MATERIAL SAFETY DATA SHEET
EM SCIENCE

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MANUFACTURER: EM SCIENCE
A DIVISION OF EM INDUSTRIES
P.O. BOX 70
450 DEMOCRAT RD.
GIBBSTOWN, N.J. 08027

PREPARATION DATE: 02/16/93
DATE MSDS PRINTED: APR 19, 1993

INFORMATION PHONE NUMBER: 609-354-9200
HOURS: MON. TO FRI. 8:30-5
CHEMTREC EMERGENCY NUMBER: 800-424-9300
HOURS: 24 HRS A DAY

CATALOG NUMBER(S):
EX0184 EX0185 EX0190 EX0195

CHEMICAL NAME:
ETHER

TRADE NAME:
ETHYL ETHER, DIETHYL ETHER, ETHYL OXIDE

CHEMICAL FAMILY:
ETHER

FORMULA:
(C2H5)2O

MOLECULAR WEIGHT: 74.12

2. COMPOSITION / INFORMATION ON INGREDIENTS

<table>
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<tr>
<th>COMPONENT</th>
<th>CAS #</th>
<th>APPR %</th>
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<tbody>
<tr>
<td>ETHER</td>
<td>60-29-7</td>
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CONTAINS 1 PPM 2,6-DI-TERT-BUTYL-P-CRESOL (CAS# 128-37-0) AS STABILIZER.
EX0185 AND EX0195 ALSO CONTAINS APPROXIMATELY 2% ETHYL ALCOHOL (CAS # 64-17-5).

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW
EXTREMELY FLAMMABLE LIQUID AND VAPOR.
TENDS TO FORM EXPLOSIVE PEROXIDES ESPECIALLY WHEN ANHYDROUS.
HARMFUL IF INHALED OR SWALLOWED.
CAUSES DEPRESSION OF CENTRAL NERVOUS SYSTEM.
MAY CAUSE DAMAGE TO LIVER, KIDNEYS, AND RESPIRATORY SYSTEM.
IRRITATING TO SKIN, EYES AND MUCOUS MEMBRANES.
MAY CAUSE EYE INJURY.

MSDS (CONTINUED) - EX0184 PAGE # 1
APPEARANCE

COLORLESS LIQUID; CHARACTERISTIC SWEET ODOR

POTENTIAL HEALTH EFFECTS (ACUTE AND CHRONIC)

SYMPTOMS OF EXPOSURE:
HARMFUL IF INHALED OR SWALLOWED.
IRRITATING ON CONTACT WITH SKIN, EYES OR MUCOUS MEMBRANES.
IT IS A DEPRESSANT OF THE CENTRAL NERVOUS SYSTEM AND IS CAPABLE OF
PRODUCING INTOXICATION, DROWSINESS, STUPOR AND UNCONSCIOUSNESS.
DEATH DUE TO RESPIRATORY FAILURE MAY RESULT FROM SEVERE AND CONTINUED
EXPOSURE.

MEDICAL COND. AGGRAVATED BY EXPOSURE:
PRE-EXISTING SKIN DISORDERS, EYE
PROBLEMS OR IMPAIRED KIDNEY, LIVER OR RESPIRATORY FUNCTIONS.
ALCOHOLIC
BEVERAGE CONSUMPTION CAN ENHANCE THE TOXIC EFFECTS OF THIS SUBSTANCE.

ROUTES OF ENTRY

INHALATION OR INGESTION

CARCINOGENICITY

THE MATERIAL IS NOT LISTED (IARC, NTP, OSHA) AS CANCER CAUSING
AGENT.

4. FIRST AID MEASURES

EMERGENCY FIRST AID:
GET MEDICAL ASSISTANCE FOR ALL CASES OF OVEREXPOSURE.
SKIN: IMMEDIATELY FLUSH THOROUGHLY WITH LARGE AMOUNTS OF WATER.
EYES: IMMEDIATELY FLUSH THOROUGHLY WITH WATER FOR AT LEAST 15
MINUTES.
INHALATION: REMOVE TO FRESH AIR; GIVE ARTIFICIAL RESPIRATION IF
BREATHING HAS STOPPED.
INGESTION: IF CONSCIOUS, DRINK WATER AND INDUCE VOMITING
IMMEDIATELY AS DIRECTED BY MEDICAL PERSONNEL. NEVER GIVE ANYTHING
BY MOUTH TO AN UNCONSCIOUS PERSON.

5. FIRE FIGHTING MEASURES

FLASH POINT (F): -49F (CC)
FLAMMABLE LIMITS LEL (%): 1.90
FLAMMABLE LIMITS OEL (%): 36.00
EXTINGUISHING MEDIA:
ALCOHOL FOAM, CARBON DIOXIDE, DRY CHEMICAL.
USE WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL.

MSDS (CONTINUED) - EX0164 PAGE # 2
FIRE FIGHTING PROCEDURES:
WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING.

FIRE & EXPLOSION HAZARDS:
DANGEROUS FIRE AND EXPLOSIVE HAZARD.
MAY FORM EXPLOSIVE PEROXIDES, ESPECIALLY WHEN HEATED.
CLOSED CONTAINERS MAY EXPLODE WHEN EXPOSED TO HEAT.
VAPOR CAN TRAVEL DISTANCES TO IGNITION SOURCE AND FLASH BACK.

6. ACCIDENTAL RELEASE MEASURES

SPILL RESPONSE:
EVACUATE THE AREA OF ALL UNNECESSARY PERSONNEL.
WEAR SUITABLE PROTECTIVE EQUIPMENT LISTED UNDER EXPOSURE / PERSONAL PROTECTION.
ELIMINATE ANY IGNITION SOURCES UNTIL THE AREA IS DETERMINED TO BE FREE FROM EXPLOSION OR FIRE HAZARDS.
CONTAIN THE RELEASE AND ELIMINATE ITS SOURCE, IF THIS CAN BE DONE WITHOUT RISK.
TAKE UP AND CONTAINERIZE FOR PROPER DISPOSAL AS DESCRIBED UNDER DISPOSAL.
COMPLY WITH FEDERAL, STATE, AND LOCAL REGULATIONS ON REPORTING RELEASES. REFER TO REGULATORY INFORMATION FOR REPORTABLE QUANTITY AND OTHER REGULATORY DATA.
THE FOLLOWING EM SCIENCE SPILL-X ABSORBENT IS RECOMMENDED FOR THIS PRODUCT:

SX0863 SOLVENT SPILL TREATMENT KIT

7. HANDLING AND STORAGE

HANDLING & STORAGE:
KEEP CONTAINER TIGHTLY CLOSED.
STORE IN A COOL, DRY AREA AWAY FROM IGNITION SOURCES AND OXIDIZERS.
CHECK PEROXIDE CONTENT BEFORE HEATING MATERIAL.
DO NOT BREATHE DUST OR VAPOR.
DO NOT GET IN EYES, ON SKIN, OR ON CLOTHING.
ELECTRICALLY GROUND ALL EQUIPMENT WHEN HANDLING THIS PRODUCT.
RETAINED RESIDUE MAY MAKE EMPTY CONTAINERS HAZARDOUS; USE CAUTION!
PROTECT AGAINST PHYSICAL DAMAGE AND DIRECT SUNLIGHT.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

MSDS (CONTINUED) - EX0184 PAGE # 3
ENGINEERING CONTROLS AND PERSONAL PROTECTIVE EQUIPMENT:

VENTILATION, RESPIRATORY PROTECTION, PROTECTIVE CLOTHING, EYE PROTECTION MATERIAL MUST BE HANDLED OR TRANSFERRED IN AN APPROVED FUME HOOD OR WITH EQUIVALENT VENTILATION.
PROTECTIVE GLOVES MUST BE WORN TO PREVENT SKIN CONTACT (NITRILE OR EQUIVALENT).
SAFETY GLASSES WITH SIDE SHIELDS MUST BE WORN AT ALL TIMES.
RESPIRATORY PROTECTION: IF WORKPLACE EXPOSURE LIMIT(S) OF PRODUCT OR ANY COMPONENT IS EXCEEDED (SEE TLV/PEL), A NIOSH/MSHA APPROVED AIR SUPPLIED RESPIRATOR IS ADVISED IN ABSENCE OF PROPER ENVIRONMENTAL CONTROL. OSHA REGULATIONS ALSO PERMIT OTHER NIOSH/MSHA RESPIRATORS (NEGATIVE PRESSURE TYPE) UNDER SPECIFIED CONDITIONS (SEE YOUR SAFETY EQUIPMENT SUPPLIER). ENGINEERING AND/OR ADMINISTRATIVE CONTROLS SHOULD BE IMPLEMENTED TO REDUCE EXPOSURE.
IMPERVIOUS PROTECTIVE CLOTHING SHOULD BE WORN TO PREVENT SKIN CONTACT.

WORK / HYGENIC PRACTICES:
WASH THOROUGHLY AFTER HANDLING.
DO NOT TAKE INTERNALLY.
EYE WASH AND SAFETY EQUIPMENT SHOULD BE READILY AVAILABLE.

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EXPOSURE GUIDELINES
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OSHA - PEL:

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<th>STEL</th>
<th>CL</th>
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<tr>
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<td>PPM</td>
<td>MG/M³</td>
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ACGIH - TLV:

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9. PHYSICAL AND CHEMICAL PROPERTIES

BOILING POINT (°C 760 MMHG)**: 35C
MELTING POINT (°C): -123C
SPECIFIC GRAVITY (H2O = 1): 0.71
VAPOR PRESSURE (MM HG): 442 20C
PERCENT VOLATILE BY VOL (%): 100
VAPOR DENSITY (AIR = 1): 2.6
EVAPORATION RATE (BUAC = 1): 37.5

MSDS (CONTINUED) - EX0184 PAGE # 4
SOLUBILITY IN WATER (%): SOLUBLE
APPEARANCE: COLORLESS LIQUID; CHARACTERISTIC SWEET ODOR

10. STABILITY AND REACTIVITY

STABILITY: YES

HAZARDOUS POLYMERIZATION: DOES NOT OCCUR

HAZARDOUS DECOMPOSITION: CARBON MONOXIDE

CONDITIONS TO AVOID:

HEAT; CONTACT WITH IGNITION SOURCE, LIGHT, AIR;
EVAPORATING TO NEAR DRYNESS.

MATERIALS TO AVOID:

( ) WATER
( ) ACIDS
( ) BASES
( ) CORROSIVES
(X) OXIDIZERS
(X) OTHER:
ACETYL PEROXIDE, LIQUID AIR, BROMOAZIDE, CHLORINE

11. TOXICOLOGICAL INFORMATION

TOXICITY DATA:
ORL-RAT LD50: 1215 MG/KG
ORL-MAN LD50: 260 MG/KG
IHL-RAT LC50: 73000 PPM/2H

TOXICOLOGICAL FINDINGS:
TESTS ON LABORATORY ANIMALS INDICATE MATERIAL MAY PRODUCE ADVERSE
MUTAGENIC EFFECTS.
CITED IN REGISTRY OF TOXIC EFFECTS OF SUBSTANCES (RTECS)

12. DISPOSAL CONSIDERATIONS

EPA WASTE NUMBERS: U117 D001

TREATMENT:
INCINERATION, FUELS BLENDING OR RECYCLE. CONTACT YOUR LOCAL
PERMITTED WASTE DISPOSAL SITE (TSO) FOR PERMISSIBLE TREATMENT
SITES.
ALWAYS CONTACT A PERMITTED WASTE DISPOSER (TSO) TO ASSURE
MSDS (CONTINUED) - EX0184 PAGE # 5
COMPLIANCE WITH ALL CURRENT LOCAL, STATE AND FEDERAL REGULATIONS.

13. TRANSPORT INFORMATION

DOT PROPER SHIPPING NAME...:
ETHYL ETHER

DOT ID NUMBER..............: UN1155

14. REGULATORY INFORMATION

TSCA INVENTORY............:
THIS PRODUCT IS A "MIXTURE". THE CAS NUMBERS OF ALL COMPONENTS ARE LISTED ON THE TSCA INVENTORY.

<table>
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<tr>
<th>COMPONENT</th>
<th>SARA EHS (302)</th>
<th>SARA EHS TPQ (LBS)</th>
<th>CERCLA RW (LBS)</th>
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<tbody>
<tr>
<td>ETHER</td>
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15. OTHER INFORMATION

COMMENTS:
NONE

NFPA HAZARD RATINGS:
HEALTH : 2
FLAMMABILITY : 4
REACTIVITY : 1
SPECIAL HAZARDS :

REVISION HISTORY:
08/01/81 02/05/87 10/27/87 07/25/89 03/01/91 02/06/92 12/04/92
- = REVISED SECTION
N/A = NOT AVAILABLE
N/E = NONE ESTABLISHED

THE STATEMENTS CONTAINED HEREBIN ARE OFFERED FOR INFORMATIONAL PURPOSES