFIN

HEXENE-1

DESCRIPTION

Ethyl's hexene-1, a clear water-white, mobile liquid, is produced using modified Ziegler ethylene chain growth technology developed by Ethyl. The product is 99+ % olefinic.

APPLICATIONS

Ethyl's hexene-1 enters into all reactions typical of alpha-olefins. It can be used as a comonomer in polyethylene and as an intermediate in the production of oxo alcohols and synthetic fatty acids.

C₆ and lighter	0.1	—
C₆	99.5	99.0 min.
C₆ and heavier	0.4	—
	<u>100.0</u>	
Monoolefin	99.9	98.5 min.
Paraffin	0.1	1.5 max.
	<u>100.0</u>	
Linear terminal	97.5	96.0 min.
Branched terminal	1.9	2.0 max.
Linear internal	0.6	1.0 max.
	<u>100.0</u>	
Color, APHA	<5	10 max.
Sulfur, ppm	0.2	—
Peroxide, ppm	0.5	—
Density at 20°C, g/ml	0.673	—
at 68°F, lbs/gal	5.61	—
Flash Point, °F (TAG CC)	-15	—
Boiling Range, °C, 5%-95%	63-64	—
Water, ppm	<10	25 max.

TOXICITY AND HANDLING

Fire is the main hazard in handling hexene-1; it is a highly flammable liquid. Hexene-1 has a low level of toxicity with an inhalation LC₅₀ of 33,400 ppm. Hexene-1 is virtually nontoxic by oral and dermal application with an LD₅₀ of over 10,000 mg/kg. It is not an eye irritant and causes only mild skin irritation.

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CHEMICALS GROUP



TOXICITY AND HANDLING (Cont'd)

Hexene-1 is sufficiently volatile to present the danger of anesthesia, unconsciousness or death in an enclosed space. It should be used with adequate ventilation. Where such ventilation is not available, a NIOSH approved respirator should be used. Ethyl suggests a guideline of 300 ppm as a TLV for hexene-1.

Good industrial hygiene practice dictates that eye and hand protection should be worn when handling hexene-1. In case of a spill on the skin or in the eyes, flushing with water is recommended. Avoid ingestion.

STORAGE AND SHIPMENT

Hexene-1 is stored and shipped in carbon steel equipment blanketed with nitrogen. It is not corrosive to steel or aluminum. Contact with air and oxygen should be avoided to minimize the chance of an explosive mixture forming in a storage tank and because of the detrimental effect upon most subsequent chemical reactions and because of the potential explosion danger created by peroxide formation.

AVAILABILITY

Hexene-1 is available in tank trailers and tank cars (10,000, 20,000, and 30,000 gallon capacity) from Ethyl Corporation's alpha olefin plant on the Houston ship channel at Pasadena, Texas. Port Terminal Railroad is the railroad carrier servicing this plant. Hexene-1 is available in drums only on special order.

SHIPPING CLASSIFICATIONS

U.S. D.O.T. Description: Petroleum Naphtha
Hazard Classification: Flammable Liquid
Placard: Flammable

U.S. TSCA Chemical Inventory Registry Number: CAS 592-41-6
IMCO Classifications: Flammable Liquid, N.O.S. Class 3.1

IN THE UNITED STATES:

Ethyl Corporation, Industrial Chemicals Division
451 Florida Boulevard
Baton Rouge, Louisiana 70801, U.S.A.
Telex: 586-431 or 441
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IN CANADA:

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NORTHEAST REGION

Ethyl Corporation, Industrial Chemicals Division
50 Green Pond Road
Rockaway, New Jersey 07866
Telephone: (201) 625-5858

WESTERN REGION

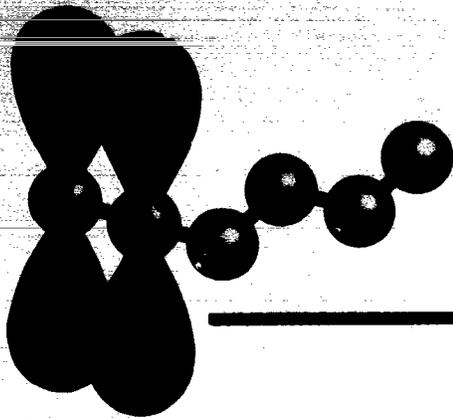
Ethyl Corporation, Industrial Chemicals Division
P. O. Box 10548
1525 East 17th Street
Santa Ana, California 92711
Telephone: (714) 558-8121

ETHYL CORPORATION
CHEMICALS GROUP



DES PLAINES, IL • HOUSTON, TX • ROCKAWAY, NJ • SANTA ANA, CA
BRUSSELS • SINGAPORE • TORONTO

The information presented herein is believed to be accurate and reliable, but is presented without guarantee or responsibility on the part of Ethyl. Further, nothing contained herein shall be taken as an inducement or recommendation to manufacture or use any of the herein described materials or processes in violation of existing or future patents.



ALPHA OLEFIN

DODECENE-1

DESCRIPTION

Ethyl's dodecene-1, a clear water-white, mobile liquid, is produced using modified Ziegler ethylene chain growth technology developed by Ethyl. The product is 99+ % olefinic.

APPLICATIONS

Ethyl's dodecene-1 enters into all reactions typical of alpha-olefins. Dodecene-1 is used as an intermediate in the production of amines and amine oxides, mercaptans, oxo alcohols, and alkylated aromatics.

C ₁₀	0.0	1.0 max.
C ₁₁	98.2	98.0 min.
C ₁₂	1.7	2.0 max.
C ₁₄	0.1	0.5 max.
	<u>100.0</u>	
Monoolefin	99.6	99.0 min.
Paraffin	0.4	1.0 max.
	<u>100.0</u>	
Linear terminal	93.5	93.0 min.
Branched terminal	5.0	5.5 max.
Linear internal	1.5	3.5 max.
	<u>100.0</u>	
Color, APHA	<5	—
Density at 20°C, g/ml	0.759	—
at 68°F, lbs/gal	6.32	—
Pour Point, °C	36	—
Flash Point (TAG CC), °F	171	—
Boiling Range, °C, 5%-95%	213-216	—

TOXICITY AND HANDLING

Dodecene-1 has a low level of toxicity with an oral and dermal LD₅₀ greater than 10,000 mg/kg. Dodecene-1 is not an eye irritant and causes only mild skin irritation.

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INDUSTRIAL CHEMICALS



TOXICITY AND HANDLING (Cont'd)

Because of its low vapor pressure, dodecene-1 has a low level of acute hazard by inhalation. Ethyl suggests 200 ppm as a guideline for limit of exposure for an eight-hour period.

Good industrial hygiene practice dictates that eye and hand protection should be worn when handling dodecene-1. In case of a spill on the skin or in the eyes, flushing with water is recommended. Avoid ingestion.

STORAGE AND SHIPMENT

Dodecene-1 is stored under a nitrogen blanket in carbon steel and shipped in carbon steel equipment. It is not corrosive to steel or aluminum. Protection from exposure to air or oxygen is recommended to minimize the chance of an explosive mixture forming in a storage tank and because of the adverse effect upon most chemical reactions and the potential explosion danger created by peroxide formation.

AVAILABILITY

Dodecene-1 is available in drums, and in tank trailers and tank cars (10,000, 20,000 and 23,500 gallon capacity) from Ethyl Corporation's alpha olefin plant on the Houston ship channel at Pasadena, Texas. Port Terminal Railroad is the railroad carrier.

SHIPPING CLASSIFICATIONS

U.S. D.O.T. Description: Petroleum Naphtha
Hazard Classification: Combustible Liquid
Placard: Combustible

U.S. TSCA Chemical Inventory Registry Number: CAS 112-41-4
IMCO Classification: Non-regulated.

IN THE UNITED STATES:

Ethyl Corporation, Industrial Chemicals Division
451 Florida Boulevard
Baton Rouge, Louisiana 70801, U.S.A.
Telex: 586-431 or 441
TWX: 515-993-3597
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IN CANADA:

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Ethyl Corporation, Industrial Chemicals Division
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Rockaway, New Jersey 07866
Telephone: (201) 625-5858

WESTERN REGION

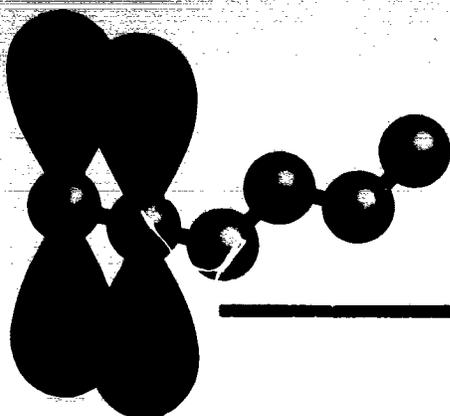
Ethyl Corporation, Industrial Chemicals Division
P. O. Box 10548
1525 East 17th Street
Santa Ana, California 92711
Telephone: (714) 558-8121

ETHYL CORPORATION
INDUSTRIAL CHEMICALS



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ALPHA OLEFIN

DECENE-1

DESCRIPTION

Ethyl's decene-1, a clear water-white, mobile liquid, is produced using modified Ziegler ethylene chain growth technology developed by Ethyl. The product is 99+ % olefinic.

APPLICATIONS

Ethyl's decene-1 enters into all reactions typical of alpha-olefins. It can be used as a comonomer in certain copolymers and as an intermediate in the production of epoxides, amines, oxo alcohols, synthetic lubricants and synthetic fatty acids.

C₈ and lighter	0.2	—
C₁₀	99.4	98.0 min.
C₁₂	0.4	—
	<u>100.0</u>	
Monoolefin	99.7	99.0 min.
Paraffin	0.3	1.0 max.
	<u>100.0</u>	
Linear terminal	96.2	94.6 min.
Branched terminal	2.2	—
Linear internal	1.6	—
	<u>100.0</u>	
Color, APHA	<5	—
Density at 20°C, g/ml	0.741	—
at 68°F, lbs/gal	6.17	—
Flash Point, °F (TAG CC)	114	—
Boiling Range, °C, 5%-95%	170-171	—

TOXICITY AND HANDLING

Decene-1 has a low level of toxicity with an oral and dermal LD₅₀ of greater than 10,000 mg/kg. All animals exposed to saturated vapors of decene for 1-4 hours survived. Decene-1 is not an eye irritant and causes only mild skin irritation.

Because of its low vapor pressure, decene-1 has a low level of acute hazard by inhalation. Ethyl suggests 200 ppm as a guideline for the limit of exposure for an eight-hour period.

Good industrial hygiene practice dictates that eye and hand protection should be worn when handling decene-1. In case of a spill on the skin or in the eyes, flushing with water is recommended. Avoid ingestion.

Decene-1 is a combustible liquid and should be handled accordingly.

ETHYL CORPORATION
INDUSTRIAL CHEMICALS



STORAGE AND SHIPMENT

Decene-1 is stored under a nitrogen blanket in carbon steel and shipped in carbon steel equipment. It is not corrosive to steel or aluminum. Protection from exposure to air and oxygen is recommended to minimize the chance of an explosive mixture forming in a storage tank and because of the adverse effect upon most chemical reactions and the potential explosion danger created by peroxide formation.

AVAILABILITY

Decene-1 is available in drums, and in tank trailers and tank cars (10,000, 20,000, and 23,500 gallon capacity) from Ethyl Corporation's alpha olefin plant on the Houston ship channel at Pasadena, Texas. Port Terminal Railroad is the railroad carrier.

SHIPPING CLASSIFICATIONS

U.S. D.O.T. Description: Petroleum Naphtha
Hazard Classification: Combustible Liquid
Placard: Combustible

U.S. TSCA Chemical Inventory Registry Number: CAS 872-05-9

IMCO Classifications: Flammable Liquid, N.O.S. Class 3.3

IN THE UNITED STATES:

Ethyl Corporation, Industrial Chemicals Division
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Telex: 586-431 or 441
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IN CANADA:

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ETHYL CORPORATION
INDUSTRIAL CHEMICALS



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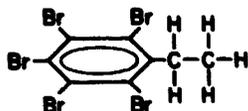
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Saytech[®]

A Member of the Ethyl Chemicals Group

FLAME RETARDANTS

SAYTEX[®] 105



SAYTEX 105, pentabromoethylbenzene, is a low melting aromatic bromine-containing additive flame retardant. It offers these key performance features:

- low melting point
- high solubility
- good thermal stability

SUGGESTED USES:

thermoset polyester resins • textiles • adhesives • coatings • polyurethanes

TYPICAL PROPERTIES:

Melting range	136-138°C
Appearance	white to cream color powder
Bromine content	79%
Volatility °C for 10% wt. loss TGA	23°C
Thermal stability	> 300°C

Solubility (g/100 ml)

water	0.1
acetone	3.6
toluene	72.5
chloroform	6.8
ethyl alcohol	6.8
styrene	72.5

SPECIFICATIONS:

Melting Range	132-138°C
Volatiles % @110°C	0.5% maximum
Iron	50 ppm maximum
Color 10% wt/vol toluene	100 APHA maximum

SAFETY AND HANDLING:

Although SAYTEX 105 is not considered hazardous within the Federal Hazardous Substances Act, basic handling precautions are recommended. Avoid prolonged or repeated skin contact. Avoid inhalation of dust or contact with eyes. Protective gloves, chemical safety goggles and approved dust respirators should be worn where there is a chance of exposure. Smoking and eating should be avoided when handling the product. Complete material safety data and a summary of toxicological evaluations are available upon request.

The data reported above is based upon laboratory flammability tests and should not be used to predict performance under actual fire conditions.

The facts stated and the recommendations made in this publication are based on our own research and the research of others, and are believed to be accurate. However, no guarantee of their accuracy is made because we cannot cover every possible contingency in manufacturing equipment and methods. For the same reason, the products discussed are sold without warranty, express or implied, and on the condition that purchasers shall make their own tests to determine the suitability of such products for their particular purposes. Statements concerning the possible use of our products are not intended as recommendations to use our products in the infringement of any patent.

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Saytech

A Member of the Ethyl Chemicals Group

FLAME RETARDANTS

tech talk

SAYTEX-105

Summary: Toxicological Evaluations

	<u>Type of Study</u>	<u>Results</u>
I.	Skin Irritation	Not an irritant
II.	Eye Irritation	Not an irritant
III.	Oral LD ₅₀	>5300mg/kg.
IV.	Dermal LD ₅₀	>8000mg/kg.
V.	Inhalation LC ₅₀	>200mg/L
VI.	Mutagenicity (Ames)	Negative response
VII.	Sensitization Guinea Pig	Not a sensitizer
VIII.	Dietary 28 day (rat)	No overt effects
IX.	Dermal Contact Repeat - animal	No response

Prepared by: LaVerne J. Makfinsky
Manager, Technical Compliance
October 7, 1982

LJM:lc

The data reported above is based upon laboratory flammability tests and should not be used to predict performance under actual fire conditions.

The facts stated and the recommendations made in this publication are based on our own research and the research of others, and are believed to be accurate. However, no guarantee of their accuracy is made because we cannot cover every possible contingency in manufacturing equipment and methods. For the same reason, the products discussed are sold without warranty, express or implied, and on the condition that purchasers shall make their own tests to determine the suitability of such products for their particular purposes. Statements concerning the possible use of our products are not intended as recommendations to use our products in the infringement of any patent.

Printed in U.S.A.



Saytech Inc.
879 Main Street • Sayreville, New Jersey 08872
(201) 724-2100 • Telex: 833095

Product Name: Pentabromoethyl benzene
CAS No.: 83-22-3
Trade Name: SARYTEX 105

● Attached

- Technical Bulletin
- Toxicological Evaluation Summary
- Material Safety Data Sheet

● Production

Annual production is considered confidential information and is based on market trends and demands.

● Worker Exposure

Employee exposure to the subject chemical is monitored by Ethyl Corporation's Industrial Hygiene Department. Concentrations of total dust are determined through area and personal monitoring. At the present time we do not have an established method to determine absolute concentrations of Pentabromoethyl benzene, therefore, it is included in the total dust concentrations detected. All of the levels detected during the manufacturing cycles of Pentabromoethyl benzene are reported to have been lower than the OSHA recommended limits of 5 mg/M^3 for respirable fractions and 15 mg/M^3 for total dust.

The manufacturing process for the subject chemical is a batch operation involving closed vessels during the reaction and drying cycles. The packaging is done in an area removed from the process area. The dried material is gravity fed from an overhead dryer directly into fiber drums containing 250# net weight. All the equipment used during the manufacturing process is serviced by pollution control devices to minimize the release of chemicals to the environment.

The exposure to any dust generated in the packaging operation of Pentabromoethyl benzene is limited to one (1) person per shift.

Employees engaged in the packaging operation are required to wear disposable coveralls, shoe covers, dust caps, cotton gloves and dust masks.

● Use Data

Pentabromoethyl benzene is marketed as a flame retardant additive. Recommended uses are listed on the enclosed Technical Bulletin.

● Environmental Data

All wastes generated during the manufacturing of the subject chemical are disposed of off-site at a chemically secure landfill. Manifests documenting each transaction are filed with the required agencies.

The subject chemical is not intended for use as an end product. Its environmental fate and/or degradation rates are dependent on the type of use application employed. Ethyl Corporation has not investigated these topics.

● Toxicological Data

A summary sheet listing all of the toxicological information, on Pentabromoethyl benzene, known to Ethyl Corporation is enclosed. Copies of actual laboratory reports in our possession will be provided if specifically requested in writing.



MATERIAL SAFETY DATA SHEET



Date January 1980

SECTION 1 - Identification

Product Name SAYTEX 105 Manufacturer's Name SAYTECH INC.
Chemical Name Pentabromo ethylbenzene Manufacturer's Address 879 Main Street Sayreville, NJ 08872
Chemical Family Brominated aromatic Telephone Number (201) 721-2100

SECTION 2 - Hazard Rating

Hazard Classification: Health 1 Flammability 0 Reactivity 1
Composition: Component Concentration Criterion and Value
None N/A N/A

SECTION 3 - Physical Properties

Appearance and Odor white, free flowing powder
Boiling Point (°F) - Specific Gravity (Water=1) - Solubility in Water <0.1
Vapor Pressure (mm Hg) - Vapor Density (Air=1) - Evaporation Rate (=1)
Reacts if Exposed to: Light No Air No Heat >300°C Water No Strong Oxidizer

SECTION 4 - Fire or Explosion Data

Flash Point (°F) - Autoignition Temperature (°F) N/A LEL (%) N/A UEL (%)
Extinguishing Media

Special Firefighting Procedure Hydrogen bromide and other gases may be liberated at high temperatures, self-contained breathing apparatus may be necessary.

Unusual Fire or Explosion Protection

SECTION 5 - Health Data

TLV Not determined Criterion
Effects of Overexposure Continuous, inhalation of excessive dust may be hazardous.

Emergency and First Aid Procedures

Ingestion Induce vomiting and get medical attention.

Inhalation Remove person to fresh air

Skin Wash with warm water and mild soap. Contaminated clothing should be laundered before reuse.

Eye Flush with large amounts of water for at least 15 min. If irritation occurs, get medical attention.

Irritant: Skin not an irritant Eye not an irritant Inhalation LC50 = >200 mg/L

Other Data OLD50 = >5.3 g/kg; DLD50 = >8.0 g/kg.

SECTION 6 - Reactivity

Stable Unstable _____ Conditions to Avoid temperatures >300°C
Incompatibility _____

Hazardous Decomposition Products Hydrogen bromide, bromine

Hazardous Polymerization: No Yes _____ Conditions to Avoid _____

Corrosive: No Yes _____ Materials _____

SECTION 7 - Spills and Leaks

Steps to be Taken in Case Material is Released or Spilled Shovel or sweep into containers. Use dust respirator, rubber gloves and eye protection.

Waste Disposal Precautions Dispose of in accordance with local, State and Federal regulations. Perforate or crush used containers before disposal.

SECTION 8 - Special Protection

Respirators: No _____ Yes Type 3M #8710 recommended

Ventilation: Use the guidelines recommended by the American Conference of Governmental Industrial Hygienists in the current edition of "Industrial Ventilation", considering the TLV, Lower Explosive (Flammable) Limit and conditions under which this product is used.

Gloves rubber Other clean, body covering clothing

Eye Protection safety glasses or goggles

SECTION 9 - Special Precautions

Handling and Storage Store in a dry area. Practice reasonable care to avoid unnecessary physical exposure.

DOT Hazard Label Required: No Yes _____ Specify _____

Other Precautions Avoid contamination of food.

APPROVED AS ESSENTIALLY SIMILAR TO OSHA FORM 20 (PREVIOUSLY L 5 B - 005 - 4)

CAS Reg. No. 85-22-3

LaVerne J. Makfinsky

Prepared By _____