APPENDIX 1
Material Safety Data Sheet

Methyl Alcohol

MATERIAL SAFETY DATA SHEET

WESCOR, INC.
459 South Main Street
Logan, UT 84321 USA
TELEPHONE: (435) 752-6011
(800) 453-2725
FAX: (435) 752-4127

EFFECTIVE DATE
1 May 2000
SUPERSEDES
15 June 1994

SECTION 1 - PRODUCT IDENTIFICATION

PRODUCT NAME	CATALOG NUMBER(S)
Wescor® SS-041E, Aerospray ® Gram Reagent E, Methanol	SS-041E

CHEMICAL NAME & SYNONYMS	CHEMICAL FAMILY
Methyl Alcohol,	Alcohols
TRADE NAME & SYNONYMS	**CHEMICAL FORMULA**
Wescor® SS-041E, SS-035D N\Methanol, Wood Alcohol, Carbinol	CH_3OH Molecular Weight 32.04

SECTION 2 - COMPOSITION OF HAZARDOUS INGREDIENTS

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	CAS #	%	TLV
Methyl Alcohol	67-56-1	100	200 ppm

SECTION 3 - HAZARDOUS IDENTIFICATION

APPEARANCE

liquid

LABEL PRECAUTIONS

Keep away from heat, sparks, and flame. Avoid contact with skin, eyes and clothing. Avoid breathing vapor. Wash throughly after handling. Protect against physical damage. Store in cool area, away from oxidizers and sources of flame or ignition. Storage should be in flammable liquids storage room or cabinet. Storage an d use areas should be No Smoking areas. Jeep tightly capped to avoid escape of vapors, and to prevent water contamination.

EFFECTS OF OVEREXPOSURE

Eye Contact	May cause irritation. Continued exposure may cause eye lesions.
Skin Contact	Methyl Alcohol is a defatting agent and may cause skin to become dry and cracked. Skin absorption can occur symptoms that parallel inhalation.
Ingestion	Toxic. Symptoms parallel inhalation. Can intoxicate and cause blindness. Usual fatal dose is 100 to 125 ml.
Inhalation	Slight irritant to mucous membranes. Toxic effects on the nervous system, especially optic nerve. Once absorbed into body, it is very slowly eliminated. Symptoms of overexposure may include headache, drowsiness, nausea, vomiting, blurred vision, blindness, coma, and death. A person may get better than worse again up to 30 hours later.
Chronic Exposure	Marked impairment of vision and enlargement of the liver has been reported. Repeated or prolonged exposure may cause skin irritant.

SECTION 4 - EMERGENCY AND FIRST AID PROCEDURES

IN CASE OF

Eye Contact	Wash eyes with plenty of water for at least 15 minutes, separating eyelids with fingers to ensure complete flushing.

SECTION 4 - EMERGENCY AND FIRST AID PROCEDURES

Skin Contact	Remove any contaminated clothing. Wash skin with soap and water for at least 15 minutes. Get medical attention if irritation develops or persists.
Ingestion	If swallowed, induce vomiting immediately by giving two glasses of water and sticking finger down throat. Never give anything by mouth to an unconscious person. Call physician immediately.
Inhalation	Remove to fresh air. If not breathing, give artificial respiration. If breathing difficult, give oxygen. Call a physician.
Note to Physician	Symptoms of overexposure may include headache, drowsiness, nausea, vomiting, blurred vision, blindness, coma, and death. A person may get better than worse again up to 30 hours later.

SECTION 5 - FIRE AND EXPLOSION INFORMATION

FLASH POINT (METHOD)		FLAMMABLE LIMITS			
11°C (52°F) (Closed Cup)	Autoignition Temperature: 385° C (725° F)	LEL	6.7	UEL	36

EXTINGUISHING MEDIA

Water spray, Dry chemical, Alcohol foam, or Carbon dioxide.

SPECIAL FIRE FIGHTING PROCEDURES, UNUSUAL FIRE AND EXPLOSION HAZARDS

Above flash point, vapor-air mixtures are explosive within flammable limits noted above. Moderate explosion hazard and dangerous fire hazard when exposed to heat, sparks, or flames. 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. Use water spray to blanket fire, cool fire-exposed containers, and flush spills or vapors away from fire. Vapors can flow along surfaces to distant ignition source and flash back.

NFPA HAZARD RATINGS

HEALTH	1	FLAMMABILITY	3	REACTIVITY	0	SPECIAL NOTICE	-

SECTION 6 - ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IF MATERIAL IS LEAKED OR SPILLED

Ventilate spill or leak area. Remove all sources of ignition. Wear protective clothing and respiratory protection from vapors. Contain ad recover liquid when possible, or absorb with vermiculite, dry sand, earth, or similar material for disposal in accordance with local, state, and federal regulations.

SECTION 7 - STORAGE AND HANDLING

STORAGE ENVIRONMENT		AVERAGE SHELF LIFE
minimum 18°C	maximum 31°C	18 Months

SPECIAL SENSITIVITY (HEAT, LIGHT, MOISTURE)

Avoid heat and excessive light

PRECAUTIONS TO BE TAKEN

Keep away from heat, sparks, and flame. Avoid contact with skin, eyes and clothing. Avoid breathing vapor. Wash throughly after handling. Protect against physical damage. Store in cool area, away from oxidizers and sources of flame or ignition. Storage should be in flammable liquids storage room or cabinet. Storage an d use areas should be No Smoking areas. Jeep tightly capped to avoid escape of vapors, and to prevent water contamination.

SECTION 8 - SPECIAL PROTECTION

RESPIRATOR TYPE	EYE PROTECTION	GLOVES
SCBA above TLV	Chemical Safety Goggles	Neoprene rubber

VENTILATION

MECHANICAL (GENERAL ROOM VENT)	X	LOCAL EXHAUST		SPECIAL	

SECTION 8 - SPECIAL PROTECTION

OTHER PROTECTIVE EQUIPMENT
Eye wash and quick drench facility

SECTION 9 - PHYSICAL PROPERTIES

FORM (SOLID, LIQUID, GAS)	ODOR	COLOR
Liquid	Characteristic alcohol	Clear
BOILING POINT	**FREEZING POINT**	**SOLUBILITY (IN WATER)**
64.5°C (148°F)	-98°C (-144°F)	Miscible
VAPOR PRESSURE (mmHg)	**VAPOR DENSITY (AIR = 1)**	**% VOLATILE BY VOLUME**
97 @ 20°C (68°F)	1.1	100
pH	**SPECIFIC GRAVITY**	**SOLUBILITY**
N.A.	N.A.	N.A.

OTHER

SECTION 10 - REACTIVITY DATA

STABILITY	CONDITIONS TO AVOID
Stable	Heat, flame, sources of ignition
HAZARDOUS POLYMERIZATION	**CONDITIONS TO AVOID**
Will not occur	This substance does not polymerize.

INCOMPATIBILITY (MATERIALS TO AVOID)
Strong oxidizing agents (nitrates, perchlorates, sulfuric acids).
HAZARDOUS DECOMPOSITION PRODUCTS
May release carbon oxides and formaldehyde when heated of decomposition.

SECTION 11 - TOXICOLOGICAL INFORMATION

ACUTE, SUBCHRONIC, OR SPECIAL STUDIES
N.E.

SECTION 12 - ECOLOGICAL INFORMATION

ECOTOXICITY, ENVIRONMENTAL FATE
N.E.

SECTION 13 - DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHODS
Atomize in suitable RCRA approved combustion chamber of dispose of material in a RCRA approved facility. Reportable Quantity (RQ) (CWA/CERCLA): 5000lbs. SARA 311/312 Reporting: Acute Health Hazard, Chronic Health Hazard, Fire Hazard. SARA 313: Name List, toxic substances subject to annual release reporting requirements (40CFR 372.65).

SECTION 14 - TRANSPORT INFORMATION

DOT DESCRIPTION, HAZARD CLASS
N.E.

SECTION 15 - REGULATORY INFORMATION

REVIEWS, STANDARDS, AND REGULATIONS
N.E

SECTION 16 - OTHER INFORMATION

N.E. = NOT ESTABLISHED N.A. = NOT APPLICABLE

The information in this MSDS was obtained from sources which we believe are reliable. However, the information is provided without any representation or warranty, express or implied, regarding its accuracy or correctness.
The conditions or methods of handling, storage, use, and disposal of the product are beyond our control and may be beyond our knowledge. For these 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 the product.

activated Methyl Diethanolamine (aMDEA)

Material Safety Data Sheet

Original Date: 03/12/1993
Revision Date: 11/21/2002

BASF CORPORATION
3000 CONTINENTAL DRIVE NORTH

MOUNT OLIVE, NJ 07828
(973) 426-4671

EMERGENCY TELEPHONE: (800) 424-9300 CHEMTREC
(800) 832-HELP (BASF Hotline)
BOTH NUMBERS ARE AVAILABLE DAYS, NIGHTS, WEEKENDS, & HOLIDAYS.

SECTION 1 - PRODUCT INFORMATION

METHYLDIETHANOLAMINE
Product ID: NCI 021721
Common Chemical Name:
2,2'-(Methylimino)bis-ethanol
Synonyms:
N-Methyliminodiethanol
Molecular Formula:
C(5)H(13)NO(2)
Chemical Family: Alkanolamines
Molecular Wt.: 119.2

SECTION 2 - INGREDIENTS

Chemical Name:	CAS	Amount
Methyldiethanolamine	105-59-9	> 99.0 %

PEL/TLV NOT ESTABLISHED

SECTION 3 - PHYSICAL PROPERTIES

Color: Colorless to yellow
Form/Appearance: Liquid
Odor: Amine

	Typical	Low/High	U.O.M.			
Specific Gravity:	1.04			@	20	DEG C
Viscosity:	101		MPAS	@	20	DEG.
pH:	11.5		SU			

pH method: (10% AQUEOUS SOLUTION)

	Typical	Low/High	Deg.	@	Pressure
Boiling Pt:	243		C	1	ATMOSPHERES
Freezing Pt:	-21		C	1	ATMOSPHERES

Decomp. Tmp: NOT AVAILABLE
Solubility in Water Description: Miscible
Vapor Pressure: 0.026 MILLIBARS X 40 DEG. C XX
Octanol/Water partition coefficient (log POW): -1.08

SECTION 4 - FIRE AND EXPLOSION DATA

	Typical	Low/High	Deg.	Method
Flash Point:	137		C	DIN 51 758
Autoignition:	265		C	DIN 51794
Flam. Limits:		0.9 - 8.4	%	

Extinguishing Media:
Use water fog, alcohol fog or dry chemical.
Fire Fighting Procedures:
Firefighters should be equipped with self-contained breathing apparatus and turn out gear.
Unusual Hazards:
Explosion hazard is low when exposed to heat or flames. Can react with oxidizing materials.

SECTION 5 - HEALTH EFFECTS

Routes of entry for solids and liquids include eye and skin contact, ingestion and inhalation. Routes of entry for gases include inhalation and eye contact. Skin contact may be a route of entry for liquified gases.

Toxicology Test Data:
Rabbit, Primary Skin Irritation - NON IRRITATING
.
Rat, Oral LD50 - 4,680 MG/KG
Moderately Toxic
Rabbit, Eye Irritation - IRRITATING
.
Rat Inhalation Risk Test; Sat. Vapor/20C -
No deaths after 8 hour exposure
Rat Inhalation Risk Test; Sat. Vapor/20C -
No deaths after 8 hour exposure
Ames Salmonella Assay -
Not mutagenic
Acute Overexposure Effects:
Contact with the eyes and skin may result in moderate irritation.
There are no other known acute effects associated with this material.
Chronic Overexposure Effects:
There are no known chronic effects associated with this material.
First Aid Procedures - Skin:
Wash affected areas with soap and water. Remove and launder contaminated clothing before reuse. If irritation develops, get medical attention.
First Aid Procedures - Eyes:
Immediately rinse eyes with running water for 15 minutes. If irritation develops, get medical attention.
First Aid Procedures - Ingestion:
If swallowed, dilute with water and immediately induce vomiting. Never give fluids or induce vomiting if the victim is unconscious or having convulsions. Get immediate medical attention.
First Aid Procedures - Inhalation:
Move to fresh air. Aid in breathing, if necessary, and get immediate medical attention.

SECTION 5 - HEALTH EFFECTS (cont)

First Aid Procedures - Notes to Physicians:
None known.
First Aid Procedures - Aggravated Medical Conditions:
No data is available which addresses medical conditions that are generally recognized as being aggravated by exposure to this product. Please refer to the effects of overexposure section for effects (if any) observed in animals.
First Aid Procedures - Special Precautions:
None

SECTION 6 - REACTIVITY DATA

Stability Data:
Stable.
Incompatability:
Acids, acid chlorides and isocyanates.
Conditions/Hazards to Avoid:
See Reactivity - Incompatibility section.
Hazardous Decomposition/Polymerization:
Hazardous decomposition products: CO, CO2 and NOx.
Polymerization: Does not occur.
Corrosive Properties:
Not corrosive.
Oxidizer Properties:
Not an oxidizer

SECTION 7 - PERSONAL PROTECTION

Clothing:
Gloves, coveralls, apron, boots as necessary to minimize contact.
Eyes:
Chemical goggles; also wear a face shield if splashing hazard exists.
Respiration:
If vapors or mists are generated, wear a NIOSH/MSHA approved organic vapor/mist respirator or an air-supplied respirator as appropriate.
Ventilation:
Use local exhaust to control vapors/mists.
Explosion Proofing:
See Section 4 - Fire and Explosion Data.
Other Personal Protection Data:
Eyewash fountains and safety showers must be easily accessible. Shower after handling.

SECTION 8 - SPILL-LEAK/ENVIRONMENTAL

General:
Spills should be contained, solidifed, and placed in suitable containers for disposal in a licensed facility. This material is not regulated by RCRA or CERCLA ("Superfund"). Wear appropriate respiratory protection and protective clothing and provide adequate ventilation during clean-up.
Waste Disposal:
Incinerate in a licensed facility. Do not discharge into waterways or sewer systems.

SECTION 8 - SPILL-LEAK/ENVIRONMENTAL (cont)

Container Disposal:
Dispose of in a licensed facility. Recommend crushing or other means to prevent unauthorized reuse.

Other Spill/Leak Procedures:
This product is an alkaline. Before discharging sewage into treatment plants neutralization is generally required.
Because it is practically insoluble in water, it can be mechanically removed.

Environmental Toxicity Test Data:
Elimination (OECD 301A) - 90 - 100 PERCENT
Readily Biodegradable
Golden Orfe, static 96 hr LC50 - 1000 - 2200 MG/L
Insignificant Hazard
Daphnia magna, 48 hr static EC50 - 233 MG/L
Practically Nontoxic
Acute Algal Toxicity, 72 hr. EC/LC50 - 37 MG/L
Slightly Toxic
Bacterial Toxicity, EC10 (17 hr) - 410 MG/L
TEST RATING NOT FOUND
Inhibition of activated sludge; LC20 - > 1000 MG/L
TEST RATING NOT FOUND

SECTION 9 - STORAGE AND HANDLING

General:
Keep away from ignition sources. Containers should be opened carefully in well-ventilated areas to avoid static discharge.
Material should be stored in sealed containers in well-ventilated areas.

Other Storage and Handling Data:
Consult other sections of this MSDS for information on reactivity and flammability.
Protection against fire and explosion. Fore extinguishers should be kept handy. Protect from acids and acid forming substances.

SECTION 10 - REGULATORY INFORMATION

TSCA Inventory Status
Listed on Inventory: YES

RCRA Haz. Waste No .: NA
CERCLA: NO Reportable Qty.: (If YES)
State Regulatory Information: (By Component) NJ/PA/MA RTK
CAS: 105-59-9 NO
NAME: Methyldiethanolamine
CAS: 7732-18-5 NO
NAME: Water

Hazard Ratings:

	Health:	Fire:	Reactivity:	Special:
HMIS	2	1	0	NA

SECTION 10 - REGULATORY INFORMATION (cont)

This product is hazardous or contains components which are hazardous according to the OSHA Hazard Communication Standard.

SECTION 11 - TRANSPORTATION INFORMATION

DOT Proper Shipping Name:
N/A
DOT Technical Name:
N/A
DOT Primary Hazard Class:
N/A
DOT Secondary Hazard Class:
N/A
DOT Label Required:
N/A
DOT Placard Required:
N/A
DOT Poison Constituent:
N/A
BASF Commodity Codes: UN/NA Code: NONE E/R Guide:
Bill of Lading Description:
NOT REGULATED BY THE DEPARTMENT OF TRANSPORTATION
"IMPORTANT: WHILE THE DESCRIPTIONS, DESIGNS, DATA AND INFORMATION CONTAINED HEREIN ARE PRESENTED IN GOOD FAITH AND BELIEVED TO BE ACCURATE, IT IS PROVIDED FOR YOUR GUIDANCE ONLY. BECAUSE MANY FACTORS MAY AFFECT PROCESSING OR APPLICATION/USE, WE RECOMMEND THAT YOU MAKE TESTS TO DETERMINE THE SUITABILITY OF A PRODUCT FOR YOUR PARTICULAR PURPOSE PRIOR TO USE. NO WARRANTIES OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE MADE REGARDING PRODUCTS DESCRIBED OR DESIGNS, DATA OR INFORMATION SET FORTH, OR THAT THE PRODUCTS, DESIGNS, DATA OR INFORMATION MAY BE USED WITHOUT INFRINGING THE INTELLECTUAL PROPERTY RIGHTS OF OTHERS. IN NO CASE SHALL THE DESCRIPTIONS, INFORMATION, DATA OR DESIGNS PROVIDED BE CONSIDERED A PART OF OUR TERMS AND CONDITIONS OF SALE. FURTHER, YOU EXPRESSLY UNDERSTAND AND AGREE THAT THE DESCRIPTIONS, DESIGNS, DATA, AND INFORMATION FURNISHED BY BASF HEREUNDER ARE GIVEN GRATIS AND BASF ASSUMES NO OBLIGATION OR LIABILITY FOR THE DESCRIPTION, DESIGNS, DATA AND INFORMATION GIVEN OR RESULTS OBTAINED, ALL SUCH BEING GIVEN AND ACCEPTED AT YOUR RISK".

END OF DATA SHEET

Amerel 1500 foam control agent

BASF Corporation

Material Safety Data Sheet

Original Date: 08/02/1993
Revision Date: 01/29/2000

BASF CORPORATION
3000 CONTINENTAL DRIVE NORTH

MOUNT OLIVE, NJ 07828
(973) 426-4671

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BOTH NUMBERS ARE AVAILABLE DAYS, NIGHTS, WEEKENDS, & HOLIDAYS.

SECTION 1 - PRODUCT INFORMATION

AMEREL™1500
Product ID: NCI 201143
Common Chemical Name:
NONE
Synonyms:
NONE
Molecular Formula:
NOT APPLICABLE
Chemical Family: Not Applicable
Molecular Wt.: NOT APPLICABLE

AMEREL is a registered trademark of Ashchem I.P. Inc., used by Drew Industrial Division.

SECTION 2 - INGREDIENTS

Chemical Name:	CAS	Amount
Silicon oil	PROPRIETARY	PROPRIETARY
PEL/TLV NOT ESTABLISHED		
SILICA	7631-86-9	10.0 - 25.0 %
ACGIH TLV	TWA 10 MG/CU. M	

SECTION 3 - PHYSICAL PROPERTIES

Color: Opaque
Form/Appearance: Liquid
Odor: Odorless

	Typical	Low/High	U.O.M.
Specific Gravity:	NOT AVAILABLE		
Bulk Density:	0	1.01 - 1.04	KG/LITER
Viscosity:		5 - 14	POISE
pH:	NOT AVAILABLE		

	Typical	Low/High	Deg.	@	Pressure
Boiling Pt:	> 145		C	1	ATMOSPHERES
Freezing Pt:	< 0		C	1	ATMOSPHERES
Decomp. Tmp:	NOT AVAILABLE				

Solubility in Water Description: Insoluble

SECTION 4 - FIRE AND EXPLOSION DATA

	Typical	Low/High	Deg.	Method
Flash Point:	> 250		C	NONE SPECIFIED

Autoignition: NOT AVAILABLE

Extinguishing Media:

Use water fog, foam or dry chemical extinguishing media.

Fire Fighting Procedures:

Firefighters should be equipped with self-contained breathing apparatus and turn out gear.

Unusual Hazards:

There are no known unusual fire or explosion hazards.

SECTION 5 - HEALTH EFFECTS

Routes of entry for solids and liquids include eye and skin contact, ingestion and inhalation. Routes of entry for gases include inhalation and eye contact. Skin contact may be a route of entry for liquified gases.

Acute Overexposure Effects:

Contact with the eyes and skin may result in irritation. Inhalation may result in respiratory irritation. Ingestion may result in gastric disturbances.

Chronic Overexposure Effects:

In recent studies, fumed and precipitated synthetic amorphous silicas were fibrogenic to the lungs of monkeys, with the fumed form being the most active type.

First Aid Procedures - Skin:

Wash affected areas with soap and water. Remove and launder contaminated clothing before reuse. If irritation develops, get medical attention.

First Aid Procedures - Eyes:

Immediately rinse eyes with running water for 15 minutes. Get immediate medical attention.

First Aid Procedures - Ingestion:

If swallowed, dilute with water and immediately induce vomiting. Never give fluids or induce vomiting if the victim is unconscious or having convulsions. Get immediate medical attention.

First Aid Procedures - Inhalation:

Move to fresh air. Aid in breathing, if necessary, and get immediate medical attention.

First Aid Procedures - Notes to Physicians:

None known.

First Aid Procedures - Aggravated Medical Conditions:

No data is available which addresses medical conditions that are generally recognized as being aggravated by exposure to this product. Please refer to the effects of overexposure section for effects observed in animals.

First Aid Procedures - Special Precautions:

None

SECTION 6 - REACTIVITY DATA

Stability Data:
Stable
Incompatability:
Strong oxidizing agents.
Conditions/Hazards to Avoid:
No data available.
Hazardous Decomposition/Polymerization:
Hazardous Decomposition Products: CO2, CO (due to incomplete combustion), Hydrocarbons and silicates.
Corrosive Properties:
Not corrosive.
Oxidizer Properties:
Not an oxidizer
Other Reactivity Data:
None known.

SECTION 7 - PERSONAL PROTECTION

Clothing:
Gloves, coveralls, apron, and boots as necessary to prevent contact.
Eyes:
Chemical Goggles
Respiration:
If vapors or mists are generated, wear a NIOSH/MSHA approved organic vapor/mist respirator or an air-supplied respirator as appropriate.
Ventilation:
Use local exhaust to control vapors/mists.
Explosion Proofing:
None required.
Other Personal Protection Data:
None under normal conditions.

SECTION 8 - SPILL-LEAK/ENVIRONMENTAL

General:
Spills should be contained, solidified and placed in suitable containers for disposal in a licensed facility. This material is not regulated by RCRA or CERCLA ("Superfund"). Wear appropriate respiratory protection and protective clothing and provide adequate ventilation during clean-up.
Waste Disposal:
Incinerate or bury in a licensed facility. Do not discharge into waterways or sewer systems without proper authority.
Container Disposal:
Dispose of in a licensed facility. Recommend crushing or other means to prevent unauthorized reuse.
Other Spill/Leak Procedures:
No other spill procedures necessary.

SECTION 9 - STORAGE AND HANDLING

General:
Store in a cool dry place. Keep containers tightly closed when not

SECTION 9 - STORAGE AND HANDLING (cont)

in use.

SECTION 10 - REGULATORY INFORMATION

TSCA Inventory Status
Listed on Inventory: YES

RCRA Haz. Waste No .:
CERCLA: NO Reportable Qty.: (If YES)
State Regulatory Information: (By Component) NJ/PA/MA RTK
CAS: 7631-86-9 YES
NAME: SILICA
Hazard Ratings:

	Health:	Fire:	Reactivity:	Special:
HMIS	2	0	0	NA
NFPA	2	0	0	NA

This product is hazardous or contains components which are hazardous according to the OSHA Hazard Communication Standard.

SECTION 11 - TRANSPORTATION INFORMATION

DOT Proper Shipping Name:
N/A
DOT Technical Name:
N/A
DOT Primary Hazard Class:
N/A
DOT Secondary Hazard Class:
N/A
DOT Label Required:
N/A
DOT Placard Required:
N/A
DOT Poison Constituent:
N/A
BASF Commodity Codes: UN/NA Code: NONE E/R Guide:
Bill of Lading Description:
NOT REGULATED BY THE DEPARTMENT OF TRANSPORTATION

	CLASS:	P. G.	SHIPPING NAME:
IATA:	NONE	N/A	NONE
IMO:	NONE	N/A	NONE
TDG:	NONE	N/A	NONE

"IMPORTANT: WHILE THE DESCRIPTIONS, DESIGNS, DATA AND INFORMATION CONTAINED HEREIN ARE PRESENTED IN GOOD FAITH AND BELIEVED TO BE ACCURATE, IT IS PROVIDED FOR YOUR GUIDANCE ONLY. BECAUSE MANY FACTORS

SECTION 11 - TRANSPORTATION INFORMATION (cont)

MAY AFFECT PROCESSING OR APPLICATION/USE, WE RECOMMEND THAT YOU MAKE TESTS TO DETERMINE THE SUITABILITY OF A PRODUCT FOR YOUR PARTICULAR PURPOSE PRIOR TO USE. NO WARRANTIES OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE MADE REGARDING PRODUCTS DESCRIBED OR DESIGNS, DATA OR INFORMATION SET FORTH, OR THAT THE PRODUCTS, DESIGNS, DATA OR INFORMATION MAY BE USED WITHOUT INFRINGING THE INTELLECTUAL PROPERTY RIGHTS OF OTHERS. IN NO CASE SHALL THE DESCRIPTIONS, INFORMATION, DATA OR DESIGNS PROVIDED BE CONSIDERED A PART OF OUR TERMS AND CONDITIONS OF SALE. FURTHER, YOU EXPRESSLY UNDERSTAND AND AGREE THAT THE DESCRIPTIONS, DESIGNS, DATA, AND INFORMATION FURNISHED BY BASF HEREUNDER ARE GIVEN GRATIS AND BASF ASSUMES NO OBLIGATION OR LIABILITY FOR THE DESCRIPTION, DESIGNS, DATA AND INFORMATION GIVEN OR RESULTS OBTAINED, ALL SUCH BEING GIVEN AND ACCEPTED AT YOUR RISK".

END OF DATA SHEET

Molecular Sieve (Type 4A)

Section 1 – PRODUCT AND COMPANY INFORMATION

Manufacturer IMS Company
10373 Stafford Road
Chagrin Falls, OH 44023-5296

WEB imscompany.com

Emergency Phone 800-424-9300
Office Phone 440-543-1615
Prepared by Product Safety Advisor
Prepared/Revised June 19, 2002
E-mail sales@imscompany.com

Part Numbers	**4A**	127918	127919	127920	127921	127922	127923
	13X	127924	127925	127926	127927	127928	127929

Product use Designed to remove moisture from gases including water from air. Used as a premium drier medium for plastics industry to dry pellets of polymers and related resins.

Hazardous Material Information System

Health 1*	**Flammability** 0	**Reactivity** 1	**Protection** X
0 Normal use Material	0 Will Not Burn	0 Stable	X = Consult the
1 Slight Hazard (temporary)	1 Possible to Burn	1 Unstable if Heated	MSDS and
2 Health Affected (lengthy)	2 Burns if Heated	2 Violent Chemical Change	your supervisor
3 Extreme Danger	3 Easily Burns	3 Shock and Heat Sensitive	for your special
4 Severe or Fatal	4 Very Easily Burns	4 May Explode	workplace need
* Chronic (Accumulates)			

NOTE The HMIS may not be enough hazard information for this chemical in all workplaces. The HMIS system requires employee training about the system and about information in this MSDS.

Section 2 – INGREDIENTS INFORMATION

Chemical/Common Name	**CAS-Number**	**%**	**PEL-OSHA**	**TLV-ACGIH**
Zeolite, Sodium Oxide	1344-00-9	70 to 90	10 mg/m^3 (3)	10 mg/m^3 (3)
Magnesium Aluminosilicate	1327-43-1	10 to 30	10 mg/m^3	10 mg/m^3
Quartz (1) (2)	14808-60-7	< 0.5	250 mppcf (4)	0.05 mg/m^3 (5)

(1) WARNING: This product contains a chemical known to the State of California to cause cancer, or birth defects, or other reproductive harm.

(2) Carcinogenicity - Ingredient is listed by IARC as a Group 1, carcinogen; NTP and OSHA as carcinogen; ACGIH as A2.

(3) As nuisance dust

(4) Total dust

(5) Respirable dust

Section 3 – HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW Repeated overexposure may cause eye, skin, eating and breathing irritation. For large spills, wear appropriate personal protective equipment. Collect released product by sweeping, vacuuming, scooping, shoveling, etc. Keep dry - away from all liquids, and also from air with high moisture.

CAUTION Slippery; round balls can cause falls if walked on.

HEALTH EFFECTS - (Acute and Chronic):

Mouth May result in damage to throat, esophagus, and/or gastro-intestinal tract.

Nose May cause burning of the upper respiratory tract and/or temporary or permanent lung damage. Contains a small amount of crystalline silica, which may cause delayed respiratory disease, if inhaled over a prolonged period of time.

Eye May result in irritation, burns, or conjunctivitis.

Skin Repeated or prolonged contact in the absence of proper hygiene, may cause dryness, irritation, and/or dermatitis.

PRIMARY ROUTES OF ENTRY Mouth, nose, eyes, skin

TARGET ORGANS, MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE None expected unless there is gross overexposure. Otherwise, respiratory ailments.

Section 4 – FIRST AID MEASURES

NOTE If any irritation persists, get medical help.

Breathing Remove to fresh air immediately. Keep person warm and quiet. Apply artificial respiration if breathing has stopped. If breathing is difficult, give oxygen, and Get Medical Help Immediately. If lung irritation, dizziness, nausea, or unconsciousness occurs, get emergency medical attention immediately.

Eating If large amounts have been eaten, give lots of water to drink and also give emetics (any liquid that can cause vomiting), quickly. Stomach siphon may be applied as well. AVOID milk and fatty acids! Get medical attention immediately.

Eye Flush thoroughly with water for at least 20 minutes. May cause temporary eye irritation. Get prompt medical attention.

Skin Wash with soap and water. Launder clothes before re-use.

NOTE **TO PHYSCIAN** this product is a desicant and generates heat as it adsorbs water, even from the air. Treat symptomatically. Also, the used product can contain other materials of hazardous nature. Identity the other materials and treat accordingly.

Section 5 – FIRE FIGHTING MEASURES

Flash Point (COC) .....Non-Flammable Flammable Limits.....LEL = ND UEL = ND

Autoignition temperature .....NA NFPA 0-0-1-NA

Extinguishing Media Foam, Dry Chemical, Water Deluge. Using water to cool exposed containers may be useful.

Special Fire Fighting Procedures Wear Self Contained Breathing Apparatus (SCBA). Use lots of water because a little water may cause heat releasing chemical reaction up to the point of causing water to boil. Water spray may be used to cool closed containers. Prevent runoff from entering streams, sewer, or drinking water supply.

Unusual Fire and Explosion Hazards A little water will cause an exothermic reaction up to the temperature of boiling water. Flooding with water will reduce the temperature to safe limits.

Section 6 – ACCIDENTAL RELEASE MEASURES

Steps to be Taken in Case Material is Released or Spilled Avoid creating or raising dusts. Use protective equipment consistent with the situation. Cleanup personnel need protection against inhalation of dusts or fumes. Eye protection is required. If not contaminated, vacuuming or wet methods of cleanup are recommended and preferred. Otherwise, cleanup according to the safety or environmental hazards of the contaminants. Place in appropriate containers for disposal keeping airborne particulate at a minimum. Store in closed containers for proper disposal. Remove all of the product to prevent a slippery condition. Being small round balls, it will be very slippery if walked on. Do not let contaminated product get to drains, sewers, public water source, or rainfall. Potential for creating static electricity when pouring any such small dry solid material. Ground persons or the process to prevent handlers from static shocks. Do not pour or transfer in an atmosphere of flammable vapors or gases.

Waste Disposal Methods Consult Federal, State, and Local regulations. Direct landfill at approved location is anticipated. Do not reuse or burn containers.

Section 7 – HANDLING AND STORAGE

Storage - Keep container sealed at all times. Open container slowly to avoid creating or raising dust. Keep container tightly sealed closed to prevent exposure to air moisture during storage. Water moisture in small amounts can cause intense heating reaction, enough to burn skin and to boil water, possibly to even higher temperatures.

Precautions to be Taken in Handling and Storage Store in cool, dry area out of direct sunlight. Do not puncture, burn, or store above 120° F (49° C).

Transfer or pouring Applications High potential for creating static electricity when pouring any such small dry solid material. Ground persons or the process to prevent handlers from static shocks. Do not pour or transfer in an atmosphere of flammable vapors or gases. Where exposure exceeds the TLV, use a NIOSH/MSHA approved respirator, goggles, rubber gloves, and protective clothing.

Maintenance Precautions Do not remove or deface label.

Handling Wash after handling, and before eating, drinking, or using tobacco products.

Other Precautions Read and follow directions and cautions on the container label, and any accompanying literature. Spills could make floors slippery from the small round balls structure. Use housekeeping and work rules to prevent slipping.

Section 8 – EXPOSURE CONTROLS – PERSONAL PROTECTION

GENERAL Provide general and/or local exhaust ventilation to keep exposure below the threshold limit value. Ventilation used must be designed to prevent spots of dust accumulation or recycling of dusts. General room ventilation may be adequate to maintain components below TLV/PEL, if handled at ambient temperatures, or in covered equipment. Local exhaust ventilation or other engineering controls may be required, if ambient temperatures are exceeded, or if used in operations without good air circulation. It is good practice to limit exposure to any dust to the OSHA nuisance dust exposure limit of 10 mg/m^3 TWA.

Apron or other body covering is recommended where there is a possibility of regular work clothing becoming contaminated with the product. All soiled or dirty clothing and personal protective equipment should be cleaned before reuse.

Respiratory Protection Provide NIOSHA/MSHA jointly approved respirator in the absence of proper environmental control. If the exposure limit is exceeded, an approved dust mask should be used (consult your safety equipment supplier). If exposures exceed limits by less than a factor of ten, use a NIOSH approved, ½ mask facepiece respirator for particulate matter. If exposures exceed 10 times the recommended limits, consult a professional industrial hygienist or your respiratory protective equipment supplier for selection of the proper equipment.

Protective Gloves Where prolonged or repeated contact with the product is likely, use dust blocking materials or fabrics for personal protective equipment, gloves, and clothing, that will prevent repeated or prolonged skin contact.

Other Protective Equipment If contact with dust is likely, eye protection is recommended. Chemical Dust Monogoggles will provide protection in most situations.

Other Engineering Controls To determine exposure levels, monitoring should be performed. Eye bath and safety shower station should be available.

Work Practices Use enough ventilation to maintain the concentration of the product and its components below their exposure limits. Avoid long-term or repeated contact. Clothing containing product should be removed and laundered before reuse. High potential for creating static electricity when pouring any such small dry solid material. Ground persons or the process to prevent handlers from static shocks. Do not pour or transfer in an atmosphere of flammable vapors or gases. Sudden release of hot vapor or mist from process equipment operating at elevated temperature and pressure, or sudden ingress of air into hot equipment under vacuum, may result in decomposition without obvious source of heat. All uses of this product in elevated-temperature processes must be thoroughly evaluated to establish and maintain safe operating conditions.

Hygienic Practices As with using any dry chemical product, avoid contact with skin and avoid breathing dusts, do not eat, drink, or smoke in work area; wash hands prior to eating, drinking or using restroom after handling or using. Any dusty product can contaminate tobacco, causing illness (from inhaling components heated in tobacco smoke or ingested from handling tobacco and/or food products).

Section 9 – PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point	NA	Specific Gravity (Water=1)	0.68
Vapor Pressure (mm Hg at 70° F (21° C)	NA	Percent Volatile by Volume (%)	NA
Vapor Density (Air=1)	NA	Evaporation Rate (ether=1)	NA
VOC	NA	Pour point	NA
Solubility in Water	NIL	pH	Neutral when dry,
Melting point	>2900° F (>1600° C)	pH	8 to 11 when wet
Viscosity, cSt	NA	Odor threshold	ND

Appearance small hard round balls (spheres), light tan color, odorless.

Section 10 – STABILITY AND REACTIVITY

Incompatibility (reactivity, materials to avoid)	Sudden contact with high concentrations of chemicals having high heats of adsorption such as olefins, HCl, HF, etc. Strong caustics (strong acids, strong bases). Water, in small amounts, when not in designed usage.
Product Chemically Stable?	Yes, under normal temperatures and pressures, in sealed containers.
Conditions to keep Stability	Keep dry, product is hygroscopic
Decomposition Products	Carbon monoxide, carbon dioxide, water, and incompletely burned contaminants products would be expected.
Sensitive to mechanical impact	None
Sensitivity to static discharge (ESD)	Higher than normal potential to being a source of ESD, as the pouring or transfer of any dry small solid particles. Ground persons or the process to prevent static shock to persons handling.

Section 11 – TOXICOLOGICAL INFORMATION

LC_{50} Rat - ND
LD_{50} Rat 32,000 mg/Kg; rabbit dermal 2,000 mg/kg
Reproductive Toxicity ND
Irritancy, sensitivity Non-Hazardous. See other sections, 3 - Hazard Identification, 4 - First Aid, and 15 – Regulatory Information.

Section 12 – ECOLOGICAL INFORMATION

No ecological issues known.

Section 13 – DISPOSAL CONSIDERATIONS

Waste Disposal Methods If any organic material is adsorbed, put into sealed, air tight, containers to prevent spontaneous combustion. Observe all warnings and precautions listed for the product. Observe proper safety and handling. Do not allow empty containers to be used for any purpose except to store and ship product. Recovered product may be reused if compatible with users processes. Contaminated material may be disposed of in a permitted waste management facility suitable for the contamination. Do not puncture or burn containers. Reclamation/recycling is encouraged where possible. Where reclamation is not practical, this product may be land filled where permitted by Federal, State, County/Provincial, and Local regulations. Never dispose by means of public sewers or drainage.

Section 14 – TRANSPORT INFORMATION

Ground (US DOT) . Not Regulated
Air (IATA) ..... Not Regulated
Vessel..... Not Regulated
EEC Packing Labeling..... Not Regulated

Section 15 – REGULATORY INFORMATION

CFC, Class 1, Class 2	N	OSHA listed	Y
EPA - CAA	N	PROP 65 listed	Y
EPA - CWA	N	RCRA listed	N
EU Risk Phrase #'s	R36 R37 R38	SARA 313 list	N
EU Safety Phrase #'s	S22 S26 S37 S39	TSCA listed	Y
FDA-21 CFR 174.5 (2) (d)	N	USDA H-1, -2	N
IDLH	N	WHMIS	Y
IARC	1	TDG	N
NTP	Y	ADR	N

This product has been classified in accordance with hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

Section 16 – OTHER INFORMATION

CAUTION Intentional misuse of this chemical product, as with any industrial chemical in contact with the body, can be harmful or fatal. This includes such things as deliberately breathing, placing in mouth, swallowing, placing on skin, or any other body contact, or repeated, or continuous contact.

IMS provides this information in good faith, but makes no representation as to its comprehensiveness or its accuracy. This document is offered as a guide to a trained person, for appropriate precautionary handling. Persons using the product and receiving the information must exercise independent judgment in determining the appropriateness of the use and the safety information for their particular purpose. IMS MAKES NO REPRESENTATIONS OR WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THIS INFORMATION OR TO THE PRODUCT. ACCORDINGLY, IMS WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE ON THIS INFORMATION.

ACGIH	American Conference of Governmental Industrial Hygienists	NA	Not Applicable, Not Available
AKA	Also Known As, Synonym	ND	Not Determined
CAS	Chemical Abstract Service	NIL	Not measurable, significant, noticeable, or no affect
GRAS	Generally Recognized As Safe by FDA rule or listing	NTP	National Toxicology Program
H-1, -2	USDA, plant process chemicals that do not touch food stuff	OSHA	Occupational Safety and Health Administration
IARC	International Agency for Research of Cancer	ppm	parts per million
IDLH	Immediately Dangerous to Life or Health, exposure rate/volume	USDA	U S Department of Agriculture
mg/m^3	milligrams per Cubic Meter	Y	Yes, Does Exists, Is Listed,
N	No, None, Not listed, Not Known		

Sulfur impregnated activated carbon HGR 4x10

Material Safety Data Sheet

Product Name: SELEXSORB(R) HG **ID: 1082**

* * * Section 1 - Chemical Product and Company Identification * * *

Chemical Formula: Mixture of activated carbon and sulfur
Product Use: Mercury removal
Other Designations: None

Alcoa World Alumina LLC
201 Isabella Street
Pittsburgh, PA 15212-5858

Phone: Health and Safety: 1-412-553-4649

Manufacturer/Supplier
Alcoa World Alumina LLC
Vidalia Works
109 State Highway 131
Vidalia, LA 71373-9701

Phone: 1-318-336-9601

Emergency Information:
USA: Chemtrec: 1-800-424-9300 or 1-703-527-3887 Alcoa: 1-412-553-4001

* * * Section 2 - Composition / Information on Ingredients * * *

CAS #	Component	Percent
7440-44-0	Carbon, activated	85-90
7704-34-9	Sulfur	10-15

* * * Section 3 - Hazards Identification * * *

Emergency Overview

Pellets or granules. Black. Odorless. Material will burn if ignited. Material can burn slowly without producing visible smoke or flame. Combustion can generate toxic and irritating gases. Dust clouds generated during processing may be explosive.

Potential Health Effects

Eyes

Can cause irritation.

Skin

Can cause irritation.

Ingestion

Can cause mild irritation.

Inhalation

Can cause upper respiratory tract irritation. Prolonged or repeated exposure can cause lung damage.

Health Effects of Ingredients

Carbon Can cause irritation of eyes, mucous membranes and upper respiratory tract. Chronic overexposures: Can cause scarring of the lungs.

Sulfur dust Can cause irritation of eyes, skin and respiratory tract. Acute overexposures: Can cause sore throat and bronchitis.

Health Effects Of Additional Compounds Which May Be Formed During Processing

On combustion, sulfur generates toxic sulfur dioxide gas. **Sulfur dioxide** Can cause irritation of eyes, skin and respiratory tract. Acute overexposures: Can cause difficulty breathing, narrowing of the airways, and fluid in the lungs (pulmonary edema). Chronic overexposures: Can cause bronchitis, dryness in the mouth and throat, and erosion of dental enamel.

Medical Conditions Aggravated By Exposure to the Product

Asthma, chronic lung disease, and skin rashes.

* * * Section 4 - First Aid Measures * * *

First Aid: Eyes

Flush eyes with plenty of water or saline for at least 15 minutes. Consult a physician.

First Aid: Skin

Wash skin with soap and water for at least 15 minutes. Consult a physician if irritation persists.

First Aid: Ingestion

If swallowed, dilute by drinking large amounts of water. *Never give anything by mouth to a convulsing or unconscious person.* Do **not** induce vomiting. Consult a physician.

First Aid: Inhalation

Remove to fresh air. If unconscious or severely injured, check for clear airway, breathing and presence of pulse. Perform CPR if there is no pulse or respiration. Consult a physician.

* * * Section 5 - Fire Fighting Measures * * *

Auto Ignition: 662ºF (350ºC) for granular material

Flammable/Combustible Properties

While not considered "flammable" or "combustible" as defined by OSHA or DOT, the material will burn if ignited. Activated carbons can burn under certain conditions. Material can burn slowly without producing visible smoke or flame. Combustion can generate toxic and irritating gases.

Fire/Explosion

Dust clouds generated during processing may be explosive.

Extinguishing Media

Use water spray (fog or fine spray) or carbon dioxide.

Fire Fighting Equipment/Instructions

Fire fighters should wear NIOSH approved, positive pressure, self-contained breathing apparatus and full protective clothing when appropriate.

* * * Section 6 - Accidental Release Measures * * *

Small/Large Spill

Avoid generating dust. Recover using mechanical means. Wash spill area with water containing detergent. After complete cleaning, area may be washed down with large quantities of water.

* * * Section 7 - Handling and Storage * * *

Handling/Storage

Avoid generating dust. Avoid eye and skin contact. Avoid all ignition sources. Store away from incompatible materials (See Section 10).

Keep material dry. Oxygen deficiency may result when the material is stored in a confined or poorly ventilated space, especially when wet.

Prior to shipment, material should be dry and cooled to ambient temperature. Shipment should be in closed containers, covered trailers, or covered hopper cars.

* * * Section 8 - Exposure Controls / Personal Protection * * *

Engineering Controls

Use with adequate ventilation.

Personal Protective Equipment

Respiratory Protection

Use NIOSH-approved respiratory protection as specified by an Industrial Hygienist or other qualified professional.
Suggested respiratory protection: N95

Eye Protection

Wear safety glasses/goggles to avoid eye contact.

Skin Protection

Wear appropriate gloves and long sleeve shirt to prevent any skin contact.

Exposure Guidelines

A: General Product Information

No information available for product.

B: Component Exposure Limits

ACGIH and OSHA have not developed exposure limits for any of this product's components.

C: Additional Compounds Which May be Formed During Processing

Sulfur dioxide (7446-09-5)

ACGIH 2 ppm TWA
ACGIH 5 ppm STEL
OSHA 5 ppm TWA; 13 mg/m3 TWA

* * * Section 9 - Physical & Chemical Properties * * *

Physical State:	Pellets or granules	**Appearance:**	Black
Boiling Point:	Not applicable	**Melting Point:**	Not applicable
Vapor Pressure:	<1 mm Hg @ 68ºF (20ºC)	**Vapor Density:**	Not applicable
Density:	Bulk: 0.55 g/cm^3 (34 lb/ft^3)	**Specific Gravity:**	See Density
Odor:	None	**pH Level:**	6-8 (suspension in water)
Odor Threshold:	Not applicable	**Solubility in Water:**	Insoluble, sulfur soluble in organic solvents
Octanol-Water Coefficient:	Not applicable		

* * * Section 10 - Chemical Stability & Reactivity Information * * *

Stability

Stable under normal conditions of use, storage, and transportation.

Incompatibility

Avoid heat, strong acids and strong oxidizing agents (i.e., nitrates, chlorates, fluorine).

Hazardous Decomposition

Carbon monoxide, carbon dioxide and sulfur dioxide.

Hazardous Polymerization

Will not occur.

* * * Section 11 - Toxicological Information * * *

Health Effects of Ingredients

A: General Product Information

No information available for product.

B: Component Analysis - LD50/LC50

No LD50/LC50's are available for this product's components.

Carcinogenicity

A: General Product Information

No information available for product.

B: Component Carcinogenicity

None of this product's components are listed by ACGIH, IARC, or NTP.

* * * Section 12 - Ecological Information * * *

Ecotoxicity

A: General Product Information

No information available for product.

B: Component Analysis - Ecotoxicity - Aquatic Toxicity

No ecotoxicity data was found for this product's components.

Environmental Fate

No information available for product.

* * * Section 13 - Disposal Considerations * * *

Disposal Instructions

Reuse or recycle material whenever possible. Material may be disposed of at an industrial landfill.

US EPA Waste Number & Descriptions

A: General Product Information

RCRA Status: Not federally regulated in the U.S. if disposed of "as is". Otherwise, characterize in accordance with applicable regulations (40 CFR 261 or state equivalent in the U.S.) TCLP leachate testing is recommended for mercury.

B: Component Waste Numbers

RCRA waste codes other than described under Section A may apply depending on use of product. Refer to 40 CFR 261 or state equivalent in the U.S.

* * * Section 14 - Transportation Information * * *

Special Transportation

	PSN #1	PSN #2	PSN #3	PSN #4
Notes:	(1)			
Proper Shipping Name:	Not regulated			
Hazard Class:	-			
UN NA Number:	-			
Packing Group:	-			
RQ:	-			
Other - Tech Name:	-			
Other - Marine Pollutant:	-			

Notes:

(1) When "Not regulated", enter the proper freight classification, "MSDS Number", and "Product Name" on the shipping paperwork.

Canadian TDG Hazard Class & PIN:	Not Regulated.

* * * Section 15 - Regulatory Information * * *

US Federal Regulations

A: General Product Information

In reference to Title VI of the Clean Air Act of 1990, this material does not contain nor was it manufactured using ozone-depleting chemicals.

B: Component Analysis

None of the components are listed under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65), or CERCLA (40 CFR 302.4).

SARA 311/312 Physical and Health Hazard Categories:

Immediate (acute) Health Hazard: No
Delayed (chronic) Health Hazard: Yes
Fire Hazard: No
Sudden Release of Pressure: No
Reactive: No

State Regulations

A: General Product Information

No information available for product.

B: Component Analysis - State

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS #	CA	FL	MA	MN	NJ	PA
Sulfur	7704-34-9	Yes	Yes	Yes	No	Yes	Yes

Other Regulations

A: General Product Information

Material meets the criteria for inclusion in WHMIS D2B.

B: Component Analysis - WHMIS IDL

No components are listed in the WHMIS IDL or are listed but are proprietary.

C: Component Analysis - Inventory

Component	CAS #	TSCA	DSL	EINECS	AUST.	MITI
Carbon, activated	7440-44-0	Yes	Yes	Yes	Yes	No
Sulfur	7704-34-9	Yes	Yes	Yes	Yes	No

* * * Section 16 - Other Information * * *

MSDS History

Original: February 28, 2000
Revised: February 20, 2003

MSDS Status

Reviewed on a periodic basis in accordance with Alcoa policy. No significant changes were made.

Prepared By

Hazardous Materials Control Committee
Preparer: Jon N. Peace, 412-553-2293

MSDS System Number

152730

Other Information

* Guide to Occupational Exposure Values-2002, Compiled by the American Conference of Governmental Industrial Hygienists (ACGIH).
* Documentation of the Threshold Limit Values and Biological Exposure Indices, Sixth Edition, 1991, Compiled by the American Conference of Governmental Industrial Hygienists, Inc. (ACGIH).
* NIOSH Pocket Guide to Chemical Hazards, U.S. Department of Health and Human Services, June 1994.
* Dangerous Properties of Industrial Materials, Sax, N. Irving, Van Nostrand Reinhold Co., Inc., 1984.
* Patty's Industrial Hygiene and Toxicology: Volume II: Toxicology, 4th ed., 1994, Patty, F. A.; edited by Clayton, G. D. and Clayton, F. E.: New York: John Wiley & Sons, Inc.
* TOMES CPS(TM), MICROMEDEX, Inc., 2002

Key-Legend:

ACGIH	American Conference of Governmental Industrial Hygienists
AICS	Australian Inventory of Chemical Substances
CAS	Chemical Abstract Service
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CPR	Cardio-pulmonary Resuscitation
DOT	Department of Transportation
DSL	Domestic Substances List (Canada)
EINECS	European Inventory of Existing Commercial Chemical Substances
EPA	Environmental Protection Act
IARC	International Agency for Research on Cancer
LC_{50}	Lethal concentration (50 percent kill)
LC_{Lo}	Lowest published lethal concentration
LD_{50}	Lethal dose (50 percent kill)
LD_{Lo}	Lowest published lethal dose
LFL	Lower Flammable Limit
MITI	Ministry of International Trade & Industry
NFPA	National Fire Protection Association
NIOSH	National Institute for Occupational Safety and Health
NTP	National Toxicology Program
OEL	Occupational Exposure Limit
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
PIN	Product Identification Number
PSN	Proper Shipping Name
RCRA	Resource Conservation and Recovery Act
SARA	Superfund Amendments and Reauthorization Act
STEL	Short Term Exposure Limit
TCLP	Toxic Chemicals Leachate Program
TDG	Transportation of Dangerous Goods
TLV	Threshold Limit Value
TSCA	Toxic Substance Control Act
TWA	Time Weighted Average
UFL	Upper Flammable Limit
WHMIS	Workplace Hazardous Materials Information System
atm	atmosphere
cm	centimeter
g, gm	gram
in	inch
kg	kilogram
lb	pound
m	meter
mg	milligram
ml, ML	milliliter
mm	millimeter
mppcf	million particles per cubic foot
n.o.s.	not otherwise specified
ppb	parts per billion
ppm	parts per million
psia	pounds per square inch absolute
u	micron
ug	microgram

This is the end of MSDS # 1082

SELEXSORB® HG

⚠ CAUTION

Hazards: Can cause irritation of the eyes, skin and upper respiratory tract. Dust clouds generated during processing may be explosive. Material can burn slowly without producing visible smoke or flame.

Chronic overexposure to carbon dust may cause scarring of lungs.

Overexposures to sulfur can cause sore throat and bronchitis.

Combustion can generate sulfur dioxide gas. Overexposures to sulfur dioxide can cause difficulty breathing, narrowing of the airways and fluid in the lung (pulmonary edema).

Precautions: Avoid eye and skin contact. Avoid generating dust. Use with adequate ventilation. Keep material dry. Avoid ignition sources.

Wear appropriate eye and skin protection to prevent contact. Use appropriate respiratory protection (N95) in case of inadequate ventilation.

First aid: EYES: Flush eyes with plenty of water or saline for at least 15 minutes. Consult a physician. SKIN: Wash skin with soap and water for at least 15 minutes. Consult a physician if irritation persists. INGESTION: If swallowed, dilute by drinking large amounts of water. *Never give anything by mouth to a convulsing or unconscious person.* Do **not** induce vomiting. Consult a physician. INHALATION: Remove to fresh air. If unconscious or severely injured, check for clear airway, breathing and presence of pulse. Perform CPR if there is no pulse or respiration. Consult a physician.

Read Alcoa Material Safety Data Sheet No. 1082 for more information about use and disposal.

Emergency Phone: (412) 553-4001.

INGREDIENTS:	CAS NUMBERS:
Carbon, activated	(7440-44-0)
Sulfur	(7704-34-9)

Alcoa World Alumina LLC
201 Isabella Street, Pittsburgh, PA 15212-5858 USA

02/03 1082

ALCOA

Ethylene

AFROX

MATERIAL SAFETY DATA SHEET

ETHYLENE

DATE: April 2001

1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT IDENTIFICATION

Product Name	ETHYLENE
Chemical Formula	C_2H_4
Trade Name	Ethylene
Colour Coding	Purple body with a Red (A.11) shoulder.
Valve	Neriki – Brass 5/8 inch BSP left hand and female valve
Company Identification	African Oxygen Limited 23 Webber Street Johannesburg, 2001 Tel. No: (011) 490-0400 Fax No: (011) 490-0506

2 COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	Ethylene
Chemical Family	Unsaturated hydrocarbon
CAS No.	74-85-1
UN No.	1962
ERG No.	116P
Hazchem Warning	2 A Flammable gas

3 HAZARDS IDENTIFICATION

Main Hazards. All Cylinders are portable gas containers, and must be regarded as pressure vessels at all times. The hazardous properties of Ethylene are its flammability, and its potential to cause asphyxia by displacement of air, with the resultant lowering of the oxygen content below that necessary to support life.

Adverse Health effects. Prolonged inhalation of substantial concentrations results in unconsciousness; light and moderate anaesthesia is attained, and deep anaesthesia seldom occurs. Inhalation is fatal only if the gas acts as a simple asphyxiant, depriving the body of necessary oxygen. Direct contact with liquid form can cause frostbite and freeze-burns in exposed tissues.

Chemical hazards. No hazardous decomposition compounds formed.

Biological Hazards. No deleterious action by Ethylene on circulatory, respiratory, or other systems or organs has been observed. Exhalation eliminates the major portion of Ethylene within minutes, although complete de-saturation from body fat takes several hours.

Vapour Inhalation. Effects of oxygen deficiency resulting from simple asphyxiants may include: rapid breathing, diminished mental alertness, impaired muscular co-ordination, faulty judgement, depression of all sensations, emotional instability, and fatigue. As asphyxiation progresses, nausea, vomiting, prostration, and loss of consciousness may result, eventually leading to convulsions, coma, and death.

Eye contact. The gas has no known effect. Contact with evaporating liquid may cause tissue freezing.

Skin contact. Contact with rapidly evaporating liquid can cause cryogenic "burns" or frostbite. Frostbite effects are a change in colour of the skin to grey or white, possibly followed by blistering.

Ingestion. None known. Ingestion is unlikely.

4 FIRST AID MEASURES

Prompt medical attention is mandatory in all cases of overexposure to Ethylene. Rescue personnel should be equipped with self-contained breathing apparatus. Victims should be assisted to an uncontaminated area and inhale fresh air. Quick removal from the contaminated area is most important. If breathing has stopped administer artificial resuscitation and supplemental oxygen. Further treatment should be symptomatic and supportive. Keep patient warm and quiet.

Eye contact. In case of cryogenic burns caused by evaporating liquid, do not apply ointment or oil into the eyes without medical advice. Do not wash the eyes with hot or even tepid water. Remove victim from the source of contamination. Open eyelids wide to allow liquid to evaporate. If pain is present, refer the victim to an ophthalmologist for treatment and follow up. If the patient cannot tolerate light, protect the eyes with a light bandage.

Skin contact. For dermal contact or frostbite, flush affected area with lukewarm water. Do not use hot water. A physician should see the patient promptly if the cryogenic "burn" has resulted in blistering of the dermal surface, or deep tissue freezing.

5 FIRE FIGHTING MEASURES

Extinguishing media. Carbon dioxide, dry chemical or water spray.

Specific hazards. Highly flammable. May form explosive gas mixtures with air. Is a simple asphyxiant.

Emergency actions. If possible, shut off gas flow at source. Evacuate area. Post warnings to prevent persons from approaching with lit cigarettes or open flames. Using water, keep all cylinders in the vicinity of the fire cool. Remove cylinders from the vicinity of the fire if possible. CONTACT THE NEAREST AFROX BRANCH.

Protective clothing. Exposed fire fighters should wear approved self-contained breathing apparatus with full face mask. Safety gloves and safety shoes or boots should be worn when handling cylinders.

Environmental precautions. As the gas is lighter than air, ensure that it is not trapped in confined spaces. This could lead to the formation of a highly explosive gas-air mixture. Ventilate all confined spaces using forced-draught if necessary. Ensure that all electrically powered equipment is flameproof.

6 ACCIDENTAL RELEASE MEASURES

Personal precautions. As Ethylene is a simple asphyxiant care should be taken when entering confined spaces where leaks have occurred. Do not enter any potentially hazardous area with any source of ignition, such as a lit cigarette or match.

Environmental precaution. Ethylene does not pose a hazard to the environment. An explosive gas-air mixture could be formed when leaks occur, so eliminate all forms of ignition.

Small spills. Small leaks should be extinguished by shutting off the source of supply, e.g. closing the valve on the cylinder, or tightening the gland nut where appropriate. If unable to stop small leaks the cylinder should be moved into the open, well away from any source of ignition. Should a small leak have ignited, use a multi-purpose dry powder or carbon dioxide extinguisher. Should there be no extinguisher available, a welders glove or heavy cloth, soaked in water, may be used to extinguish the flame.

Large spills. Stop the source if it can be done without risk. Eliminate all sources of ignition and static discharges. Restrict access to the area until completion of the clean-up procedure. Post relevant warning signs. Wear adequate protective clothing when working near the source of the leak. Ventilate the area using forced draught if necessary. Ensure that all equipment is flameproof.

7 HANDLING AND STORAGE

Do not allow cylinders to slide or come into contact with sharp edges. Ethylene cylinders may be stacked horizontally provided that they are firmly secured at each end to prevent rolling. Ensure that equipment is adequately earthed. Conspicuous signs should be posted in the storage area forbidding smoking or the use of naked lights. Use the "first in - first out" inventory system to prevent full cylinders from being stored for excessive periods of time. Compliance with all relevant legislation is essential. Keep away from children.

8 EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational exposure hazards. Except for its flammability, and its property of causing asphyxiation by lowering the oxygen content of the atmosphere, Ethylene is not hazardous. Its maximum permissible limit in workroom air should not exceed 5 500 ppm, 20% of the lower flammable limit.

Engineering control measures. Engineering control measures are preferred to reduce exposures. General methods include mechanical ventilation, process or personal enclosure, and control of process conditions. Administrative controls and personal protective equipment may also be required. Use a suitable flameproof ventilation system separate from other exhaust ventilation systems. Exhaust direct to outside supply sufficient replacement air to make up for air removed by exhaust system.

Personal protection. Use self contained breathing apparatus when fighting large fires.

Eyes. Use safety glasses when working with cylinders.

Hands.	Use suitable protective gloves when working with cylinders.
Feet.	Wear protective footwear when working with cylinders.
Skin.	No known effect.

9 PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL DATA

Chemical Symbol	C_2H_4
Molecular Weight	28,054
Specific volume @ 20°C & 101,325 kPa	858,3 ml/g
Relative density of gas @ 101,325 kPa (Air=1)	0,908
Critical temperature	9,9°C
Flammability limits in air	3,1 - 32,0% (by vol)
Autoignition temperature	490°C
Colour	None
Taste	Sweet
Odour	Musty

10 STABILITY AND REACTIVITY

Conditions to avoid. Overheating of cylinders. Keep sparks and flames away from cylinder, and under no circumstances allow a torch flame to come into contact with any part of the cylinder. Never test for leaks with a flame. Use soapy water when testing for leaks. Never use cylinders as rollers or supports, or for any other purposes other than the storing of Ethylene.

Incompatible materials. Ethylene is non-corrosive and may be contained in ambient temperatures by most common metals used in installations designed to have sufficient strength for the working pressures involved.

Hazardous Decomposition Products. No hazardous compounds are formed when Ethylene/air mixtures are completely combusted.

11 TOXICOLOGICAL INFORMATION

Acute Toxicity	No known effect.
Skin & eye contact	No known effect.
Chronic Toxicity	No known effect.
Carcinogenicity	No known effect.
Mutagenicity	No known effect.
Reproductive Hazards	No known effect

12 ECOLOGICAL INFORMATION

As Ethylene is lighter than air it will disperse rapidly in open areas. It does not pose a hazard to the ecology.

13 DISPOSAL CONSIDERATIONS

Disposal Methods. Small amounts may be blown to the atmosphere under controlled conditions. No sources of ignition should be in the vicinity. Large amounts should only be handled by the gas supplier.

Disposal of packaging. The disposal of containers must only be handled by the gas supplier.

14 TRANSPORT INFORMATION

ROAD TRANSPORTATION

UN No.	1962
Class	2.1
Danger group	Flammable gas
ERG No	116P
Hazchem warning	2 A Flammable gas

SEA TRANSPORTATION

IMDG	1962
Class	2.1
Label	Flammable toxic gas

AIR TRANSPORTATION

ICAO/IATA Code	1962
Class	2.1
Subsidiary risk	Flammable gas
Packaging instructions	
- Cargo	200
- Passenger	Forbidden
Maximum quantity allowed	
- Cargo	150 kg
- Passenger	Forbidden

15 REGULATORY INFORMATION

EEC Hazard class	Flammable gas
Risk phrases	R11 Highly flammable R18 In use may form flammable explosive vapour-air mixture R20 Harmful by inhalation R34 Liquid causes burns R41 Liquid could cause severe damage to eyes R44 Risk of explosion if heated under confinement
Safety phrases	S2 Keep out of reach of children S3 Keep in a cool place S9 Keep container in a well-ventilated place S16 Keep away from sources of ignition S33 Take precautionary measures against static discharges S36 Wear suitable protective clothing S51 Use only in well ventilated areas
National legislation	None

Refer to SABS 0265 for explanation of the above

16 OTHER INFORMATION

Bibliography

Compressed Gas Association, Arlington, Virginia
Handbook of Compressed Gases - 3rd Edition
Matheson. Matheson Gas Data Book - 6th Edition
SABS 0265 - Labelling of Dangerous Substances

17 EXCLUSION OF LIABILITY

Information contained in this publication is accurate at the date of publication. The company does not accept liability arising from the use of this information, or the use, application, adaptation or process of any product described herein.

Propane

MFA Oil Company
One Ray Young Drive
Columbia, Missouri 65201
573-442-0171

Propane

BEGIN MSDS NCR19690

SECTION 1 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

National Cooperative Refinery Association EMERGENCY RESPONSE
1391 Iron Horse Road CHEMTREC: 1-800-424-9300 (USA)
McPherson, KS 67460
(316) 241-2340

SUBSTANCE: PROPANE

TRADE NAMES/SYNONYMS:
N-PROPANE; DIMETHYLMETHANE; PROPYL HYDRIDE; R-290; PROPYLHYDRIDE; LIQUEFIED PETROLEUM GAS; LPG; C3H8; UN 1978; STCC 4905781; NCR19690; RTECS TX2275000

CHEMICAL FAMILY: hydrocarbons, aliphatic

CREATION DATE: Sep 12 1994
REVISION DATE: Dec 11 2001

SECTION 2 COMPOSITION, INFORMATION ON INGREDIENTS

COMPONENT: PROPANE
CAS NUMBER: 74-98-6
EC NUMBER (EINECS): 200-827-9
EC INDEX NUMBER: 601-003-00-5
PERCENTAGE: 100

SECTION 3 HAZARDS IDENTIFICATION

NFPA RATINGS (SCALE 0-4): HEALTH=1 FIRE=4 REACTIVITY=0

EMERGENCY OVERVIEW:
PHYSICAL DESCRIPTION: Colorless gas with a characteristic natural gas odor.
MAJOR HEALTH HAZARDS: central nervous system depression, difficulty breathing
PHYSICAL HAZARDS: Flammable gas. May cause flash fire.

POTENTIAL HEALTH EFFECTS:

INHALATION:
SHORT TERM EXPOSURE: nausea, vomiting, irregular heartbeat, headache, symptoms of drunkenness, disorientation, suffocation, convulsions, coma
LONG TERM EXPOSURE: same as effects reported in short term exposure
SKIN CONTACT:
SHORT TERM EXPOSURE: blisters, frostbite
LONG TERM EXPOSURE: no information on significant adverse effects
EYE CONTACT:
SHORT TERM EXPOSURE: frostbite, blurred vision
LONG TERM EXPOSURE: no information is available
INGESTION:
SHORT TERM EXPOSURE: frostbite
LONG TERM EXPOSURE: no information is available

CARCINOGEN STATUS:
OSHA: No
NTP: No
IARC: No

SECTION 4 FIRST AID MEASURES

INHALATION: If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.

SKIN CONTACT: If frostbite or freezing occur, immediately flush with plenty of lukewarm water (105-115 F; 41-46 C). DO NOT USE HOT WATER. If warm water is not available, gently wrap affected parts in blankets. Get immediate medical attention.

EYE CONTACT: Flush eyes with plenty of water.

INGESTION: If a large amount is swallowed, get medical attention.

NOTE TO PHYSICIAN: For inhalation, consider oxygen.

SECTION 5 FIRE FIGHTING MEASURES

FIRE AND EXPLOSION HAZARDS: Severe fire hazard. Severe explosion hazard. Vapor/air mixtures are explosive. The vapor is heavier than air. Vapors or gases may ignite at distant ignition sources and flash back. Electrostatic discharges may be generated by flow or agitation resulting in ignition or explosion.

EXTINGUISHING MEDIA: carbon dioxide, regular dry chemical

Large fires: Flood with fine water spray.

FIRE FIGHTING: Move container from fire area if it can be done without risk. Cool containers with water spray until well after the fire is out. Stay away from the ends of tanks. For fires in cargo or storage area: Cool containers

with water from unmanned hose holder or monitor nozzles until well after fire is out. If this is impossible then take the following precautions: Keep unnecessary people away, isolate hazard area and deny entry. Let the fire burn. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire. For tank, rail car or tank truck: Stop leak if possible without personal risk. Let burn unless leak can be stopped immediately. For smaller tanks or cylinders, extinguish and isolate from other flammables. Evacuation radius: 800 meters (1/2 mile). Stop flow of gas.

FLASH POINT: -157 F (-105 C)
LOWER FLAMMABLE LIMIT: 2.1%
UPPER FLAMMABLE LIMIT: 9.5%
AUTOIGNITION: 842 F (450 C)

SECTION 6 ACCIDENTAL RELEASE MEASURES

OCCUPATIONAL RELEASE:
Avoid heat, flames, sparks and other sources of ignition. Do not touch spilled material. Stop leak if possible without personal risk. Reduce vapors with water spray. Keep unnecessary people away, isolate hazard area and deny entry. Remove sources of ignition. Ventilate closed spaces before entering.

SECTION 7 HANDLING AND STORAGE

STORAGE: Store and handle in accordance with all current regulations and standards. Subject to storage regulations: U.S. OSHA 29 CFR 1910.110. Grounding and bonding required. Keep separated from incompatible substances.

SECTION 8 EXPOSURE CONTROLS, PERSONAL PROTECTION

EXPOSURE LIMITS:
PROPANE:
1000 ppm (1800 mg/m3) OSHA TWA
2500 ppm ACGIH TWA
1000 ppm (1800 mg/m3) NIOSH recommended TWA 10 hour(s)
1800 mg/m3 (1000 ml/m3) DFG MAK (peak limitation category-IV)

MEASUREMENT METHOD: Combustible gas meter; NIOSH II(2) # S87

LIQUIFIED PETROLEUM GAS (LPG):
1000 ppm (1800 mg/m3) OSHA TWA
1000 ppm ACGIH TWA
1000 ppm (1800 mg/m3) NIOSH recommended TWA 10 hour(s)
1000 ppm (1750 mg/m3) UK OES TWA
1250 ppm (2180 mg/m3) UK OES STEL
MEASUREMENT METHOD: Combustible gas meter; NIOSH II(2) # S93

VENTILATION: Ventilation equipment should be explosion-resistant if explosive concentrations of material are present. Ensure compliance with applicable exposure limits.

EYE PROTECTION: Wear splash resistant safety goggles with a faceshield.
Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

CLOTHING: For the gas: Protective clothing is not required. For the liquid:
Wear appropriate protective, cold insulating clothing.

GLOVES: Wear insulated gloves.

RESPIRATOR: The following respirators and maximum use concentrations are drawn from NIOSH and/or OSHA.
2100 ppm
Any supplied-air respirator.
Any self-contained breathing apparatus with a full facepiece.
Escape -
Any appropriate escape-type, self-contained breathing apparatus.
For Unknown Concentrations or Immediately Dangerous to Life or Health -
Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply.
Any self-contained breathing apparatus with a full facepiece.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL DESCRIPTION: Colorless gas with a characteristic natural gas odor.
MOLECULAR WEIGHT: 44.11
MOLECULAR FORMULA: C-H3-C-H2-C-H3
BOILING POINT: -44 F (-42 C)
FREEZING POINT: -310 F (-190 C)
VAPOR PRESSURE: 6536 mmHg @ 20 C
VAPOR DENSITY (air=1): 1.55
SPECIFIC GRAVITY (water=1): 0.5853 @ -45 C
WATER SOLUBILITY: very slightly soluble
PH: Not applicable
VOLATILITY: 100%
ODOR THRESHOLD: 5000-20000 ppm
EVAPORATION RATE: Not applicable
COEFFICIENT OF WATER/OIL DISTRIBUTION: Not applicable
SOLVENT SOLUBILITY:
Soluble: absolute alcohol, ether, chloroform, benzene, turpentine

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SECTION 10 STABILITY AND REACTIVITY

REACTIVITY: Stable at normal temperatures and pressure.

CONDITIONS TO AVOID: Avoid heat, flames, sparks and other sources of ignition.
Minimize contact with material. Containers may rupture or explode if exposed to heat.

INCOMPATIBILITIES: oxidizing materials, combustible materials

PROPANE:
BARIUM PEROXIDE: Violent exothermic reaction.
CHLORINE DIOXIDE: Spontaneous explosion.
PLASTICS, RUBBER, COATINGS: Attacked by liquid propane.
OXIDIZERS (STRONG): Fire and explosion hazard.

HAZARDOUS DECOMPOSITION:
Thermal decomposition products: oxides of carbon

POLYMERIZATION: Will not polymerize.

SECTION 11 TOXICOLOGICAL INFORMATION

PROPANE:
TARGET ORGANS: central nervous system
ADDITIONAL DATA: Stimulants such as epinephrine may induce ventricular fibrillation.

HEALTH EFFECTS:
INHALATION:
ACUTE EXPOSURE:
PROPANE: Brief exposure to 10,000 ppm caused no symptoms in human subjects; 100,000 ppm produced slight dizziness in a few minutes but was not noticeably irritating to the nose or respiratory tract. High levels may produce disorientation, excitation, excessive salivation, headache and vomiting. In primates, 100,000 ppm produced some myocardial effects and at 200,000 ppm aggravation of these parameters and respiratory depression. Concentations of 100,000 ppm in mice and 150,000 ppm in dogs appear to produce no arrhythmia but weak cardiac sensitization. Simple asphyxiants at concentrations of 33% may cause rapid respiration, dyspnea and reduced mental alertness and muscle coordination. Concentrations of 75% may produce nausea, vomiting, prostration, unconsciousness, convulsions, deep coma and death.

CHRONIC EXPOSURE:
PROPANE: Repeated contact may result in symptoms as described in acute exposure.

SKIN CONTACT:
ACUTE EXPOSURE:
PROPANE: No adverse effects have been reported from the gas. Due to rapid evaporation, the liquid may cause frostbite with redness, tingling and pain or numbness. In more severe cases, the skin may become hard and white and develop blisters.

CHRONIC EXPOSURE:
PROPANE: No adverse effects reported.

EYE CONTACT:
ACUTE EXPOSURE:

PROPANE: Vapor concentrations of 100,000 ppm were not noticeably irritating to the eyes. Due to rapid evaporation, the liquid may cause frostbite with redness, pain and blurred vision.

CHRONIC EXPOSURE:
PROPANE: No data available.

INGESTION:
ACUTE EXPOSURE:
PROPANE: Ingestion of a gas is unlikely. If the liquid is swallowed, frostbite damage of the lips, mouth and mucous membranes may occur.

CHRONIC EXPOSURE:
PROPANE: No data available.

SECTION 12 ECOLOGICAL INFORMATION

Not available

SECTION 13 DISPOSAL CONSIDERATIONS

Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001. Dispose in accordance with all applicable regulations.

SECTION 14 TRANSPORT INFORMATION

U.S. DOT 49 CFR 172.101:
PROPER SHIPPING NAME: Propane see also Petroleum gases, liquefied.
ID NUMBER: UN1978
HAZARD CLASS OR DIVISION: 2.1

CANADIAN TRANSPORTATION OF DANGEROUS GOODS: No classification assigned.

LAND TRANSPORT ADR/RID:
PROPER SHIPPING NAME: Propane/Propane, technically pure
UN NUMBER: UN1978
ADR/RID CLASS: 2
CLASSIFICATION CODE: 2F

AIR TRANSPORT IATA/ICAO: No classification assigned.

MARITIME TRANSPORT IMDG:
PROPER SHIPPING NAME: Propane
UN NUMBER: UN1978
IMDG CLASS: 2.1

SECTION 15 REGULATORY INFORMATION

U.S. REGULATIONS:

CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4): Not regulated.

SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.30): Not regulated.

SARA TITLE III SECTION 304 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.40): Not regulated.

SARA TITLE III SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370.21):
ACUTE: Yes
CHRONIC: No
FIRE: Yes
REACTIVE: No
SUDDEN RELEASE: Yes

SARA TITLE III SECTION 313 (40 CFR 372.65): Not regulated.

OSHA PROCESS SAFETY (29CFR1910.119): Not regulated.

STATE REGULATIONS:

California Proposition 65: Not regulated.

CANADIAN REGULATIONS:

WHMIS CLASSIFICATION: Not determined.

EUROPEAN REGULATIONS:

EC CLASSIFICATION (ASSIGNED):
F+ Extremely Flammable

EC Classification may be inconsistent with independently-researched data.

DANGER/HAZARD SYMBOL:
F+ Extremely Flammable

EC RISK AND SAFETY PHRASES:
R 12 Extremely flammable.

S 2 Keep out of reach of children.
S 9 Keep container in a well-ventilated place.
S 16 Keep away from sources of ignition - No smoking.

GERMAN REGULATIONS:

WATER HAZARD CLASS (WGK):
STATE OF CLASSIFICATION: VwVwS
CLASSIFICATION UNDER HAZARD TO WATER: 0

NATIONAL INVENTORY STATUS:

U.S. INVENTORY (TSCA): Listed on inventory.

TSCA 12(b) EXPORT NOTIFICATION: Not listed.

SECTION 16 OTHER INFORMATION

Therminol® 55 heat transfer fluid

Solutia Inc.

Material Safety Data Sheet

1. PRODUCT AND COMPANY IDENTIFICATION

Product name: THERMINOL® 55 Heat transfer fluid

Reference Number: 000000000196 Date: 10/21/2002

Company Information:

United States:
Solutia Inc.
575 Maryville Center Drive, P.O. Box 66760
St. Louis, MO 63166-6760
Emergency telephone: Chemtrec: 1-800-424-9300
Non-Emergency telephone: 1-314-674-6661

Canada:
Solutia Canada Inc.
6800 St. Patrick Street
LaSalle, PQ H8N 2H3
Emergency telephone: CANUTEC: 1-613-996-6666
Non-Emergency telephone: 1-314-674-6661

Mexico:
Solutia MEXICO, S. DE R.L. DE C.V.
Blvd. Manuel Avila Camacho No. 40 Piso 12 Colonia Lomas de Chapultepec
Edificio Torre Esmeralda11000 Mexico, D.F.
Emergency telephone: SETIQ: (in Mexico) 01-800-002-1400
Non-Emergency telephone: (in Mexico) 555-202-5600

Brazil:
Solutia Brazil Ltd.
Avenue Jorge Bei Maluf, 2105
CEP 08686-000 Suzano, SP
Emergency telephone: 0800 193-190
Non-Emergency telephone: 5511 4745-8569

2. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS No.	Average concentration	Concentration range	Units
benzene, C14-30-alkyl derivs	68855-24-3	100.0		%

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Form: liquid
Colour: clear to yellow
Odour: characteristic

WARNING STATEMENTS

CAUTION!
May cause eye irritation
May cause skin irritation

May cause respiratory tract irritation

POTENTIAL HEALTH EFFECTS

Likely routes of exposure:	eye and skin contact inhalation
Eye contact:	Moderately irritating to eyes.
Skin contact:	Moderately irritating to skin. No more than slightly toxic if absorbed. Repeated contact may cause a drying, solvent like action on the skin.
Inhalation:	Elevated processing temperatures may cause release of vapours which are irritating if inhaled. Significant adverse health effects are not expected to develop under normal conditions of exposure. No more than slightly toxic if inhaled.
Ingestion:	No more than slightly toxic if swallowed. Significant adverse health effects are not expected to develop if only small amounts (less than a mouthful) are swallowed.
Signs and symptoms of overexposure:	headache dizziness/incoordination nausea/vomiting loss of consciousness vertigo confusion anxiety laboured breathing drowsiness

Refer to Section 11 for toxicological information.

4. FIRST AID MEASURES

If in eyes:	Immediately flush with plenty of water. If easy to do, remove any contact lenses. Remove material from skin and clothing. Get medical attention if irritation persists.
If on skin:	Immediately flush the area with plenty of water. Remove contaminated clothing. Get medical attention. Wash clothing before reuse.
If inhaled:	Remove patient to fresh air. If not breathing, give artificial respiration. If breathing is difficult give oxygen. Remove material from eyes, skin and clothing.
If swallowed:	Immediate first aid is not likely to be required. A physician or Poison Control Center can be contacted for advice. Wash heavily contaminated clothing before reuse.

5. FIRE FIGHTING MEASURES

Flash point:	177 C	Cleveland Open Cup
Fire point:	218 C	Cleveland Open Cup
Autoignition temperature:	343 C	ASTM E-659

Hazardous products of combustion:	carbon dioxide; carbon monoxide (CO); soot; smoke; hydrocarbons
Extinguishing media:	Water spray, foam, dry chemical, or carbon dioxide
Unusual fire and explosion hazards:	None known
Fire fighting equipment:	Firefighters, and others exposed, wear self-contained breathing apparatus. Equipment should be thoroughly decontaminated after use.
Miscellaneous advice:	This product is not classified as a fire-resistant heat transfer fluid. Precautions to avoid sources of ignitions should be taken.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:	Use personal protection recommended in section 8.
Environmental precautions:	Keep out of drains and water courses.
Methods for cleaning up:	Contain large spills with dikes and transfer the material to appropriate containers for reclamation or disposal. Absorb remaining material or small spills with an inert material and then place in a chemical waste container. Flush spill area with water.

Refer to Section 13 for disposal information and Sections 14 and 15 for reportable quantity information.

7. HANDLING AND STORAGE

Handling
Avoid contact with eyes, skin and clothing.
Avoid breathing vapour or mist.
Keep container closed.
Use with adequate ventilation.
Wash thoroughly after handling.
Precautions against ignitions and fire should be taken with this product.
Heat transfer fluids are intended for INDIRECT heating purposes ONLY.
This product has not been approved for food grade use.

Emptied containers retain vapour and product residue. Observe all recommended safety precautions until container is cleaned, reconditioned or destroyed. Do not cut, drill, grind or weld on or near this container. The reuse of this material's container for non industrial purposes is prohibited and any reuse must be in consideration of the data provided in this material safety data sheet.

Storage
General: Stable under normal conditions of handling and storage.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Eye protection:	Wear chemical goggles. Have eye flushing equipment available.
Hand protection:	Wear chemical resistant gloves. Consult the glove/clothing manufacturer to determine the appropriate type glove/clothing for a given application.
Body protection:	Wear suitable protective clothing. Consult the glove/clothing manufacturer to determine the appropriate type glove/clothing for a given application. Wear full protective clothing if exposed to splashes. Wash contaminated skin promptly. Launder contaminated clothing and clean protective equipment before reuse. Wash thoroughly after handling.
Respiratory protection:	Avoid breathing vapour or mist. Use approved respiratory protection equipment when airborne exposure is excessive. Consult the respirator manufacturer to determine the appropriate type of equipment for a given application. Observe respirator use limitations specified by the manufacturer.
Ventilation:	Provide natural or mechanical ventilation to minimize exposure. If practical, use local mechanical exhaust ventilation at sources of air contamination such as processing equipment.

Airborne exposure limits: (ml/m3 = ppm)

THERMINOL® 55	No specific occupational exposure limit has been established.

Components referred to herein may be regulated by specific Canadian provincial legislation. Please refer to exposure limits legislated for the province in which the substance will be used.

9. PHYSICAL AND CHEMICAL PROPERTIES

Specific gravity:	0.863 - 0.901 @ 25 C
Boiling range :	340 - 390 C @ 1,013 hPa
Boiling point :	351 C @ 1,013 hPa
Water solubility:	1 mg/l @ 25 C
Kinematic viscosity:	13 - 34.1 mm2/s @ 38 C

NOTE: These physical data are typical values based on material tested but may vary from sample to sample. Typical values should not be construed as a guaranteed analysis of any specific lot or as specifications for the product.

10. STABILITY AND REACTIVITY

Conditions to avoid:	All sources of ignition.
Materials to avoid -	None known

Hazardous reactions:	Hazardous polymerization does not occur.
Hazardous decomposition products:	carbon monoxide (CO); carbon dioxide; soot; smoke; hydrocarbons

11. TOXICOLOGICAL INFORMATION

Human experience: Repeated contact may cause a drying, solvent like action on the skin.

This product has been tested for toxicity. Results from Solutia sponsored studies or from the available public literature are described below.

Acute animal toxicity data

Oral:	LD50 , rat, > 15,800 mg/kg , Practically nontoxic following oral administration.
Dermal:	LD50 , rabbit, > 7,940 mg/kg , Practically nontoxic after skin application in animal studies.
Inhalation:	limit test , rat, , , No mortality or signs of toxicity at the highest level achievable.
Eye irritation:	rabbit , Slightly irritating to eyes., 24 h
Skin irritation:	rabbit , Moderately irritating to skin., 24 h
Repeat dose toxicity:	rat, diet, 90 day, Produced effects on body weight, serum enzymes and/or organ weights in repeat dose studies.
Target organs affected	kidneys, liver
Repeat dose toxicity:	rat, inhalation, 28 days, Adverse effects observed in repeat dose studies.
Target organs affected	blood
Developmental toxicity:	rat, gavage, , No effects on offspring observed in laboratory animals in the presence of maternal toxicity.
Mutagenicity:	No genetic effects were observed in standard tests using bacterial and animal cells.

12. ECOLOGICAL INFORMATION

Environmental Toxicity:

Invertebrates	48 h, EL50 (water accommodated fraction - W.A.F.) Water flea (Daphnia magna) > 600 mg/l
Fish:	96 h, LC50 Rainbow trout (Oncorhynchus mykiss) > 100 mg/l 96 h, LC50 Fathead minnow (Pimephales promelas) > 1,000 mg/l
Algae:	96 h, EL50 (water accommodated fraction - W.A.F.) Algae (Selenastrum capricornutum) > 1,000 mg/l

Environmental fate

Biodegradation	Modified SCAS (OECD 301A) 1 % Resistant to biodegradation. Modified Sturm (OECD 301B) 4 % Resistant to biodegradation. theoretical CO2 evolution 3 % Resistant to biodegradation.

13. DISPOSAL CONSIDERATIONS

US EPA RCRA Status: This material when discarded may be a hazardous waste as that term is defined by the Resource Conservation and Recovery Act (RCRA), 40 CFR 261.24, due to its toxicity characteristic. This material should be analyzed in accordance with Method 1311 for the compound(s) below.

US EPA RCRA hazardous waste number: D018 Compound/Characteristic: BENZENE

Disposal considerations: Incineration

Miscellaneous advice: This product meets the criteria for a synthetic used oil under the U.S. EPA Standards for the Management of Used Oil (40 CFR 279). Those standards govern recycling and disposal in lieu of 40 CFR 260 -272 of the Federal hazardous waste program in states that have adopted these used oil regulations. Consult your attorney or appropriate regulatory official to be sure these standards have been adopted in your state. Recycle or burn in accordance with the applicable standards.
Solutia operates a used fluid return program for certain fluids under these used oil standards. Contact your Sales Representative for details.
This product should not be dumped, spilled, rinsed or washed into sewers or public waterways.

14. TRANSPORT INFORMATION

The data provided in this section is for information only. Please apply the appropriate regulations to properly classify your shipment for transportation.

US DOT
Other: Not regulated for transport.

Canadian TDG
Other: Not regulated for transport.

15. REGULATORY INFORMATION

All components are in compliance with the following inventories: U.S. TSCA, Canadian DSL, EU EINECS, Japanese ENCS, Australian AICS, Korean, Phillipine PICCS, Chinese

Canadian WHMIS classification: D2(B) - Materials Causing Other Toxic Effects

SARA Hazard Notification:

Hazard Categories Under Title III Immediate

Rules (40 CFR 370):

Section 302 Extremely Hazardous Substances:

Section 313 Toxic Chemical(s):

CERCLA Reportable Quantity:

Not applicable

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulation and the MSDS contains all the information required by the Canadian Controlled Products Regulation.

Refer to Section 11 for OSHA/HPA Hazardous Chemical(s) and Section 13 for RCRA classification.

Safety data sheet also created in accordance with Brazilian law NBR 14725

16. OTHER INFORMATION

Product use: Heat transferring agents

Reason for revision: Significant changes to the following section(s):, Section 1

	Health	Fire	Reactivity	Additional Information
Suggested NFPA Rating	1	1	0	
Suggested HMIS Rating:	1	1	0	B

Prepared by the Solutia Hazard Communication Group. Please consult Solutia @ 314-674-6661 if further information is needed.

Diesel fuel

MATERIAL SAFETY DATA SHEET

========== CHEMICAL PRODUCT AND COMPANY IDENTIFICATION ==========

TRADE NAME: #2 DIESEL FUEL
CAS NUMBER: 68476-34-6
SYNONYM(S): PROCESS STREAM; NO. 2 DIESEL FUEL; FUEL OIL; MIDDLE DISTILLATE; AB0/AA9-1; AG7; AG8
MSDS NUMBER: 1354
PRODUCT CODE: NA
HIERARCHY: NA
MANUFACTURER/SUPPLIER: BP Oil Company
ADDRESS: 200 Public Square, Cleveland, OH 44114-2375
TELEPHONE NUMBERS - 24 HOUR EMERGENCY ASSISTANCE:
BP America: 800-321-8642
CHEMTREC Assistance (In U.S.): 800-424-9300
CHEMTREC Assistance (Elsewhere): 703-527-3887
TELEPHONE NUMBERS - GENERAL ASSISTANCE: (Normal Office Hours): (8:00-4:30 M-F, EST):
Technical: 216-586-6184
MSDS Contact: 216-586-8023

========== COMPOSITION/INFORMATION ON INGREDIENTS ==========

COMPONENT:Diesel Fuel No. 2, A distillate having a minimum viscosity of 32.6 SUS at 100 degrees F to a maximum of 40.1 SUS at 100 degrees F
CAS NO.: 68476-34-6
% BY WT.: 99.9 - 100
EXPOSURE LIMITS: None Established

========== HAZARDS IDENTIFICATION ==========

EMERGENCY OVERVIEW:

Clear Liquid With Hydrocarbon Odor. May Be Dyed For Identification. Danger! Harmful or Fatal If Swallowed. Aspiration Hazard If Swallowed--Can Enter Lungs and Cause Damage. May Be Irritating To the Eyes and Respiratory Tract. Causes Skin Irritation. Vapors May Be Harmful. Possible Cancer Hazard - Contains Material Which May Cause Cancer Based On Animal Data. Combustible Liquid & Vapor.

POTENTIAL HEALTH EFFECTS:

SKIN:

Repeated or prolonged contact may result in defatting, redness, itching, inflammation, cracking and possible secondary infection. May cause allergic reactions in some individuals. Absorption from prolonged or massive skin contact may cause poisoning. High pressure skin injections are Serious Medical Emergencies. Injury may not appear serious at first; within a few hours, tissue will become swollen, discolored and extremely painful (see Notes to Physician section).

EYE:

Exposure to vapors, fumes or mists may cause irritation.

INHALATION:

May cause respiratory tract irritation. Exposure may cause central nervous system symptoms similar to those listed under "Ingestion" (see Ingestion section). Degenerative changes in the liver, kidneys and bone marrow may occur with prolonged, high concentrations. Repeated or prolonged exposures may cause behavioral changes.

INGESTION:

Aspiration into lungs may cause pneumonitis. May cause gastrointestinal disturbances. Symptoms may include irritation, nausea, vomiting and diarrhea. May cause harmful central nervous system effects. Effects may include excitation, euphoria, headache, dizziness, drowsiness, blurred vision, fatigue, tremors, convulsions, loss of consciousness, coma, respiratory arrest and death.

SPECIAL TOXIC EFFECTS:

Based on animal studies, repeated overexposure may produce skin tumors upon repeated and prolonged skin contact in the absence of good personal hygiene. However, long-term dermal application studies of similar materials, i.e. middle distillates, in animals have shown that skin tumors are produced only when marked and prolonged skin irritation takes place during the study. Therefore, this product should not present a significant hazard of skin tumor formation when the "Skin Protection" recommendations are followed. IARC has determined that diesel engine exhaust is probably carcinogenic to humans. (IARC Class- 2A). Lifetime exposure to whole diesel exhaust has been shown to cause cancer in laboratory animals. NIOSH recommends that whole diesel exhaust be regarded as a potential occupational carcinogen. Warning: The use of any hydrocarbon fuel in an area without adequate ventilation may result in hazardous levels of combustion products and inadequate oxygen levels. IARC has determined that occupational exposures in petroleum refining are probably carcinogenic to humans.

========== FIRST AID MEASURES ==========

SKIN:

Remove contaminated clothing immediately. Wash area of contact

thoroughly with soap and water. Get medical attention if irritation persists. High pressure skin injections are serious medical emergencies. Thermal burns require immediate medical attention. Get immediate medical attention.

EYE:

Flush immediately with large amounts of water for at least 15 minutes. Eyelids should be held away from the eyeball to ensure thorough rinsing. Get medical attention if irritation persists. Thermal burns require immediate medical attention.

INHALATION:

Remove affected person from source of exposure. If not breathing, ensure clear airway and institute cardiopulmonary resuscitation (CPR). If breathing is difficult, administer oxygen if available. After administration of oxygen, continue to monitor closely. Get medical attention.

INGESTION:

Do not induce vomiting because of danger of aspirating liquid into lungs. Get immediate medical attention. If spontaneous vomiting occurs, monitor for breathing difficulty.

NOTES TO PHYSICIAN:

In case of ingestion, gastric lavage with activated charcoal can be used promptly to prevent absorption. Consideration should be given to the use of an endotracheal tube, to prevent aspiration. Individuals intoxicated by Diesel Fuel No. 2 should be hospitalized immediately, with acute and continuing attention to neurologic and cardiopulmonary function. Positive pressure ventilation may be necessary. After the initial episode, individuals should be followed for changes in blood variables and the delayed appearance of pulmonary edema and chemical pneumonitis. Such patients should be followed for several days or weeks for delayed effects, including bone marrow toxicity, hepatic and renal impairment. Individuals with chronic pulmonary disease will be more seriously impaired, and recovery from inhalation exposure may be complicated. In case of skin injection, prompt debridement of the wound is necessary to minimize necrosis and tissue loss.

========== FIREFIGHTING MEASURES ==========

FLASH POINT:	51.7 C (125.06 F)
AUTOIGNITION TEMPERATURE:	ND
FLAMMABILITY LIMITS IN AIR (% BY VOL.) LOWER:	> 0.7
FLAMMABILITY LIMITS IN AIR (% BY VOL.) UPPER:	< 5

HAZARDOUS COMBUSTION PRODUCTS:

Combustion may produce CO, CO2 and reactive hydrocarbons.

BASIC FIRE FIGHTING PROCEDURES:

Use water spray, dry chemical, foam or carbon dioxide to extinguish

fire. Use water spray to cool fire-exposed containers, structures and to protect personnel. If leak or spill has not ignited, ventilate area and use water spray to disperse gas or vapor and to protect personnel attempting to stop leak. Use water to flush spills away from sources of ignition. Do not flush down public sewers or other drainage systems. Exposed firefighters must wear MSHA/NIOSH approved positive pressure self-contained breathing apparatus with full face mask and full protective clothing.

UNUSUAL FIRE & EXPLOSION HAZARDS:

Irritating and/or toxic substances may be emitted upon thermal decomposition. Dangerous when exposed to heat or flame. Runoff to sewer may cause fire or explosion hazard. Containers may explode in heat of fire.

ACCIDENTAL RELEASE MEASURES

If your facility or operation has an "Oil or Hazardous Substance Contingency Plan", activate its procedures. Take immediate steps to stop and contain the spill. Caution should be exercised regarding personnel safety and exposure to the spilled material. For technical advice and assistance related to chemicals, contact CHEMTREC (800/424-9300) and your local fire department. Notify the National Response Center, if required. Also notify appropriate state and local regulatory agencies, the LEPC and the SERC. Contact the local Coast Guard if the release is into a waterway. Keep unnecessary people away; isolate hazard area and deny entry. Stay upwind; keep out of low areas. (Also see Personal Protection Information section.) Shut off ignition sources; no flares, smoking or flames in hazard area. Stop leak if you can do it without risk. Water spray may reduce vapor; but it may not prevent ignition in closed spaces. Small Spills: Take up with sand or other noncombustible absorbent material and place into containers for later disposal. Large Spills: Dike far ahead of liquid spill for later disposal.

When reporting a spill to the National Response Center or the Coast Guard, you may need to supply the Coast Guard Chemical Hazard Response Information System (CHRIS) code:

Group Number: 33
CHRIS Code: OTD

Additional spill related information may be found in the U.S. Coast Guard Chemical Hazard Response Information System (CHRIS) Manual.

During an accidental release, personal protection equipment may be required (see Section EXPOSURE CONTROLS/PERSONAL PROTECTION). Additional regulatory requirements may apply (see Section REGULATORY INFORMATION).

HANDLING AND STORAGE

HANDLING:

Use non-sparking tools. Ground lines and equipment used during transfer to reduce the possibility of static spark-initiated fire or

explosion.

Empty containers may contain toxic, flammable/combustible or explosive residue or vapors. Do not cut, grind, drill, weld, reuse or dispose containers unless adequate precautions are taken against these hazards.

STORAGE:

Store in tightly closed containers in cool, dry, isolated, well-ventilated area away from heat, sources of ignition and incompatibles.

EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS:

Ventilation may be used to control or reduce airborne concentrations.

PERSONAL PROTECTION EQUIPMENT (PPE):

EYE PROTECTION:

Wear safety glasses or chemical goggles to prevent eye contact. Do not wear contact lenses when working with this substance. Have eye washing facilities readily available where eye contact can occur.
SKIN PROTECTION:

Wear impervious gloves and protective clothing to prevent skin contact.
RESPIRATORY PROTECTION:

NIOSH/MSHA approved breathing equipment may be required for non-routine and emergency use.

See Section COMPOSITION/INFORMATION ON INGREDIENTS For Exposure Guidelines.

PHYSICAL AND CHEMICAL PROPERTIES

BOILING POINT:	160 C (320 F)
SP. GRAVITY (Water=1):	0.84 - 0.88 @ 15.56 C (60.008 F)
MELTING POINT:	NA
% VOLATILE:	Negligible
VAPOR PRESSURE:	0.4 MM HG @ 20 C (68 F)
EVAPORATION RATE:	Slower
VAPOR DENSITY (Air=1):	4.7
VISCOSITY:	1.2 - 4.6 CST @ 37.8 C (100.04 F)
% SOLUBILITY IN WATER:	Negligible
POUR POINT:	-12.22 C (10.004 F)
pH:	NEUTRAL
MOLECULAR WEIGHT:	NA
MOLECULAR FORMULA:	Mixture

ODOR/APPEARANCE:
Clear Liquid With Hydrocarbon Odor. May Be Dyed For Identification.

STABILITY AND REACTIVITY

STABILITY/INCOMPATIBILITY:

Stable. Avoid contact with strong oxidizers.

HAZARDOUS REACTIONS/DECOMPOSITION PRODUCTS:

Thermal decomposition or combustion may produce CO, CO2 and reactive hydrocarbons.

TOXICOLOGICAL INFORMATION

OTHER:

An extensive profile which characterizes adverse health effects information for this material has been prepared by the Agency for Toxic Substances Disease Registry (ATSDR). Individuals interested in a summary of the toxicology of this material should reference this document. This profile can be obtained from the National Technical Information Services (NTIS).

DISPOSAL CONSIDERATIONS

WASTE DISPOSAL (Resource Conservation & Recovery Act - RCRA):

This material, when discarded or disposed of, is a characteristic hazardous waste according to Federal regulations (40 CFR 261). This material exhibits the characteristic of ignitability and is assigned the EPA Hazardous Waste Number of D001. The discarding or disposal of this material must be done at a properly permitted facility in accordance with the regulations of 40 CFR 262, 263, 264, and 268. Additionally, the discarding or disposal of this material may be further regulated by state, regional, or local regulations. Chemical additions, processing or otherwise altering this material may make the waste management information presented in this MSDS incomplete, inaccurate, or otherwise inappropriate. The transportation, storage, treatment and disposal of this waste material must be conducted in compliance with all applicable Federal, state, and local regulations.

There may be specific current regulations at the local, regional, or state level that pertain to this information. Chemical additions, processing, or otherwise altering this material may make the waste management information presented in this MSDS, incomplete, inaccurate, or otherwise inappropriate.

TRANSPORT INFORMATION

U.S. DEPARTMENT OF TRANSPORTATION (D.O.T.):

Proper Shipping Name (49 CFR 172.101):	Fuel Oil (No. 2)
Hazard Class (49 CFR 172.101):	3
UN/NA Code (49 CFR 172.101):	NA 1993
Packing Group (49 CFR 179.101):	PG III
Bill Of Lading Desc. (49 CFR 172.101):	Fuel Oil (No. 2), 3, NA 1993, PG III

Labels Required (49 CFR 172.101):	Not Regulated
Placards Required (49 CFR 172.101):	Combustible

INTERNATIONAL AND DOMESTIC AIR TRANSPORTATION:

IATA Proper Shipping Name:	Diesel Fuel
Hazard Class:	3
Subsidiary Risk:	NA
UN Code:	UN 1202
Package Specification:	309, 310
Labels Required:	Flammable Liquid, Orientation Arrows

INTERNATIONAL WATER TRANSPORTATION:

IMDG Proper Shipping Name:	Diesel Fuel
Hazard Class:	3.3
UN Code:	UN 1202
IMDG Page Number:	3375
Labels Required:	Flammable Liquid
Placards Required:	Flammable

CANADIAN TRANSPORTATION OF DANGEROUS GOODS (T.D.G.):

Shipping Name:	Fuel Oil, No. 2
PIN (UN/NA):	UN 1202
Regulated Class:	3
Division:	NA
Packaging Group:	PG III
Labels Required:	Flammable Liquid
Placards Required:	Flammable

========== REGULATORY INFORMATION ==========

NOTIFICATION:

Any spill or release, or substantial threat of release, of this material to navigable water (virtually any surface water) sufficient to cause a visible sheen upon the water must be reported immediately to the National Response Center (800/424-8802), as required by U.S. Federal Law. Failure to report may result in substantial civil and criminal penalties. Also contact the Coast Guard and appropriate state and local regulatory agencies.

US EPA TOXIC SUBSTANCE CONTROL ACT (TSCA):

All components of this product are listed on the TSCA inventory.

US EPA SUPERFUND AMENDMENTS & REAUTHORIZATION ACT (SARA) TITLE III INFORMATION:

Listed below are the hazard catagories for SARA Section 311/312 (40 CFR 370):

Immediate Hazard:	X

Delayed Hazard:	X
Fire Hazard:	X
Pressure Hazard:	-
Reactivity Hazard:	-

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA):

All components of this product are listed on the Canadian DSL or NDSL inventories.

CANADIAN WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) CATEGORIES:

The following WHMIS categories apply to this product:

Compressed Gas:	-	Other Toxic Effects:	X
Flammable/Combustible:	X	Bio Hazardous:	-
Oxidizer:	-	Corrosive:	-
Acutely Toxic:	X	Dangerously Reactive:	-

OTHER INFORMATION

NFPA RATINGS:		HMIS RATINGS:	
Health:	0	Health:	0
Flammability:	2	Flammability:	2
Reactivity:	0	Reactivity:	0
Special Hazards:	-	Personal Protective Equipment:	H

REVISION DATE:	27-sep-1996
REPLACES SHEET DATED:	17-feb-1995
COMPLETED BY:	BP OIL HSEQ DEPARTMENT

REVISION SUMMARY: The following section(s) have been revised since the previous issue of this MSDS:

- HAZARDS IDENTIFICATION
- FIRST AID MEASURES
- EXPOSURE CONTROLS / PERSONAL PROTECTION
- STABILITY AND REACTIVITY
- TOXICOLOGICAL INFORMATION
- DISPOSAL CONSIDERATIONS
- TRANSPORT INFORMATION
- REGULATORY INFORMATION
- OTHER INFORMATION

ND: No Data NA: Not Applicable *See specific note or section

Gasoline

CITGO Gasolines, All Grades Unleaded

Material Safety Data Sheet

CITGO Petroleum Corporation
P.O. Box 3758
Tulsa, OK 74102-3758

MSDS No. UNLEAD

Revision Date 07/06/2001

IMPORTANT: Read this MSDS before handling or disposing of this product and pass this information on to employees, customers and users of this product.

Hazard Rankings

	HMIS	NFPA
Health Hazard	* 2	1
Fire Hazard	3	3
Reactivity	0	0

*** = Chronic Health Hazard**

Protective Equipment

Minimum Requirements
See Section 8 for Details

Emergency Overview

Physical State Liquid.

Color Transparent, clear to amber or red.

Odor Pungent, characteristic gasoline.

DANGER:
Extremely flammable liquid; vapor may cause flash fire or explosion.
Use Only as a Motor Fuel. Do Not Siphon by Mouth.
Harmful or fatal if swallowed - Can enter lungs and cause damage.
High concentrations of vapor reduce oxygen available for breathing and may cause suffocation.
May be harmful if inhaled or absorbed through the skin.
Mist or vapor may irritate the eyes, mucous membranes, and respiratory tract.
Liquid contact may cause mild to moderate eye and/or mild to severe skin irritation.
May be harmful if inhaled or absorbed through the skin.
Overexposures may cause central nervous system (CNS) depression and target organ effects (See Section 3).
Inhalation overexposure can increase the heart's susceptibility to arrhythmias (irregular beats).
Contains Benzene - Cancer Hazard.
Long term exposure to gasoline vapor has caused cancer in laboratory animals.
Spills may create a slipping hazard.

SECTION 1: IDENTIFICATION

Trade Name CITGO Gasolines, All Grades Unleaded

Product Number UNLEAD

CAS Number Mixture.

Technical Contact (918) 495-5940 or (918) 495-5933

Medical Emergency (918) 495-4700

CHEMTREC Emergency (United States Only) (800) 424-9300

Product Family Motor fuels.

Synonyms Unleaded Gasolines; Motor Gasolines; Petrol; Automobile Motor Fuels; Finished Gasolines; Gasoline, Regular Unleaded; Gasoline, Mid-grade Unleaded; Gasoline, Premium Unleaded; Reformulated Gasolines (RFG); Reformulated Motor Fuels; Oxygenated Motor Spirits; Gasoline, Regular Reformulated; Gasoline, Mid-grade Reformulated; Gasoline, Premium Reformulated.

SECTION 2: COMPOSITION

Component Name(s)	CAS Registry No.	Concentration (%)
1) Methyl tertiary-Butyl Ether (MTBE)	1634-04-4	0 - 15
2) tertiary-Amyl Methyl Ether (TAME)	994-05-8	0 - 15
3) Ethyl tertiary-butyl ether (ETBE)	637-92-3	0 - 15
4) tertiary-Amyl Ethyl Ether (TAEE)	919-94-8	0 - 15
5) Di-isopropyl Ether (DIPE)	108-20-3	0 - 15
6) Ethanol	64-17-5	0 - 10
7) Pentane, all isomers	Mixture.	5 - 20
8) Octane, all isomers	Mixture.	5 - 20
9) Toluene	108-88-3	1 - 20
10) Xylene, all isomers	1330-20-7	1 - 18
11) Hexane, other isomers	Mixture.	5 - 15
12) Heptane, all isomers	Mixture.	5 - 15
13) Nonane, all isomers	Mixture.	0 - 10
14) Isopentane	78-78-4	0 - 10
15) n-Butane	106-97-8	0 - 10
16) n-Hexane	110-54-3	1 - 8
17) Methylcyclohexane	108-87-2	1 - 5
18) Trimethylbenzene, all isomers	25551-13-7	1 - 5
19) Benzene	71-43-2	0 - 4.9
20) Cumene	98-82-8	0.5 - 4
21) Ethylbenzene	100-41-4	0.2 - 4
22) Hexene, all isomers	Mixture.	1 - 3
23) Methylcyclopentane	96-37-7	1 - 3
24) Cyclohexane	110-82-7	1 - 3
25) Ethylmethylbenzenes (Ethyltoluenes)	25550-14-5	1 - 3
26) Cyclopentane	287-92-3	1 - 2
27) Naphthalene	91-20-3	0.1 - 2
28) Indene	95-13-6	0.5 - 1.5
29) n-Propylbenzene	103-65-1	0.5 - 1.5
30) Styrene	100-42-5	0 - 1

SECTION 3: HAZARDS IDENTIFICATION

Also see Emergency Overview and Hazard Ratings on the top of Page 1 of this MSDS.

Major Route(s) of Entry Skin contact. Eye Contact. Skin Absorption. Inhalation.

Signs and Symptoms of Acute Exposure

Inhalation Overexposure to gasoline vapor can cause upper respiratory tract irritation, headache, nausea, vomiting and/or central nervous system (CNS) depression. Also, effects of components of this mixture can include euphoria, excitation, giddiness, abdominal pain, loss of appetite, fatigue, muscular weakness and staggered gait. CNS effects include dizziness, drowsiness, disorientation, vertigo, memory loss, visual disturbances, difficulty breathing, convulsions, unconsciousness, paralysis, coma and death. High vapor concentrations (such as in confined spaces) can displace the amount of oxygen in air available to breathe below that level necessary to sustain life. Gasoline vapor concentrations in the range of 20,000 ppm (2% by volume) in air can be fatal to humans in five minutes. In addition, exposures by susceptible individuals to concentrations as low as 5,000 ppm can result in death by cardiac arrest (heart attack).

Eye Contact This material can cause mild to moderate eye irritation as a result of short-term contact with liquid, mist or vapor. Symptoms can include stinging, watering, redness or swelling (conjunctivitis). In severe cases, permanent eye damage can result.

Skin Contact This material can cause mild to severe skin irritation with short-term exposure. The degree of irritation will depend on the amount of material that is applied to the skin and the speed and thoroughness that it is removed. Signs and symptoms can include pain, sensation of heat, discoloration, swelling or blistering. Repeated or prolonged skin contact can produce moderate irritation or dermatitis. Signs and symptoms can include drying, swelling, scaling, blistering, cracking or other skin changes. Certain components of this material can be absorbed through the skin and produce target organ effects. If the skin is damaged, the potential for absorption increases.

Ingestion

If swallowed, this material may irritate the mucous membranes of the mouth, throat, and esophagus. It can be readily absorbed by the stomach and intestinal tract. Symptoms include a burning sensation of the mouth and esophagus, nausea, vomiting, dizziness, staggering gait, drowsiness, loss of consciousness and delirium, as well as additional central nervous system (CNS) effects (see "Inhalation" above).

Due to its light viscosity, there is a danger of aspiration into the lungs during swallowing and subsequent vomiting. Aspiration can result in severe lung damage or death. Cardiovascular effects include shallow rapid pulse and pallor followed by flushing. Also, progressive CNS depression, respiratory insufficiency and ventricular fibrillation may result in death.

Chronic Health Effects Summary

Intentional misuse by deliberately concentrating and inhaling gasoline can be harmful or fatal. Altered mental state, drowsiness, peripheral motor neuropathy, irreversible brain damage ("Petrol Sniffers Encephalopathy"), delirium, fetal development effects, seizures and sudden death are associated with gasoline abuse. Chronic effects of ingestion and subsequent aspiration of gasoline into the lungs has been associated with the formation of lung cavities (pneumatoceles) and chronic lung dysfunction. Gasoline has been associated with cancer in experimental animals, however, the data are generally not considered relevant to humans.

Prolonged or repeated overexposure to n-hexane, a component of gasoline, may cause damage to the peripheral nervous system that is characterized by numbness, tingling or pain in the extremities. These effects can progressively worsen to neuromuscular motor coordination difficulty or partial paralysis. Prolonged or repeated overexposure to benzene, a potential component of gasoline, has been associated with depletion of red blood cells (anemia), damage to white blood cells (leukopenia) and bone marrow (aplastic anemia). In addition, long term overexposure to benzene has been associated with a cancer of the blood forming tissues (acute myelogenous leukemia or AML). Prolonged or repeated overexposure to toluene, a component of gasoline, has been associated with reproductive effects in experimental animals and in long-term chemical abuse situations. Long-term overexposures to toluene and xylene have been associated with hearing damage.

This material and/or its components have been associated with developmental toxicity, reproductive toxicity, genotoxicity, immunotoxicity and carcinogenicity. Refer to Section 11 of this MSDS for additional health-related information.

Conditions Aggravated by Exposure

Personnel with pre-existing central nervous system (CNS) disease, chronic respiratory diseases, skin disorders, blood disorders, impaired cardiovascular systems, liver or kidney function should avoid exposure.

Exposure to high concentrations of this material may increase the sensitivity of the heart to epinepherine (adrenalin) and catecholamine-like drugs. Personnel with pre-existing cardiac disorders may be more susceptible to this effect (see Section 4, "Note to Physicians").

Target Organs

This material causes damage to the following organs: kidneys, lungs, heart, cardiovascular system, eyes, central nervous system (CNS).
This material may cause damage to the following organs: blood, the reproductive system, liver, mucous membranes, peripheral nervous system, upper respiratory tract, skin, bone marrow.

Carcinogenic Potential

This material may contain benzene, ethylbenzene or styrene at concentrations above 0.1%. Benzene is considered to be a known human carcinogen by OSHA, IARC and NTP. IARC has identified ethylbenzene, styrene, gasoline and gasoline engine exhaust as possibly carcinogenic to humans (Group 2B) based on laboratory animal studies.

OSHA Hazard Classification is indicated by an "X" in the box adjacent to the hazard title. If no "X" is present, the product does not exhibit the hazard as defined in the OSHA Hazard Communication Standard (29 CFR 1910.1200).

OSHA Health Hazard Classification				OSHA Physical Hazard Classification					
Irritant	X	Toxic		Combustible		Explosive		Pyrophoric	
Sensitizer		Highly Toxic		Flammable	X	Oxidizer		Water-reactive	
Corrosive		Carcinogenic	X	Compressed Gas		Organic Peroxide		Unstable	

SECTION 4: FIRST AID MEASURES

Take proper precautions to ensure your own health and safety before attempting rescue or providing first aid. For more specific information, refer to Exposure Controls and Personal Protection in Section 8 of this MSDS.

Inhalation

Immediately move victim to fresh air. If victim is not breathing, immediately begin rescue breathing. If heart has stopped, immediately begin cardiopulmonary resuscitation (CPR). If breathing is difficult, 100 percent humidified oxygen should be administered by a qualified individual. Seek medical attention immediately. If exposed to benzene in an emergency situation, a medical evaluation should be completed at the end of the work-shift in accordance with OSHA requirements.

Eye Contact

Check for and remove contact lenses. If irritation or redness develops, flush eyes with cool, clean, low-pressure water for at least 15 minutes. Hold eyelids apart to ensure complete irrigation of the eye and eyelid tissue. Do not use eye ointment. Seek medical attention immediately.

Skin Contact

Remove contaminated shoes and clothing. Flush affected area with large amounts of water. If skin surface is damaged, apply a clean dressing and seek medical attention. Do not use ointments. If skin surface is not damaged, clean affected area thoroughly with mild soap and water. Seek medical attention if tissue appears damaged or if pain or irritation persists.

Ingestion

Do not induce vomiting. If spontaneous vomiting is about to occur, place victim's head below knees. If victim is drowsy or unconscious, place on the left side with head down. Never give anything by mouth to a person who is not fully conscious. Do not leave victim unattended. Seek medical attention immediately.

Notes to Physician

Inhalation overexposure can produce toxic effects. Monitor for respiratory distress. If cough or difficulty in breathing develops, evaluate for upper respiratory tract inflammation, bronchitis, and pneumonitis. Vigorous anti-inflammatory or steroid treatment may be required at first evidence of upper airway or pulmonary edema. Administer 100 percent humidified supplemental oxygen with assisted ventilation, as required.

If ingested, this material presents a significant aspiration and chemical pneumonitis hazard. Accordingly, induction of emesis is not recommended. Consider administration of an aqueous slurry of activated charcoal followed by a cathartic such as magnesium citrate or sorbitol. Also, treatment may involve careful gastric lavage if performed soon after ingestion or in patients who are comatose or at risk of convulsing. Protect the airway by cuffed endotracheal intubation or by placement of the body in a Trendelenburg and left lateral decubitus position. Obtain chest X-ray and liver function tests. Monitor for cardiac function, respiratory distress and arterial blood gases in severe exposure cases.

Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in persons exposed to high concentrations of this material (e.g., in enclosed spaces or with deliberate abuse). If used, monitor heart action closely. Consider use of other drugs with less arrhythmogenic potential.

SECTION 5: FIRE FIGHTING MEASURES

NFPA Flammability Classification

NFPA Class-IB flammable liquid. Extremely flammable.

Flash Point Method

CLOSED CUP: -43°C (-45.4°F). (Tagliabue [ASTM D-56])

Lower Flammable Limit AP 1.4 %

Upper Flammable Limit AP 7.6 %

Autoignition Temperature

280°C (536°F)

Hazardous Combustion Products

Carbon dioxide, carbon monoxide, smoke, fumes, unburned hydrocarbons, aldehydes and other products of incomplete combustion.

Special Properties

Flammable Liquid! This material releases vapors at or below ambient temperatures. When mixed with air in certain proportions and exposed to an ignition source, its vapor can cause a flash fire. Use only with adequate ventilation. Vapors are heavier than air and may travel long distances along the ground to an ignition source and flash back. A vapor and air mixture can create an explosion hazard in confined spaces such as sewers. If container is not properly cooled, it can rupture in the heat of a fire.

Extinguishing Media

SMALL FIRE: Use dry chemicals, carbon dioxide, foam, water fog, or inert gas (nitrogen).
LARGE FIRE: Use foam, water fog, or water spray. Water fog and spray are effective in cooling containers and adjacent structures. However, water can cause frothing and/or may not extinguish the fire. Water can be used to cool the external walls of vessels to prevent excessive pressure, autoignition or explosion. DO NOT use a solid stream of water directly on the fire as the water may spread the fire to a larger area.

Fire Fighting Protective Clothing

Firefighters must use full bunker gear including NIOSH-approved positive pressure self-contained breathing apparatus to protect against potential hazardous combustion or decomposition products and oxygen deficiencies. Evacuate area and fight the fire from a maximum distance or use unmanned hose holders or monitor nozzles. Cover pooling liquid with foam. Containers can build pressure if exposed to radiant heat; cool adjacent containers with flooding quantities of water until well after the fire is out. Withdraw immediately from the area if there is a rising sound from a venting safety device or discoloration of vessels, tanks, or pipelines. Be aware that burning liquid will float on water. Notify appropriate authorities if liquid enter sewers or waterways.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Take proper precautions to ensure your own health and safety before attempting spill control or clean-up. For more specific information, refer to the Emergency Overview on Page 1, Exposure Controls and Personal Protection in Section 8 and Disposal Considerations in Section 13 of this MSDS.

Flammable Liquid! Release causes an immediate fire or explosion hazard. Evacuate all non-essential personnel from immediate area and establish a "regulated zone" with site control and security. A vapor-suppressing foam may be used to reduce vapors. Eliminate all ignition sources. All equipment used when handling this material must be grounded. Stop the leak if it can done without risk. Do not touch or walk through spilled material. Remove spillage immediately from hard, smooth walking areas. Prevent its entry into waterways, sewers, basements, or confined areas. Absorb or cover with dry earth, sand, or other non-combustible material and transfer to appropriate waste containers. Use clean, non-sparking tools to collect absorbed material.

For large spills, secure the area and control access. Dike far ahead of a liquid spill to ensure complete collection. Water mist or spray may be used to reduce or disperse vapors; but, it may not prevent ignition in closed spaces. This material will float on water and its run-off may create an explosion or fire hazard. Verify that responders are properly HAZWOPER-trained and wearing appropriate respiratory equipment and fire-resistant protective clothing during cleanup operations. In an urban area, cleanup spill as soon as possible; in natural environments, cleanup on advice from specialists. Pick up free liquid for recycle and/or disposal if it can be accomplished safely with explosion-proof equipment. Collect any excess material with absorbant pads, sand, or other inert non-combustible absorbent materials. Place into appropriate waste containers for later disposal. Comply with all laws and regulations.

SECTION 7: HANDLING AND STORAGE

Handling

A static electrical charge can accumulate when this material is flowing through pipes, nozzles or filters and when it is agitated. A static spark discharge can ignite accumulated vapors particularly during dry weather conditions. Always bond receiving containers to the fill pipe before and during loading. Always keep nozzle in contact with the container throughout the loading process. Do not fill any portable container in or on a vehicle. Special precautions, such as reduced loading rates and increased monitoring, must be observed during "switch loading" operations (i.e., loading this material in tanks or shipping compartments that previously contained middle distillates or similar products).

A spill or leak can cause an immediate fire or explosion hazard. Keep containers closed and do not handle or store near heat, sparks, or any other potential ignition sources. Do not contact with oxidizable materials. Do not breathe vapor. Use only with adequate ventilation and personal protection. Never siphon by mouth. Avoid contact with eyes, skin, and clothing. Prevent contact with food and tobacco products. Do not take internally.

When performing repairs and maintenance on contaminated equipment, keep unnecessary persons away from the area. Eliminate all potential ignition sources. Drain and purge equipment, as necessary, to remove material residues. Use gloves constructed of impervious materials and protective clothing if direct contact is anticipated. Provide ventilation to maintain exposure potential below applicable exposure limits. Promptly remove contaminated clothing. Wash exposed skin thoroughly with soap and water after handling.

Empty containers may contain material residues which can ignite with explosive force. Misuse of empty containers can be dangerous if used to store toxic, flammable, or reactive materials. Cutting or welding of empty containers can cause fire, explosion, or release of toxic fumes from residues. Do not pressurize or expose empty containers to open flame, sparks, or heat. Keep container closed and drum bungs in place. All label warnings and precautions must be observed. Return empty drums to a qualified reconditioner. Consult appropriate federal, state and local authorities before reusing, reconditioning, reclaiming, recycling, or disposing of empty containers and/or waste residues of this material.

Storage

Store and transport in accordance with all applicable laws. Keep containers tightly closed. Store in a cool, dry, well-ventilated place. Clearly label all containers. Do not allow containers to be kept in enclosed vehicles. Keep away from all ignition sources. Ground all equipment containing this material. Containers must be able to withstand pressures that are created from changes in product temperature. Product samples and other small containers of this flammable liquid should be stored in a separate safety cabinet or room. All electrical equipment in areas where this material is stored or handled should be installed and operated in accordance with applicable regulatory requirements and the National Electrical Code.

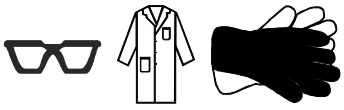
SECTION 8: EXPOSURE CONTROLS AND PERSONAL PROTECTION

Engineering Controls

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapor or mists below the applicable workplace exposure limits indicated below. All electrical equipment should comply with the National Electric Code. An emergency eye wash station and safety shower should be located near the work-station.

Personal Protective Equipment

Personal protective equipment should be selected based upon the conditions under which this material is used. A hazard assessment of the work area for PPE requirements should be conducted by a qualified professional pursuant to OSHA regulations. The following pictograms represent the minimum requirements for personal protective equipment. For certain operations, additional PPE may be required.



Eye Protection

Safety glasses with side shields are recommended as a minimum protection. During transfer operations or when there is a likelihood of misting, splashing, or spraying, chemical goggles should be worn. Suitable eye wash water should be readily available.

Hand Protection

Avoid skin contact. Use gloves (e.g., disposable PVC, neoprene, nitrile, vinyl, or PVC/NBR). Wash hands with plenty of mild soap and water before eating, drinking, smoking, use of toilet facilities or leaving work. DO NOT use this material as a skin cleaner.

Body Protection

Avoid skin contact. Wear long-sleeved fire-retardant garments (e.g., Nomex®) while working with flammable and combustible liquids. Additional chemical-resistant protective gear may be required if splashing or spraying conditions exist. This may include an apron, boots and additional facial protection. If product comes in contact with clothing, immediately remove soaked clothing and shower. Promptly remove and discarded contaminated leather goods.

Respiratory Protection

For unknown vapor concentrations use a positive-pressure, pressure-demand, self-contained breathing apparatus (SCBA). Due to the fire and explosion hazard, do not enter atmosphere containing concentrations greater than 20% of the lower flammable limit under any circumstances. For known vapor concentrations above the occupational exposure guidelines (see below), use a NIOSH-approved organic vapor respirator if adequate protection is provided. Protection factors vary depending upon the type of respirator used. Respirators should be used in accordance with OSHA requirements (29 CFR 1910.134).

General Comments

Warning! Use of this material in spaces without adequate ventilation may result in generation of hazardous levels of combustion products and/or inadequate oxygen levels for breathing. Odor is an inadequate warning for hazardous conditions.

Occupational Exposure Guidelines

Substance	**Applicable Workplace Exposure Levels**

1) Gasoline	TWA: 300 (ppm) STEL: 500 (ppm) from ACGIH (TLV)
2) Petroleum Distillates (Naphtha)	TWA: 500 (ppm) from OSHA (PEL)
3) Methyl tert-Butyl Ether (MTBE)	TWA: 40 (ppm) from ACGIH (TLV)
4) Ethanol	TWA: 1000 (ppm) from ACGIH (TLV) TWA: 1000 (ppm) from OSHA (PEL)
5) Butane	TWA: 800 (ppm) from ACGIH (TLV)
6) Pentane, all isomers	TWA: 600 (ppm) from ACGIH (TLV) TWA: 1000 (ppm) from OSHA (PEL)
7) Cyclopentane	TWA: 600 (ppm) from ACGIH (TLV)
8) Hexane Isomers	TWA: 500 (ppm) STEL: 1000 (ppm) from ACGIH (TLV)
9) 1-Hexene	TWA: 30 (ppm) from ACGIH (TLV)
10) Hexane (n-Hexane)	TWA: 50 (ppm) from ACGIH (TLV) - SKIN TWA: 500 (ppm) from OSHA (PEL)
11) Cyclohexane	TWA: 300 (ppm) from ACGIH (TLV) TWA: 300 (ppm) from OSHA (PEL)
12) Heptane (n-Heptane)	TWA: 400 (ppm) STEL: 500 (ppm) from ACGIH (TLV) TWA: 500 (ppm) from OSHA (PEL)
13) Methylcyclohexane	TWA: 400 (ppm) from ACGIH (TLV) TWA: 500 (ppm) from OSHA (PEL)
14) Benzene	TWA: 0.5 (ppm) STEL: 2.5 (ppm) from ACGIH (TLV) - SKIN TWA: 1 (ppm) STEL: 5 AL: 0.5 (ppm) from OSHA (PEL) - SKIN (See Table Z-2 in 29 CFR 1910.1028 for exclusions to PEL.)
15) Toluene	TWA: 50 (ppm) from ACGIH (TLV) - SKIN TWA: 200 (ppm) CEIL: 300 (ppm) 500* (ppm) from OSHA (PEL) (*10-min peak per 8 hour shift)
16) Octane, all isomers	TWA: 300 (ppm) from ACGIH (TLV) TWA: 500 (ppm) from OSHA (PEL)
17) Xylene, all isomers	TWA: 100 (ppm) STEL: 150 (ppm) from ACGIH (TLV) TWA: 100 (ppm) from OSHA (PEL)
18) Ethylbenzene	TWA: 100 (ppm) STEL: 125 (ppm) from ACGIH (TLV) TWA: 100 (ppm) from OSHA (PEL)
19) Nonane, all isomers	TWA: 200 (ppm) from ACGIH (TLV)
20) Cumene	TWA: 50 (ppm) from ACGIH (TLV) TWA: 50 (ppm) from OSHA (PEL) - SKIN
21) Trimethylbenzene (mixed isomers)	TWA: 25 (ppm) from ACGIH (TLV)
22) Indene	TWA: 10 (ppm) from ACGIH (TLV)
23) Naphthalene	TWA: 10 (ppm) STEL: 15 (ppm) from ACGIH (TLV) - SKIN TWA: 10 (ppm) from OSHA (PEL)
24) Styrene	TWA: 20 (ppm) STEL: 40 (ppm) from ACGIH (TLV) - BEI TWA: 100 (ppm) STEL C 200; 600* from OSHA (PEL) (*5-minute peak in any three hours)

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Physical State	Liquid.	**Color**	Transparent, clear to amber or red.	**Odor**	Pungent, characteristic gasoline.
Specific Gravity	0.72 - 0.77 (Water = 1)	**pH**	Not Applicable.	**Vapor Density**	3 to 4 (Air = 1)
Boiling Point/Range	38° to 204°C (100° to 400°F) (ASTM D-86)			**Melting/Freezing Point**	Not available.
Vapor Pressure	220 to 450 mm Hg at 20°C (68°F) or 6 to 15 Reid-psia at 37.8°C (100°F).			**Viscosity (cSt @ 40°C)**	0.35 to 1.0 [ASTM D-445]
Solubility in Water	Ethanol is readily soluble in water. Other oxygenate components are moderately soluble and the hydrocarbon components are slightly soluble in water.			**Volatile Characteristics**	720 - 770 g/l VOC's W/V.

Additional Properties Average Density at 60°F = 6.2 lbs./gal. (ASTM D-2161)

SECTION 10: STABILITY AND REACTIVITY

Chemical Stability	Stable. **Hazardous Polymerization** Not expected to occur.
Conditions to Avoid	Keep away from extreme heat, sparks, open flame, and strongly oxidizing conditions.
Materials Incompatibility	Strong acids, alkalies and oxidizers such as liquid chlorine, other halogens, hydrogen peroxide and oxygen.
Hazardous Decomposition Products	No additional hazardous decomposition products were identified other than the combustion products identified in Section 5 of this MSDS.

SECTION 11: TOXICOLOGICAL INFORMATION

For other health-related information, refer to the Emergency Overview on Page 1 and the Hazards Identification in Section 3 of this MSDS.

Toxicity Data

Gasoline:
Unleaded Gasoline:
VAPOR (TELo) Acute: 140 ppm (Human) (8 hours) - Mild eye irritant.
VAPOR (TELo) Acute: 500 ppm (Human) (1 hour) - Moderate eye irritant.
INHALATION (TCLo) Acute: 900 ppm (Human) (1 hour) - CNS and pulmonary effects.
DERMAL (TDLo) Acute: 53 mg/kg (Human) - Skin allergy effects.
INHALATION (LC50) Acute: 101,200 ppm (Rat, Mouse, & Guinea Pig) (5 minutes).

Unleaded Gasoline Containing 15% MTBE:
ORAL (LD50) Acute: >5,000 mg/kg (Rat screen level).
DERMAL (LD50) Acute: >2,000 mg/kg (Rabbit screen level).
INHALATION (LC50) Acute: >5,200 ppm (Rat screen level) (8 hours).
DRAIZE EYE Acute: Mild eye irritant. (Rabbit).
DRAIZE DERMAL Acute: Moderate skin irritant. (Rabbit).
BUEHLER DERMAL Acute: Non-sensitizing. (Guinea Pig).
28-Day DERMAL Sub-Chronic: Severe skin irritant. (Rabbit).

A major epidemiological study concluded that there was no increased risk of kidney cancer associated with gasoline exposures for petroleum refinery employees or neighboring residents. Another study identified a slight trend in kidney cancers among service station employees following a 30-year latency period. Two-year inhalation toxicity studies with fully vaporized unleaded gasoline (at concentrations of 67, 292 and 2,056 ppm in air) produced kidney damage and kidney tumors in male rats, but not in female rats or mice of either sex. Results from subsequent scientific studies suggest that the kidney damage, and probably the kidney tumor response, is limited to the male rat. The kidney tumors apparently were the result of the formation of alpha-2u-globulin, a protein unique to male rats. This finding is not considered relevant to human exposure. Under conditions of the study, there was no evidence that exposure to unleaded gasoline vapor is associated with developmental toxicity. Experimental studies with laboratory animals did suggest that overexposure to gasoline may adversely effect male reproductive performance. Also, in laboratory studies with rats, the maternal and developmental "no observable adverse effect level" (NOAEL) was determined to be 9,000 ppm (75% of the LEL value). Female mice developed a slightly higher incidence of liver tumors compared to controls at the highest concentration. IARC has listed gasoline as possibly carcinogenic to humans (Group 2B).

Methyl tertiary-Butyl Ether (MTBE):
Acute symptoms associated with human exposure to MTBE appear to be mild and transient. In laboratory studies, rodents exposed to high doses of MTBE exhibited blood chemistry changes and liver and kidney abnormalities. In laboratory studies, MTBE vapor exposure at the high dose concentration was associated with an increased incidence of liver tumors in female mice. Also, at high dose concentration exposures, MTBE was associated with an increased incidence of kidney and testicular (Leydig cell) tumors in male rats. Additional oncogenicity studies on rats resulted in testicular tumors following administration by ingestion. These data are not generally considered relevant to humans. In the Ninth edition (2000) of its Report on Carcinogens, NTP has not identified MTBE as either a known carcinogen or reasonably anticipated to be carcinogenic to humans. In animal studies, developmental and reproductive toxicity related to MTBE inhalation exposures was observed only at concentrations that were maternally toxic. MTBE was shown to be maternal toxic at 4,000 and 8,000 ppm levels when

mice were exposed for six hours per day during their pregnancy. Also, a decrease in the number of successful pregnancies and a reduction in birth weights were observed at these exposure levels. Birth defects (cleft palate) were observed at the high dose level. These data suggest that the risk of developmental and reproductive toxicity in humans is negligible as a result of anticipated exposures to MTBE.

Tertiary-Amyl Methyl Ether (TAME):
TAME was found to be negative for the induction of structural chromosome aberrations (both S9-activated and non-activated) in Chinese hamster ovary (CHO) cells. Inhalation of TAME vapors at concentrations above 250 ppm produced reversible CNS depression in rats and mice. In a four week inhalation study, increases in liver weights with no tissue injury were observed in rats exposed to a TAME concentration of 500 ppm. Birth defects in mice and fetotoxicity in both rats and mice were observed after inhalation exposures to maternally toxic concentrations of TAME.

Diisopropyl Ether (DIPE):
Increased kidney and liver weights were observed in rats and mice in subchronic and chronic inhalation studies of DIPE. Also, evidence of microscopic changes (hyaline droplets) were reported in liver tissue and kidney tubules of rabbits and male rats exposed to DIPE at concentrations of 7,100 ppm. These findings were similar those found in gasoline studies. Overexposure by inhalation of pregnant rats to DIPE at concentrations of 3,095 and 6,745 ppm increased the frequency of rudimentary 14th ribs in the offspring. This effect was not observed at exposure concentrations of 430 ppm. The significance of these findings to human exposure is unclear.

Ethanol:
Inhalation exposure to ethanol vapor at concentrations above applicable workplace exposure levels is expected to produce eye and mucus membrane irritation. Human exposure at concentrations from 1,000 to 5,000 ppm produced symptoms of narcosis, stupor and morbid drowsiness. Subjects exposed to ethanol vapor in concentrations between 500 and 10,000 ppm experienced coughing and smarting of the eyes and nose. At 15,000 ppm there was continuous lacrimation and coughing. While extensive acute and chronic effects can be expected with ethanol consumption, ingestion is not expected to be a significant route of exposure to this product.

Pentanes, all isomers:
n-Pentane was associated with cardiac sensitization in rabbits at a concentration of 100,000 ppm in air within four hours of exposure. Pentane can act as an aesthetic by inhalation. Mice exhibited signs of respiratory irritation and mild central nervous system effects at concentrations of 32,000 to 69,000 ppm for five minutes.

Toluene:
Deliberate long-term inhalation of toluene at high concentrations (e.g., glue sniffing) has been associated with reversible liver effects, permanent kidney damage, CNS depression, brain damage and cardiac sensitization. In addition, intentional abuse behavior increases the risk for reproductive effects including pre-term delivery, prenatal death and growth retardation. Also, case studies of persons abusing toluene have revealed isolated incidences of birth defects. Long-term inhalation studies with toluene produced kidney damage, enlargement of the liver and thymus, heart palpitations, brain damage, general weakness and impaired reaction time in laboratory animals. Also, in long-term laboratory studies, rats exposed to high concentrations of toluene exhibited high-frequency hearing loss. Case studies have reported hearing damage in humans exposed elevated concentrations of toluene and other mixed solvents.

Xylene, all isomers:
Overexposure to xylene may cause upper respiratory tract irritation, headache, cyanosis, blood serum changes, CNS damage and narcosis. Effects may be increased by the use of alcoholic beverages. Also, ototoxicity has been associated with chronic overexposure to xylene. An inhalation study with laboratory rats indicated an association between elevated exposures to mixed xylenes and hearing loss. Animal studies have associated embryo and feto-toxicity with maternally toxic dose exposures of mixed xylene isomers and ethylbenzene. Lung inflammation and liver damage were identified as health effects in chronic studies using guinea pigs. The significance of these animal study results to humans is not known.

Heptane, all isomers:
n-Heptane was not mutagenic in the Salmonella/microsome (Ames) assay and is not considered to be carcinogenic.

n-Butane:
An n-butane exposure of 5,000 ppm in air has been shown to affect the heart in dogs, causing lower contractile force and other effects. Also, butane may decrease the myocardial threshold to

epinephrine-induced arrhythimias.

n-Hexane:
Intentional abuse of products containing n-hexane have been associated with permanent brain and nervous system damage. Adverse effects include numbness, tingling, pain, and loss of muscle control in the extremities, disorientation, impaired vision and reflexes, decline in motor function and even paralysis. These neurological effects are pronounced in combination with lack of oxygen supply, especially among women. Chronic repeated or prolonged overexposure to n-hexane, either by inhalation or skin absorption, has been associated with peripheral neuropathy in both human workers and rodents. The neurotoxic properties of n-hexane may increase with concurrent exposure to methyl ethyl ketone, methyl isobutyl ketone or toluene. n-Hexane has been associated with testicular degeneration and epididymal lesions in rats. Also, n-hexane produced fetal toxicity and reduced fetal weight in mice at maternally toxic doses.

Methylcyclohexane:
Rats inhaling methylcyclohexane at an airborne concentration of 15,250 ppm for one hour displayed tremors, loss of coordination, anesthesia and convulsions. Experimental animals exposed to 10,050 ppm for six hours per day for 14 days exhibited weight loss or decreased weight gain and changes in the structure of their salivary glands. In experimental studies with rabbits, the LD50 for methylcyclohexane was estimated to be between 3,300 ppm and 7,300 ppm. Death was preceded by conjunctival congestion with mucoid secretion and lacrimation, salivation, coughing, sneezing, labored breathing and diarrhea. Lethal oral dosing of rabbits caused lethargy, severe diarrhea and circulatory collapse. Vascular and degenerative lesions were observed in the kidneys and liver.

Trimethylbenzenes, all isomers:
The TCLo for humans is 10 ppm, with somnolence and respiratory tract irritation noted. In inhalation studies with rats, four of ten animals died after exposures of 2400 ppm for 24 hours. An oral dose of 5 mL/kg resulted in death in one of ten rats. Minimum lethal intraperitoneal doses were 1.5 to 2.0 mL/kg in rats and 1.13 to 12 mL/kg in guinea pigs. Levels of total hydrocarbon vapors present in the breathing atmosphere of these workers ranged from 10 to 60 ppm. Mesitylene (1, 3, 5 Trimethylbenzene) inhalation at concentrations of 1.5, 3.0, and 6.0 mg/L for six hours was associated with dose-related changes in white blood cell counts in rats. No significant effects on the complete blood count were noted with six hours per day exposure for five weeks, but elevations of alkaline phosphatase and SGOT were observed. Central nervous system depression and ataxia were noted in rats exposed to 5,100 to 9,180 ppm for two hours.

Benzene:
Prolonged and repeated exposure to high concentrations of benzene is associated with injury to blood forming organs and anemia. It is linked to the development of acute myelogenous leukemia (AML) in humans. Studies of workers exposed to high levels of benzene have identified humoral and cellular immunity impairment and a decrease in levels of circulating leukocytes. NTP, IARC and OSHA list benzene as carcinogenic to humans. Consumption of alcohol may increase the blood system changes related to benzene exposure. Animal studies have shown testicular effects and alterations in reproductive cycles, but teratogenic effects have not been reported even at maternally toxic doses. Also, animal studies show some evidence of fetotoxic and developmental effects.

Ethylbenzene:
NTP completed a 2-year inhalation bioassay of ethylbenzene in rodents. The study was conducted in rats and mice at exposure concentrations of 0, 75, 200 and 750 ppm. No significant effects were observed at the 75 and 200 ppm levels. However, compared to chamber controls, the severity of nephropathy was increased in rats at the 750 ppm level; and male rats had higher incidences of renal tubule carcinomas. Step section analyses of the kidneys found a significant increase hyperplasia and renal tubule adenomas in both male and female rats. Also at this 750 ppm level, male mice had a higher incidence of alveolar/bronchiolar adenomas and carcinomas and female mice had increased hepatocellular adenomas and carcinomas when compared to chamber controls. Also, hyperplasia was observed in the thyroid gland of both sexes of mice and in the pituitary gland of female mice. The relevance of these findings to human health is unclear. However, based upon this data, the IARC has designated ethylbenzene as possibly carcinogenic to humans (Group 2B).

Cyclohexane:
Cyclohexane can cause eye, skin and mucous membrane irritation, CNS depressant and narcosis at elevated concentrations. In experimental animals exposed to lethal concentrations by inhalation or oral route, there was generalized vascular damage and severe degenerative changes in the heart, lungs, liver, kidneys and brain. Cyclohexane does not act as a promotor for tumors on mice when exposed to dimethylbenzanthracene. Further, it did not induce unscheduled DNA synthesis in cultured human lymphocytes. It is not mutagenic in the Salmonella/microsome (Ames) or the mouse lymphoma L5178Y assays, with or without metabolic activation. However, it did increase the number of chromosomal

aberrations in bone marrow cells of rats exposed to between 100 and 300 ppm for six hours/day for five days. These chromosomal aberrations did not appear to be dose-related.

Naphthalene:
Naphthalene is a potential irritant to eyes, skin and lungs. Ingestion of naphthalene has been associated with severe red blood cell and liver damage leading to death. Following prolonged or repeated exposures, naphthalene has been shown to cause cataracts, optical neuritis, hemolytic and aplastic anemia, jaundice and possibly neurotoxicity. In animal studies, naphthalene caused fetal effects and decreased spleen weights in pregnant female mice. In an NTP sponsored study, naphthalene produced a dose related increase in tumors at the 30 and 60 ppm exposure level in both male and female rats. Higher incidences of respiratory epithelial adenomas, olfactory epithelial neuroblastomas, and non-neoplastic lesions of the nose were observed as compared to controls. Cytogenic studies with Chinese hamster ovary cells have demonstrated sister chromatid exchanges and chromosomal aberrations. The relevance of these studies to human health is unclear.

Indene:
Indene and ethylmethylbenzenes are primary skin irritants. Overexposure has been associated with kidney damage and increased blood cholinesterase levels. In inhalation developmental studies, indene and other C9 aromatic hydrocarbons have been associated with decreased fetal and newborne pup weights.

Styrene:
Neurological injury associated with chronic styrene exposure include distal hypesthesia, decreased nerve conduction velocity, and altered psychomotor performance. These effects did not occur with exposures to airborne concentrations that were less than 100 ppm. Increased deaths from degenerative neurological disorders were found in a comprehensive epidemiological study of Danish reinforced plastics workers. These workers were reported to have a 2.5-fold increased risk for myeloid leukemia with clonal chromosome aberrations. Also, there are several studies that suggest potential reproductive effects in humans and experimental animals from overexposure to styrene. Styrene was not mutagenic in the standard (liquid phase) Ames Salmonella/microsome assay, but was weakly positive when tested in the vapor phase. IARC has listed styrene as possibly carcinogenic to humans (Group 2B).

SECTION 12: ECOLOGICAL INFORMATION

Ecotoxicity

Unleaded gasoline is potentially toxic to freshwater and saltwater ecosystems. Various grades of gasoline exhibited range of lethal toxicity (LC100) from 40 PPM to 100 PPM in ambient stream water with Rainbow Trout (Salmo irideus). A 24-hour TLm (Median Toxic Limit) was calculated to be 90 PPM with juvenile American Shad (Squalius cephalus). Using Bluegill Sunfish (Lepomis macrochirus), Grey Mullet (Chelon labrosus) and Gulf Menhaden (Brevoortia patronus), gasoline exhibited a 96-hour LC50 of 8 PPM, 2 PPM, and 2 PPM, respectively.

Methyl tertiary-Butyl Ether (MTBE) has a relatively low level of aquatic ecotoxicity. Using the crustacean Harpacticoid Copepods (Nitrocra spinipes), MTBE exhibited a 96-hour LC50 of from 1,000 PPM to 10,000 PPM depending upon various water temperatures. MTBE exhibited a 24-hour LC50 of 1,700 PPM and a 96-hour LC50 of 1,000 PPM using Bleak Fish (Alburnus alburnus) at 10° C. Using Golden Orfe Fish (Leuciscus idus melanotus), MTBE exhibited a 48-hour LC0 of 1,000 PPM and an LC100 of 2,000 PPM.

Environmental Fate

Gasoline contains components that are potentially toxic to freshwater and saltwater ecosystems. It will normally float on water. The lighter components of gasoline will evaporate rapidly. In stagnant or slow-flowing waterways, a hydrocarbon layer can cover a large surface area. As a result, this covering layer might limit or eliminate natural atmospheric oxygen transport into the water. With time, if not removed, oxygen depletion in the waterway might be enough to cause a fish kill or create an anaerobic environment. This coating action can also be harmful or fatal to plankton, algae, aquatic life, and water birds.

This material can be hazardous to human health or the environment. If spilled, this material will normally evaporate rapidly. Hydrocarbon components may contribute to atmospheric smog. The atmospheric half-life of the butane components under photochemical smog conditions are estimated to be between three and seven days. Isopentane, n-pentane, hexane isomers, n-heptane, heptane isomers and iso-octane have estimated half-lives of between two and five days in air when photochemical hydroxyl or nitrate radicals are present. Toluene has a half-life of from three hours to approximately one day. Cyclohexane has a half-life of from six hours to over four days when hydroxyl radicals are present.

SECTION 13: DISPOSAL CONSIDERATIONS

Hazard characteristic and regulatory waste stream classification can change with product use. Accordingly, it is the responsibility of the user to determine the proper storage, transportation, treatment and/or disposal methodologies for spent materials and residues at the time of disposition.

Maximize material recovery for reuse or recycling. If spilled material is introduced into a wastewater treatment system, chemical and biological oxygen demand (COD and BOD) will likely increase. This material is biodegradable if gradually exposed to microorganisms, preferably in an aerobic environment. In sewage-seeded wastewater, at or below concentrations of 0.2 vol.% of this material, there is little or no effect on bio-oxidation and/or digestion. However, at 1 vol.%, it doubles the required digestion period. Higher concentrations interfere with floc formation and sludge settling and also plug filters or exchange beds. Vapor emissions from a bio-oxidation process contaminated with this material can be a health hazard.

Recovered non-usable material may be regulated by US EPA as a hazardous waste due to its ignitibility (D001) and/or its toxic (D018) characteristics. In addition, conditions of use may cause this material to become a hazardous waste, as defined by Federal or State regulations. It is the responsibility of the user to determine if the material is a hazardous waste at the time of disposal. Transportation, treatment, storage, and disposal of waste material must be conducted in accordance with RCRA regulations (see 40 CFR Parts 260 through 271). State and/or local regulations might be even more restrictive. Contact the RCRA/Superfund Hotline at (800) 424-9346 or your regional US EPA office for guidance concerning case specific disposal issues.

SECTION 14: TRANSPORT INFORMATION

DOT Status A U.S. Department of Transportation regulated material.

Proper Shipping Name Gasoline

Hazard Class Class 3: Flammable liquid.

Packing Group(s) II

UN/NA ID UN1203

Reportable Quantity A Reportable Quantity (RQ) has not been established for this material.

Placards

Emergency Response Guide No. 128

HAZMAT STCC No. 4908177

MARPOL III Status Not a DOT "Marine Pollutant" per 49 CFR 171.8.

SECTION 15: REGULATORY INFORMATION

TSCA Inventory This product and/or its components are listed on the Toxic Substances Control Act (TSCA) inventory.

SARA 302/304 The Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III requires facilities subject to Subparts 302 and 304 to submit emergency planning and notification information based on Threshold Planning Quantities (TPQs) and Reportable Quantities (RQs) for "Extremely Hazardous Substances" listed in 40 CFR 302.4 and 40 CFR 355. No components were identified.

SARA 311/312 The Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III requires facilities subject to this subpart to submit aggregate information on chemicals by "Hazard Category" as defined in 40 CFR 370.2. This material would be classified under the following hazard categories:

Fire, Acute (Immediate) Health Hazard, Chronic (Delayed) Health Hazard

SARA 313

This product contains the following components in concentrations above de minimis levels that are listed as toxic chemicals in 40 CFR Part 372 pursuant to the requirements of Section 313 of SARA:
Methyl tertiary-Butyl Ether (MTBE) [CAS No.: 1634-04-4] Concentration: 0 - 15%
Toluene [CAS No.: 108-88-3] Concentration: 1 - 20%
Xylene, all isomers [CAS No.: 1330-20-7] Concentration: 1 - 18%
n-Hexane [CAS No.: 110-54-3] Concentration: 1 - 8%
1, 2, 4 Trimethylbenzene [CAS No.: 95-63-6] Concentration: 1 - 3%
Benzene [CAS No.: 71-43-2] Concentration: 0 - 4.9%
Ethylbenzene [CAS No.: 100-41-4] Concentration: 0.2 - 4%
Cumene [CAS No.: 98-82-8] Concentration: 0.5 - 4%
Styrene [CAS No.: 100-42-5] Concentration: 0 - 1%
Cyclohexane [CAS No.: 110-82-7] Concentration: 1 - 3%
Naphthalene [CAS No.: 91-20-3] Concentration: 0.1 - 2%

CERCLA

The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) requires notification of the National Response Center concerning release of quantities of "hazardous substances" equal to or greater than the reportable quantities (RQ's) listed in 40 CFR 302.4. As defined by CERCLA, the term "hazardous substance" does not include petroleum, including crude oil or any fraction thereof which is not otherwise specifically designated in 40 CFR 302.4. Chemical substances present in this product or refinery stream that may be subject to this statute are:
Methyl tertiary-Butyl Ether (MTBE) [CAS No.: 1634-04-4] RQ = 1000 lbs. (453.6 kg) Concentration: 0 - 15%
Toluene [CAS No.: 108-88-3] RQ = 1000 lbs. (453.6 kg) Concentration: 1 - 20%
Xylene, all isomers [CAS No.: 1330-20-7] RQ = 100 lbs. (45.36 kg) Concentration: 1 - 18%
n-Hexane [CAS No.: 110-54-3] RQ = 5000 lbs. (2268 kg) Concentration: 1 - 8%
2,2,4-Trimethylpentane [CAS No.: 540-84-1] RQ = 1000 lbs. (453.6 kg) Concentration: 1 - 5%
Benzene [CAS No.: 71-43-2] RQ = 10 lbs. (4.536 kg) Concentration: 0 - 4.9%
Ethylbenzene [CAS No.: 100-41-4] RQ = 1000 lbs. (453.6 kg) Concentration: 0.2 - 4%
Cumene [CAS No.: 98-82-8] RQ = 5000 lbs. (2268 kg) Concentration: 0.5 - 4%
Cyclohexane [CAS No.: 110-82-7] RQ = 1000 lbs. (453.6 kg) Concentration: 1 - 3%
Naphthalene [CAS No.: 91-20-3] RQ = 100 lbs. (45.36 kg) Concentration: 0.1 - 2%
Styrene [CAS No.: 100-42-5] RQ = 1000 lbs. (453.6 kg) Concentration: 0 - 1%

CWA

This material is classified as an oil under Section 311 of the Clean Water Act (CWA) and the Oil Pollution Act of 1990 (OPA). Discharges or spills which produce a visible sheen on waters of the United States, their adjoining shorelines, or into conduits leading to surface waters must be reported to the EPA's National Response Center at (800) 424-8802.

California Proposition 65

This material contains the following components which are known to the State of California to cause cancer, birth defects or other reproductive harm; and therefore, it may be subject to the requirements of California Proposition 65 (CA Health & Safety Code Section 25249.5): Gasoline (Wholly Vaporized and Engine Exhaust), Benzene [CAS No. 71-43-3] and Toluene [CAS No. 108-88-3]

New Jersey Right-to-Know Label

Gasoline [NJDEP CAS No. 8006-61-9]

Additional Regulatory Remarks

As minimum requirements, CITGO recommends that the following advisory information be displayed on equipment used to dispense gasoline in motor vehicles. Additional warnings specified by various regulatory authorities may be required: "DANGER: Extremely Flammable. Use as a Motor Fuel Only. No Smoking. Stop Engine. Turn Off All Electronic Equipment including Cellular Telephones. Do Not Overfill Tank. Keep Away from Heat and Flames. Do Not leave nozzle unattended during refueling. **Static Sparks Can Cause a Fire, especially when filling portable containers.** Containers must be metal or other material approved for storing gasoline. PLACE CONTAINER ON GROUND. DO NOT FILL ANY PORTABLE CONTAINER IN OR ON A VEHICLE. Keep nozzle spout in contact with the container during the entire filling operation. **Harmful or Fatal if Swallowed. Long-Exposure Has Caused Cancer in Laboratory Animals.** Avoid prolonged breathing of vapors. Keep face away from nozzle and gas tank. Never siphon by mouth."

Section 12(b) of Toxic Substances Control Act: This material may contain detectable concentrations of **Methyl tertiary-Butyl Ether (MTBE) [CAS No. 1634-04-4], tertiary-Amyl Methyl Ether (TAME) [CAS No. 994-05-8], Methylcyclopentane [CAS No. 96-37-7], Cyclohexane [CAS No. 110-82-7], n-Hexane {CAS No. 110-54-3] and 1,3,5-Trimethylbenzene (Mesitylene) [CAS No. 108-67-8]**. Accordingly, this product may be subject to US EPA's one-time only per country export notification requirements.

SECTION 16: OTHER INFORMATION

Refer to the top of Page 1 for the HMIS and NFPA Hazard Ratings for this product.

REVISION INFORMATION

Version Number	6.0
Revision Date	07/06/2001
Print Date	Printed on 07/06/2001.

ABBREVIATIONS

AP = Approximately EQ = Equal > = Greater Than < = Less Than NA = Not Applicable ND = No Data NE = Not Established

ACGIH = American Conference of Governmental Industrial Hygienists

AIHA = American Industrial Hygiene Association

IARC = International Agency for Research on Cancer

NTP = National Toxicology Program

NIOSH = National Institute of Occupational Safety and Health

OSHA = Occupational Safety and Health Administration

NPCA = National Paint and Coating Manufacturers Association

HMIS = Hazardous Materials Information System

NFPA = National Fire Protection Association

EPA = Environmental Protection Agency

DISCLAIMER OF LIABILITY

THE INFORMATION IN THIS MSDS WAS OBTAINED FROM SOURCES WHICH WE BELIEVE ARE RELIABLE. HOWEVER, THE INFORMATION IS PROVIDED WITHOUT ANY WARRANTY, EXPRESSED OR IMPLIED REGARDING ITS CORRECTNESS. SOME INFORMATION PRESENTED AND CONCLUSIONS DRAWN HEREIN ARE FROM SOURCES OTHER THAN DIRECT TEST DATA ON THE SUBSTANCE ITSELF. THIS MSDS WAS PREPARED AND IS TO BE USED ONLY FOR THIS PRODUCT. IF THE PRODUCT IS USED AS A COMPONENT IN ANOTHER PRODUCT, THIS MSDS INFORMATION MAY NOT BE APPLICABLE. USERS SHOULD MAKE THEIR OWN INVESTIGATIONS TO DETERMINE THE SUITABILITY OF THE INFORMATION OR PRODUCTS FOR THEIR PARTICULAR PURPOSE.

THE CONDITIONS OR METHODS OF HANDLING, STORAGE, USE, AND DISPOSAL OF THE PRODUCT ARE BEYOND OUR CONTROL 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 HANDLING, STORAGE, USE OR DISPOSAL OF THE PRODUCT.

* * * * * END OF MSDS * * * * *

Sodium Hypochlorite

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

SODIUM HYPOCHLORITE SOLUTION

MSDS Number: S4106 --- *Effective Date: 05/05/00*

1. Product Identification

Synonyms: Bleach; hypochlorous acid, sodium salt; soda bleach; sodium oxychloride
CAS No.: 7681-52-9
Molecular Weight: 74.44
Chemical Formula: NaOCl
Product Codes: 9416, P005

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Sodium Hypochlorite (as NaOCl)	7681-52-9	5%	Yes
Water	7732-18-5	95%	No

3. Hazards Identification

Emergency Overview

WARNING! HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO EYES AND RESPIRATORY TRACT. CAUSES SUBSTANTIAL BUT TEMPORARY EYE INJURY.

J.T. Baker SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate
Flammability Rating: 0 - None
Reactivity Rating: 1 - Slight
Contact Rating: 2 - Moderate

Lab Protective Equip: GOGGLES; LAB COAT
Storage Color Code: Orange (General Storage)

Potential Health Effects

Inhalation:
May cause irritation to the respiratory tract, (nose and throat); symptoms may include coughing and sore throat.
Ingestion:
May cause nausea, vomiting.
Skin Contact:
May irritate skin.
Eye Contact:
Contact may cause severe irritation and damage, especially at higher concentration.
Chronic Exposure:
A constant irritant to the eyes and throat. Low potential for sensitization after exaggerated exposure to damaged skin.
Aggravation of Pre-existing Conditions:
Persons with impaired respiratory function, or heart disorders (or disease) may be more susceptible to the effects of the substance.

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4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.
Ingestion:
If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.
Skin Contact:
Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention immediately. Wash clothing before reuse. Thoroughly clean shoes before reuse.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

Note to Physician:
Consider oral administration of sodium thiosulfate solutions if sodium hypochlorite is ingested. Do not administer neutralizing substances since the resultant exothermic reaction could further damage tissue. Endotracheal intubation could be needed if glottic edema compromises the airway. For individuals with significant inhalation exposure, monitor arterial blood gases and chest x-ray.

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5. Fire Fighting Measures

Fire:
Not considered to be a fire hazard. Substance releases oxygen when heated, which may increase the severity of an existing fire. Containers may rupture from pressure build-up.
Explosion:
This solution is not considered to be an explosion hazard. Anhydrous sodium hypochlorite is very explosive.
Fire Extinguishing Media:
Use any means suitable for extinguishing surrounding fire. Use water spray to cool fire-exposed containers, to

dilute liquid, and control vapor.
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.

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6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

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7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from incompatible substances. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

---

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
Sodium Hypochlorite:
AIHA (WEEL) - STEL - 2 mg/m3

-OSHA Permissible Exposure Limit (PEL):
0.5 ppm (TWA), 1 ppm (STEL) as Chlorine

-ACGIH Threshold Limit Value (TLV):
1 ppm (TWA), 3 ppm (STEL) as Chlorine
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 exposure limit is exceeded, a full facepiece respirator with an acid gas cartridge may be worn up to 50 times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.
Eye Protection:
Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

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9. Physical and Chemical Properties

Appearance:
Colorless to yellowish liquid.
Odor:
Chlorine-like odor.
Solubility:
100% in water.
Density:
1.07 - 1.14
pH:
9 - 10 (neutral solution-no excess sodium hydroxide)
% Volatiles by volume @ 21C (70F):
ca. 95
Boiling Point:
40C (104F) Decomposes slightly
Melting Point:
-6C (21F)
Vapor Density (Air=1):
No information found.
Vapor Pressure (mm Hg):
17.5 @ 20C (68F)
Evaporation Rate (BuAc=1):
No information found.

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10. Stability and Reactivity

Stability:
Slowly decomposes on contact with air. Rate increases with the concentration and temperature. Exposure to sunlight accelerates decomposition. Sodium hypochlorite becomes less toxic with age.
Hazardous Decomposition Products:
Emits toxic fumes of chlorine when heated to decomposition. Sodium oxide at high temperatures.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Ammonia (chloramine gas may evolve),amines, ammonium salts, aziridine, methanol, phenyl acetonitrile, cellulose, ethyleneimine, oxidizable metals, acids, soaps, and bisulfates.
Conditions to Avoid:
Light, heat, incompatibles.

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11. Toxicological Information

No LD50/LC50 information found relating to normal routes of occupational exposure. Investigated as a tumorigen and mutagen. Irritation data: eye, rabbit, 10 mg - Moderate

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Sodium Hypochlorite (as NaOCl) (7681-52-9)	No	No	3

Water (7732-18-5)	No	No	None

12. Ecological Information

Environmental Fate:
No information found.
Environmental Toxicity:
No information found.

13. Disposal Considerations

Dilute with water and flush to sewer if local ordinances allow, otherwise, whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Not regulated.

15. Regulatory Information

\Chemical Inventory Status - Part 1\

Ingredient	TSCA	EC	Japan	Australia
Sodium Hypochlorite (as NaOCl) (7681-52-9)	Yes	Yes	Yes	Yes
Water (7732-18-5)	Yes	Yes	Yes	Yes

\Chemical Inventory Status - Part 2\

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Sodium Hypochlorite (as NaOCl) (7681-52-9)	Yes	Yes	No	Yes
Water (7732-18-5)	Yes	Yes	No	Yes

\Federal, State & International Regulations - Part 1\

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Sodium Hypochlorite (as NaOCl) (7681-52-9)	No	No	No	No
Water (7732-18-5)	No	No	No	No

\Federal, State & International Regulations - Part 2\

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Sodium Hypochlorite (as NaOCl) (7681-52-9)	100	No	No

Water (7732-18-5)	No	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: No Fire: No Pressure: No
Reactivity: No (Mixture / Liquid)

Australian Hazchem Code: No information found.
Poison Schedule: S5
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

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16. Other Information

NFPA Ratings: Health: **2** Flammability: **0** Reactivity: **1**
Label Hazard Warning:
WARNING! HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO EYES AND RESPIRATORY TRACT. CAUSES SUBSTANTIAL BUT TEMPORARY EYE INJURY.
Label Precautions:
Avoid contact with eyes, skin and clothing.
Avoid breathing mist.
Keep container closed.
Use with adequate ventilation.
Wash thoroughly after handling.
Label First Aid:
If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. 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 while removing contaminated clothing and shoes. Wash clothing before reuse. In all cases get medical attention immediately.
Product Use:
Laboratory Reagent.
Revision Information:
MSDS Section(s) changed since last revision of document include: 1, 2, 3, 8, 11, 14, 15, 16.
Disclaimer:
****
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****
Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

Resin bed for E-cell

MATERIAL SAFETY DATA SHEET (MSDS)

NOT OSHA HAZARDOUS
NOT WHMIS CONTROLLED

BS242 — LIST 7

Protecting your laboratory environment
LABCONCO

8811 Prospect Avenue, K.C., MO 64132
(816) 333-8811, Fax (816) 363-0130, (800) 821-5525

PRODUCT NAME:	**Ion Exchange Resin**	Code: 69855	Key: 891090-3
	Date Issued: 11/08/88	DOT Hazard Class NON-REGULATED	
Formula: Not applicable	**Chemical Name or Synonyms:** Mixed bed ion exchange resin (hydrogen and hydroxide forms)		

SECTION 1 — COMPOSITIONAL INFORMATION

Anion/Cation exchange resin Water	CAS Reg. No. NONHAZ NONHAZ	 35-50 50-65	R&H OSHA ACGIH NE NE NE NE NE NE NE=None established

SECTION 2 — PHYSICAL PROPERTY INFORMATION

APPEARANCE — ODOR — Ph Beads; pH (aqueous slurry) = 5 to 9			**Viscosity** NA
MELTING OR FREEZING POINT OC/32F (WATER)	**BOILING POINT** 100C/212F (water)	**VAPOR PRESSURE mmHg** 17 @20C (water)	**VAPOR DENSITY (AIR=1)** Less than 1 (water)
SOLUBILITY IN WATER Negligible	**PERCENT VOLATILE &BY WEIGHT)** 50-65 (water)	**SPECIFIC GRAVITY (WATER-1)** 1.1.-1.3	**EVAPORATION RATE (BUTYL ACETATE-1)** Less than 1 (water)

SECTION 3 FIRE AND EXPLOSION HAZARD INFORMATION

FLASH POINT NA	**AUTO IGNITION TEMPERATURE** 500C/932F (EST.)	**LOWER EXPLOSION LIMIT (%)** NA	**UPPER EXPLOSION LIMIT (%)** NA

EXTINGUISHING MEDIA

	Foam		Alcohol Foam	X	CO_2	X	Dry Chemical	X	Water Spray		Other
---	---	---	---	---	---	---	---	---	---	---	---

SPECIAL FIRE FIGHTING PROCEDURES
Wear self-contained breathing apparatus (pressure-demand, MSHA/NIOSH-approved or equivalent) and full protective gear.

UNUSUAL FIRE AND EXPLOSION HAZARDS
Toxic combustion products may include alkylamines and oxides of sulfur and nitrogen.

SECTION 4 — HEALTH HAZARD INFORMATION

ROHM AND HAAS RECOMMENDED WORK PLACE EXPOSURE LIMITS
STEL = Non established.

EFFECTS OF OVEREXPOSURE
Eye Contact: Product can cause eye irritation.

EMERGENCY AND FIRST AIR PROCEDURES
Eye Contact: Immediately flush eyes with large amounts of water and continue for at least 15 minutes. Get prompt medical attention.

SECTION 5 REACTIVITY INFORMATION

STABILITY X Stable ☐ Unstable		**CONDITIONS TO AVOID** Temperatures over 200C/392F

HAZARDOUS DECOMPOSITION PRODUCTS: Thermal decomposition may yield styrene and divinylbenzene monomers, alkylamines and oxides of nitrogen.

HAZARDOUS POLYMERIZATION ☐ **MAY OCCUR** ☒ **WILL NOT** OCCUR	**CONDITIONS TO AVOID** None known	

INCOMPATIBILITY (MATERIALS TO AVOID)		Avoid contact with concentrated nitric acid or any other strong oxidizing agent at all times.
WATER [ ]	OTHER [X]	

SECTION 6 — SPILL OR LEAK PROCEDURE INFORMATION

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Floor may be slippery. Use care to avoid falls. Sweep up and transfer to containers for recovery or disposal.

WASTE DISPOSAL METHODS

Unused resin may be incinerated or landfilled in facilities meeting local, state and federal regulations. For contaminated resin, the user must determine the hazard and use an appropriate disposal method.

SECTION 7 — SPECIAL PROTECTION INFORMATION

VENTILATION TYPE

Normal room ventilation.

RESPIRATORY PROTECTION

None required for normal operations.

PROTECTIVE GLOVES	EYE PROTECTION
None required	Safety glasses (ANSI Z-87.1 or approved equivalent)

OTHER PROTECTIVE EQUIPMENT

Eyewash facility

SECTION 8 — STORAGE AND HANDLING INFORMATION

STORAGE TEMPERATURE	INDOOR	HEATED	REFRIGERATED	OUTDOOR
max. 49C/120F min. OC/32F	YES			YES

NOTE: Store at ambient temperatures. Avoid repeated freeze-thaw cycles.

NOTE: Ground ion exchange resins should be treated as potential eye irritants. A finely ground form of a structurally related strong acid cation exchange resin produced severe rabbit eye irritation.

NOTE: The maximum operating temperature recommended for this product is 60C/140F. Functional group destruction and loss of capacity will occur above this temperature.

SECTION 9 — TOXICITY INFORMATION

No toxicity data available for this product.

SECTION 10 — MISCELLANEOUS INFORMATION

Caution: Do not pack column with dry ion exchange resins. Dry beads expand when wetted; this expansion can cause a glass column to shatter.

Caution: Nitric acid and other strong oxidizing agents can cause explosive-type reactions when mixed with ion exchange resins. Proper design of equipment to prevent rapid build-up of pressure is necessary if use of an oxidizing agent such as nitric acid is contemplated. Before using strong oxidizing agents in contact with ion exchange beads, consult sources knowledgeable in handling these materials.

NA — Not Applicable C — Ceiling value	Key 906545-0	Date of Issue 11/07/88	Supersedes 8/31/87

HAZARD RATING
4 - EXTREME
3 — HIGH
2 — MODERATE
1 — SLIGHT
0 — INSIGNIFICANT

**SEE SECTION 4