

BEI (x2)

MSDS NUMBER: 30009590

PAGE: 1

MATERIAL SAFETY DATA SHEET

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION
AND OF THE COMPANY/UNDERTAKING

SUBSTANCE/PREPARATION:

ETHYLENEIMINE

TRADE NAMES/SYNONYMS:

AZIRIDINE * ETHYLENIMINE * AZACYCLOPROPANE * AZIRAN * DIMETHYLENIMINE
* RCRA P054 * STCC 4906220 * UN 1185 * C2H5N

CHEMICAL FAMILY:

IMINE

MOLECULAR FORMULA:

C2-H5-N

MOLECULAR WEIGHT:

43.08

EINECS NUMBER:

NOT ASSIGNED

ELINCS NUMBER:

NOT ASSIGNED

COMPANY:

SMITHKLINE BEECHAM CORPORATION
CORPORATE ENVIRONMENTAL HEALTH AND SAFETY
709 SWEDELAND ROAD
KING OF PRUSSIA, PA 19406
PHONE: (215)270-7807

2. COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENTS

ETHYLENEIMINE

CAS REGISTRY NO

151-56-4

PERCENT

>99.0

CONTAMINANTS:

MAY CONTAIN SODIUM HYDROXIDE AS AN INHIBITOR

3. HAZARDS IDENTIFICATION

SUMMARY:

ETHYLENEIMINE IS A COLORLESS LIQUID WITH AN AMMONIA-LIKE ODOR. MAY BE FATAL IF INHALED. MAY BE FATAL IF ABSORBED THROUGH SKIN. MAY BE FATAL IF SWALLOWED. CANCER HAZARD (CONTAINS MATERIAL WHICH CAN CAUSE CANCER IN HUMANS). RISK OF CANCER DEPENDS ON DURATION AND LEVEL OF EXPOSURE. CAUSES RESPIRATORY TRACT, SKIN AND EYE BURNS. CAUSES SEVERE BURNS TO MUCOUS MEMBRANES. MAY CAUSE ALLERGIC SKIN REACTION. FLAMMABLE LIQUID AND VAPOR. MAY CAUSE FLASH FIRE. MAY REACT DANGEROUSLY WITH WATER. POISON. DO NOT BREATHE VAPOR OR MIST. DO NOT GET IN EYES, ON SKIN, OR ON CLOTHING. KEEP AWAY FROM ALL IGNITION SOURCES. DO NOT ALLOW WATER TO GET IN CONTAINER. AVOID REPEATED OR PROLONGED CONTACT. KEEP CONTAINER TIGHTLY CLOSED. WASH THOROUGHLY AFTER HANDLING. USE ONLY WITH ADEQUATE VENTILATION.

SKIN CONTACT:

SHORT TERM EXPOSURE: MAY CAUSE BURNS. MAY CAUSE ALLERGIC REACTIONS. ADDITIONAL EFFECTS MAY INCLUDE BLISTERS. MAY ALSO CAUSE DEATH. LONG TERM EFFECTS: SAME EFFECTS AS SHORT TERM EXPOSURE.

EYE CONTACT:

SHORT TERM EXPOSURE: MAY CAUSE IRRITATION, POSSIBLY SEVERE. ADDITIONAL EFFECTS MAY INCLUDE TEARING AND EYE DAMAGE. LONG TERM EFFECTS: SAME EFFECTS AS SHORT TERM EXPOSURE.

DATE CREATED: 15 February 85

DATE REVISED: 24 March 93

MATERIAL SAFETY DATA SHEET

INHALATION:

SHORT TERM EXPOSURE: MAY CAUSE BURNS. ADDITIONAL EFFECTS MAY INCLUDE SORES, COUGHING, FEVER, NAUSEA, VOMITING, STOMACH PAIN, BLOOD IN THE URINE, DIFFICULTY BREATHING, HEADACHE, DIZZINESS, LUNG DAMAGE, LIVER AND KIDNEY DAMAGE AND CONVULSIONS. MAY ALSO CAUSE REPRODUCTIVE EFFECTS AND DEATH. LONG TERM EFFECTS: SAME EFFECTS AS SHORT TERM EXPOSURE.

INGESTION:

SHORT TERM EXPOSURE: MAY CAUSE BURNS. ADDITIONAL EFFECTS MAY INCLUDE SORE THROAT, VOMITING, DIARRHEA, DILATED PUPILS AND BLINDNESS. MAY ALSO CAUSE DEATH.

LONG TERM EFFECTS: MAY CAUSE CANCER.

FIRST AID: REMOVE FROM EXPOSURE AREA. IF BREATHING HAS STOPPED, PERFORM ARTIFICIAL RESPIRATION OR CPR. FLUSH SKIN/EYES WITH WATER FOR 15 MINUTES. IF VOMITING OCCURS, KEEP HEAD BELOW HIPS TO PREVENT ASPIRATION. GET MEDICAL ATTENTION IMMEDIATELY. SEE MSDS FOR FURTHER RECOMMENDATIONS.

CONDITIONS AGGRAVATED BY EXPOSURE:

NONE

4. FIRST-AID MEASURES**SUMMARY:**

REMOVE FROM EXPOSURE AREA. IF BREATHING HAS STOPPED, PERFORM ARTIFICIAL RESPIRATION OR CPR. FLUSH SKIN/EYES WITH WATER FOR 15 MINUTES. IF VOMITING OCCURS, KEEP HEAD BELOW HIPS TO PREVENT ASPIRATION. GET MEDICAL ATTENTION IMMEDIATELY. SEE MSDS FOR FURTHER RECOMMENDATIONS.

SKIN CONTACT:

REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (AT LEAST 15-20 MINUTES). IN CASE OF CHEMICAL BURNS, COVER AREA WITH STERILE, DRY DRESSING. BANDAGE SECURELY, BUT NOT TOO TIGHTLY. GET MEDICAL ATTENTION IMMEDIATELY.

EYE CONTACT:

WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (AT LEAST 15-20 MINUTES). CONTINUE IRRIGATING WITH NORMAL SALINE UNTIL THE PH HAS RETURNED TO NORMAL (30-60 MINUTES). COVER WITH STERILE BANDAGES. GET MEDICAL ATTENTION IMMEDIATELY.

INHALATION:

REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, GIVE ARTIFICIAL RESPIRATION. MAINTAIN AIRWAY AND BLOOD PRESSURE AND ADMINISTER OXYGEN IF AVAILABLE. KEEP AFFECTED PERSON WARM AND AT REST. TREAT SYMPTOMATICALLY AND SUPPORTIVELY. ADMINISTRATION OF OXYGEN SHOULD BE PERFORMED BY QUALIFIED PERSONNEL. GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:

DILUTE THE ALKALI BY GIVING WATER OR MILK IMMEDIATELY AND ALLOW VOMITING TO OCCUR. AVOID GASTRIC LAVAGE OR EMETICS. ESOPHAGOSCOPY IS THE ONLY WAY TO EXCLUDE THE POSSIBILITY OF CORROSION IN THE UPPER GASTROINTESTINAL TRACT; IF CORROSION IS SUSPECTED, ESOPHAGOSCOPY SHOULD USUALLY BE PERFORMED WITHIN 24 HOURS (DREISBACH, HANDBOOK OF POISONING, 12TH ED.). MAINTAIN AIRWAY AND TREAT SHOCK. IF VOMITING OCCURS, KEEP HEAD BELOW HIPS TO HELP PREVENT ASPIRATION. GET MEDICAL ATTENTION IMMEDIATELY.

ANTIDOTES:

DATE CREATED: 15 February 85

DATE REVISED: 24 March 93

NO SPECIFIC ANTIDOTE. TREAT SYMPTOMATICALLY AND SUPPORTIVELY.

5. FIRE-FIGHTING MEASURES

(REFERENCES TO CFR & NFPA ARE APPLICABLE TO U.S. OPERATIONS)

SUMMARY:

DANGEROUS FIRE HAZARD. NEVER SMOKE WHEN USING THIS PRODUCT OR HANDLE NEAR AN OPEN FLAME OR SPARKS. VAPOR-AIR MIXTURES MAY BE EXPLOSIVE. VAPORS MAY TRAVEL ALONG THE GROUND TO A FIRE SOURCE AND FLASH BACK. IF IT CATCHES FIRE, DO NOT TRY TO STOP THE FIRE YOURSELF. SEEK THE HELP OF FIREFIGHTING PERSONNEL. CONTAINERS MAY EXPLODE WHEN EXPOSED TO FIRE.

FIRE CONTROL:

DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR REGULAR FOAM

FOR LARGER FIRES, USE WATER SPRAY, FOG OR REGULAR FOAM

ALCOHOL FOAM

FIRE AND EXPLOSION HAZARD:

DANGEROUS FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME.

VAPORS ARE HEAVIER THAN AIR AND MAY TRAVEL A CONSIDERABLE DISTANCE TO A SOURCE OF IGNITION AND FLASH BACK.

VAPOR-AIR MIXTURES ARE EXPLOSIVE.

FIREFIGHTING:

DO NOT GET WATER INSIDE CONTAINER. APPLY COOLING WATER TO SIDES OF CONTAINERS THAT ARE EXPOSED TO FLAMES UNTIL WELL AFTER FIRE IS OUT. STAY AWAY FROM ENDS OF TANKS. FOR MASSIVE FIRE IN CARGO AREA, USE UNMANNED HOSE HOLDER OR MONITOR NOZZLES; IF THIS IS IMPOSSIBLE, WITHDRAW FROM AREA AND LET FIRE BURN. WITHDRAW IMMEDIATELY IN CASE OF RISING SOUND FROM VENTING SAFETY DEVICE OR ANY DISCOLORATION OF TANK DUE TO FIRE. ISOLATE FOR 1/2 MILE IN ALL DIRECTIONS IF TANK, RAIL CAR OR TANK TRUCK IS INVOLVED IN FIRE (1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5, GUIDE PAGE 30).

EXTINGUISH ONLY IF FLOW CAN BE STOPPED; USE WATER IN FLOODING AMOUNTS AS FOG, SOLID STREAMS MAY NOT BE EFFECTIVE. COOL CONTAINERS WITH FLOODING AMOUNTS OF WATER, APPLY FROM AS FAR A DISTANCE AS POSSIBLE. AVOID BREATHING TOXIC VAPORS, KEEP UPWIND. EVACUATE TO A RADIUS OF 5000 FEET FOR UNCONTROLLABLE FIRES. CONSIDER EVACUATION OF DOWNWIND AREA IF MATERIAL IS LEAKING.

6. ACCIDENTAL RELEASE MEASURES

OCCUPATIONAL SPILL:

SHUT OFF IGNITION SOURCES. DO NOT TOUCH SPILLED MATERIAL. STOP LEAK IF YOU CAN DO IT WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. FOR SMALL SPILLS, FLUSH AREA WITH FLOODING AMOUNTS OF WATER. DIKE FAR AHEAD OF SPILL FOR LATER DISPOSAL. NO SMOKING, FLAMES OR FLARES IN HAZARD AREA! KEEP UNNECESSARY PEOPLE AWAY; ISOLATE HAZARD AREA AND DENY ENTRY.

WATER SPILL:

THE CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986

DATE CREATED: 15 February 85

DATE REVISED: 24 March 93

MATERIAL SAFETY DATA SHEET

(PROPOSITION 65) PROHIBITS CONTAMINATING ANY KNOWN SOURCE OF DRINKING WATER WITH SUBSTANCES KNOWN TO CAUSE CANCER AND/OR REPRODUCTIVE TOXICITY.

7. HANDLING AND STORAGE

(REFERENCES TO CFR & NFPA ARE APPLICABLE TO U.S. OPERATIONS)

HANDLING:

PROVIDE LOCAL EXHAUST OR PROCESS ENCLOSURE VENTILATION TO MEET THE PUBLISHED EXPOSURE LIMITS. VENTILATION EQUIPMENT MUST BE EXPLOSION-PROOF.

STORAGE:

OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN STORING THIS SUBSTANCE.

STORE IN ACCORDANCE WITH 29 CFR 1910.106.

BONDING AND GROUNDING: SUBSTANCES WITH LOW ELECTROCONDUCTIVITY, WHICH MAY BE IGNITED BY ELECTROSTATIC SPARKS, SHOULD BE STORED IN CONTAINERS WHICH MEET THE BONDING AND GROUNDING GUIDELINES SPECIFIED IN NFPA 77-1983, RECOMMENDED PRACTICE ON STATIC ELECTRICITY.

THRESHOLD PLANNING QUANTITY (TPQ):

THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) SECTION 302 REQUIRES THAT EACH FACILITY WHERE ANY EXTREMELY HAZARDOUS SUBSTANCE IS PRESENT IN A QUANTITY EQUAL TO OR GREATER THAN THE TPQ ESTABLISHED FOR THAT SUBSTANCE NOTIFY THE STATE EMERGENCY RESPONSE COMMISSION FOR THE STATE IN WHICH IT IS LOCATED. SECTION 303 OF SARA REQUIRES THESE FACILITIES TO PARTICIPATE IN LOCAL EMERGENCY RESPONSE PLANNING (40 CFR 355.30).

PROTECT AGAINST PHYSICAL DAMAGE. OUTSIDE OR DETACHED STORAGE IS PREFERABLE, AWAY FROM OTHER FLAMMABLE MATERIALS AND OXIDIZING AGENTS. INSIDE STORAGE SHOULD BE IN A STANDARD FLAMMABLE LIQUIDS STORAGE ROOM OR CABINET. ETHYLENEIMINE VAPORS ARE NOT INHIBITED AND MAY FORM POLYMERS IN VENTS OR FLAME ARRESTERS, RESULTING IN STOPPAGE OF THE VENTS.

STORE AWAY FROM INCOMPATIBLE SUBSTANCES.

THRESHOLD QUANTITY (TQ): 1000 POUNDS

THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) PROCESS SAFETY MANAGEMENT (PSM) STANDARD REQUIRES THAT FACILITIES UTILIZING A PROCESS WHICH INVOLVES A CHEMICAL AT OR ABOVE ITS SPECIFIED THRESHOLD QUANTITY COMPLY WITH THE PROVISIONS OF 29 CFR 1910.119, PROCESS SAFETY MANAGEMENT OF HIGHLY HAZARDOUS CHEMICALS.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

(REFERENCES TO CFR & NFPA ARE APPLICABLE TO U.S. OPERATIONS)

EXPOSURE CONTROLS:**ETHYLENEIMINE:**

SmithKline Beecham(PEL/EG):

No Exposure Limit Established.

United Kingdom(HSE):

0.5 PPM (1 MG/M3) 8 HR TWA TB4

DATE CREATED: 15 February 85

DATE REVISED: 24 March 93

MATERIAL SAFETY DATA SHEET

United States (ACGIH):

0.5 ppm (1.0 mg/m³) ACGIH TWA (skin)0.5 ppm (1.0 mg/m³) ACGIH TWA (skin)

United States (OSHA):

OSHA Carcinogen

OSHA Carcinogen

OTHER:

AUSTRALIA: 0.5 PPM TWA, 1 MG/M³ - SKIN, SUSPECT CARCINOGEN.

BELGIUM: NO EXPOSURE LIMIT ESTABLISHED.

DENMARK: 0.5 PPM TWA, 1 MG/M³ TWA - SKIN.

FRANCE: NO EXPOSURE LIMIT ESTABLISHED.

GERMANY: NO EXPOSURE LIMIT ESTABLISHED - SUSPECT HUMAN CARCINOGEN.

INDUSTRIAL HYGIENE METHOD:

Bubbler; chloroform; high-pressure liquid chromatography
with ultraviolet detection; (NIOSH Vol. II(5) # 300).

PERSONAL PROTECTION:

ETHYLENEIMINE:

VENTILATION SHOULD MEET THE REQUIREMENTS IN 29 CFR 1910.1012(C) AND (D).

EYE PROTECTION:

EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES AND A
FACESHIELD TO PREVENT CONTACT WITH THIS SUBSTANCE.

EMERGENCY WASH FACILITIES:

WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES AND/OR SKIN MAY BE
EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHOULD PROVIDE AN EYE WASH FOUNTAIN
AND QUICK DRENCH SHOWER WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

CLOTHING:

EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE (IMPERVIOUS) CLOTHING AND EQUIPMENT
TO PREVENT ANY POSSIBILITY OF SKIN CONTACT WITH THIS SUBSTANCE.

ETHYLENEIMINE:

PROTECTIVE CLOTHING SHOULD MEET THE REQUIREMENTS IN 29 CFR 1910.1012(C).

GLOVES:

EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS
SUBSTANCE.

ETHYLEMEIMINE:

PROTECTIVE GLOVES SHOULD MEET THE REQUIREMENTS IN 29 CFR 1910.1012(C).

RESPIRATOR:

THE FOLLOWING RESPIRATORS ARE THE MINIMUM LEGAL REQUIREMENTS AS SET FORTH
BY THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION FOUND IN 29 CFR 1910,
SUBPART Z.EMPLOYEES ENGAGED IN HANDLING OPERATIONS INVOLVING THIS CHEMICAL SHALL BE
PROVIDED WITH AND REQUIRED TO WEAR AND USE A FULL-FACE SUPPLIED AIR
RESPIRATOR, OF THE CONTINUOUS FLOW OR PRESSURE DEMAND TYPE, IN ACCORDANCE WITH
29 CFR 1910.134.IN CLEAN UP OF LEAKS OR SPILLS, MAINTAINANCE OR REPAIR OPERATIONS ON
CONTAMINATED SYSTEMS OR REPAIR OPERATIONS OR ANY OPERATION INVOLVING WORK IN
AN AREA WHERE DIRECT CONTACT WITH THIS CHEMICAL COULD RESULT, THE EMPLOYEE

SHALL BE PROVIDED WITH AND REQUIRED TO WEAR A CONTINUOUS-AIR SUPPLIED HOOD IN ACCORDANCE WITH 29 CFR 1910.134.

THE FOLLOWING RESPIRATORS AND MAXIMUM USE CONCENTRATIONS ARE RECOMMENDATIONS BY THE U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, NIOSH POCKET GUIDE TO CHEMICAL HAZARDS; NIOSH CRITERIA DOCUMENTS OR BY THE U.S. DEPARTMENT OF LABOR, 29 CFR 1910 SUBPART Z.

THE SPECIFIC RESPIRATOR SELECTED MUST BE BASED ON CONTAMINATION LEVELS FOUND IN THE WORK PLACE, MUST NOT EXCEED THE WORKING LIMITS OF THE RESPIRATOR AND BE JOINTLY APPROVED BY THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH AND THE MINE SAFETY AND HEALTH ADMINISTRATION (NIOSH-MSHA).

ETHYLENEIMINE:

AT ANY DETECTABLE CONCENTRATION:

ANY SELF-CONTAINED BREATHING APPARATUS THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.
ANY SUPPLIED-AIR RESPIRATOR THAT HAS A FULL-FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE IN COMBINATION WITH AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

ESCAPE- ANY AIR-PURIFYING, FULL-FACEPIECE RESPIRATOR (GAS MASK) WITH A CHIN-STYLE, FRONT- OR BACK-MOUNTED ORGANIC VAPOR CANISTER.
ANY APPROPRIATE ESCAPE-TYPE, SELF-CONTAINED BREATHING APPARATUS.

FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITIONS:

ANY SELF-CONTAINED BREATHING APPARATUS THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

ANY SUPPLIED-AIR RESPIRATOR THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE IN COMBINATION WITH AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: COLORLESS, VOLATILE LIQUID WITH A PUNGENT, AMMONIACAL ODOR.
FLASH POINT: 12 F (-11 C) (CC)
AUTOIGNITION TEMP: 608 F (320 C)
LOWER EXPLOSIVE LIMIT: 3.3%
UPPER EXPLOSIVE LIMIT: 54.8%
BOILING POINT: 133-135 F (56-57 C)
MELTING POINT: -101 F (-74 C)
VAPOR PRESSURE: 160 MMHG @ 20 C
VAPOR DENSITY: 1.48
SPECIFIC GRAVITY: 0.8321
WATER SOLUBILITY: SOLUBLE
PH: ALKALINE IN SOLUTION
ODOR THRESHOLD: 2 PPM
SOLVENT SOLUBILITY: SOLUBLE IN ETHER, ALCOHOL, ALKALIES, MOST ORGANIC

DATE CREATED: 15 February 85

DATE REVISED: 24 March 93

MATERIAL SAFETY DATA SHEET

SOLVENTS.

10. STABILITY AND REACTIVITY

CONDITIONS TO AVOID:

MATERIAL IS EXTREMELY FLAMMABLE; AVOID CONTACT WITH HEAT, SPARKS OR OPEN FLAME. DO NOT OVERHEAT CONTAINERS; CONTAINERS MAY EXPLODE IN HEAT OF FIRE. MATERIAL IS POISONOUS; AVOID CONTACT WITH SKIN AND INHALATION OF VAPORS. AVOID CONTAMINATION OF WATER SOURCES.

REACTIVITY:

REACTS EXOTHERMICALLY WITH WATER FORMING A STRONG BASE.

INCOMPATIBILITIES:

ETHYLENEIMINE:

ACIDS: MAY CATALYZE VIOLENT POLYMERIZATION REACTION.

ALLYL CHLORIDE: TEMPERATURE AND PRESSURE INCREASE IN A CLOSED CONTAINER.

CARBON DISULFIDE: TEMPERATURE AND PRESSURE INCREASE IN A CLOSED CONTAINER.

CHLORINE: FORMS AN EXPLOSIVE COMPOUND.

EPICHLOROHYDRIN: TEMPERATURE AND PRESSURE INCREASE IN A CLOSED CONTAINER.

GLYOXAL: TEMPERATURE AND PRESSURE INCREASE IN A CLOSED CONTAINER.

OLEUM: TEMPERATURE AND PRESSURE INCREASE IN A CLOSED CONTAINER.

OXIDIZERS (STRONG): FIRE AND EXPLOSION HAZARD.

(BETA)-PROPIOLACTONE: TEMPERATURE AND PRESSURE INCREASE IN A CLOSED CONTAINER.

SODIUM HYPOCHLORITE: FORMS AN EXPLOSIVE COMPOUND.

SILVER AND ALLOYS: MAY FORM EXPLOSIVE COMPOUNDS.

VINYL ACETATE: TEMPERATURE AND PRESSURE INCREASE IN A CLOSED CONTAINER.

HAZARDOUS DECOMPOSITION:

THERMAL DECOMPOSITION PRODUCTS MAY INCLUDE TOXIC OXIDES OF CARBON AND NITROGEN.

POLYMERIZATION:

SELF-POLYMERIZES IF NOT INHIBITED WITH SOLID CAUSTIC ALKALI. MAY POLYMERIZE EXOTHERMICALLY WITH POSSIBLE VIOLENT RUPTURE OF CONTAINER AT ELEVATED TEMPERATURES. MAY POLYMERIZE VIOLENTLY IN PRESENCE OF ACIDS AND ACID-FORMING MATERIALS IF UNDILUTED. MAY POLYMERIZE WITH SILVER OR ALUMINUM. EXPLOSIVE POLYMERIZATION OF 33% ETHYLENEIMINE SOLUTION WITH 2-CHLOROETHYLAMINE IN THE PRESENCE OF STRONG SODIUM HYDROXIDE SOLUTION ABOVE 50 C.

11. TOXICOLOGY INFORMATION

ETHYLENEIMINE

CARCINOGEN STATUS:

SB: KNOWN OR PROBABLE HUMAN CARCINOGEN (1) US OSHA: 1 NTP: N IARC: N

ETHYLENEIMINE:

IRRITATION DATA: 10 MG/24 HOURS OPEN SKIN-RABBIT; 2 MG EYE-RABBIT SEVERE; 2 PPM/1 MINUTE EYE-MOUSE.

TOXICITY DATA: 100 MG/M3/2 HOURS INHALATION-RAT LC50; 400 MG/M3/2 HOURS INHALATION-MOUSE LC50; 25 PPM/8 HOURS INHALATION-GUINEA PIG LCLO; 14

DATE CREATED: 15 February 85

DATE REVISED: 24 March 93

MATERIAL SAFETY DATA SHEET

MG/KG SKIN-GUINEA PIG LD50; 15 MG/KG ORAL-RAT LD50; 3500 UG/KG INTRAPERITONEAL-RAT LD50; 4 MG/KG INTRAPERITONEAL-MOUSE LD50; 15 MG/KG UNREPORTED-MOUSE LD50; 100 MG/M3/2 HOURS INHALATION-RABBIT LC100 (85GMAT); MUTAGENIC DATA (RTECS); REPRODUCTIVE EFFECTS DATA (RTECS); TUMORIGENIC DATA (RTECS).

CARCINOGEN STATUS: OSHA CARCINOGEN; ANIMAL LIMITED EVIDENCE (IARC GROUP-3). ETHYLENEIMINE IS CARCINOGENIC IN 2 STRAINS OF MICE FOLLOWING ITS ORAL ADMINISTRATION, PRODUCING AN INCREASED INCIDENCE OF LIVER-CELL AND PULMONARY TUMORS. A SINGLE SUBCUTANEOUS INJECTION IN SUCKLING MALE MICE PRODUCED AN INCREASED INCIDENCE OF LUNG TUMORS. IN MALE RATS, IT PRODUCED AN INCREASED INCIDENCE OF TUMORS AT THE INJECTION SITE.

LOCAL EFFECTS: CORROSIVE- INHALATION, SKIN, EYES, INGESTION.

ACUTE TOXICITY LEVEL: HIGHLY TOXIC BY INHALATION, DERMAL ABSORPTION, INGESTION.

TARGET EFFECTS: SENSITIZER- DERMAL. POISONING MAY ALSO AFFECT THE KIDNEYS, BLOOD AND CENTRAL NERVOUS SYSTEM.

HEALTH EFFECTS

INHALATION:

ETHYLENEIMINE:

CORROSIVE/HIGHLY TOXIC.

ACUTE EXPOSURE- INHALATION OF VAPOR CONCENTRATIONS GREATER THAN 100 PPM MAY CAUSE IMMEDIATE OR DELAYED EFFECTS INCLUDING NAUSEA, VOMITING, ABDOMINAL CRAMPS, HEADACHE, DIZZINESS, PAIN IN THE VICINITY OF THE TEMPLES, DULLNESS, RESPIRATORY IRRITATION AND INFLAMMATION, LARYNGEAL EDEMA, BRONCHITIS, DYSPNEA, FEVER AND CONVULSIONS. COUGHING WHICH MAY PERSIST FOR WEEKS OR MONTHS MAY BE INDICATIVE OF LUNG INJURY WITH CONGESTION, EDEMA AND HEMORRHAGE. ULCERATION OF THE NASAL SEPTUM AND VOCAL CHORDS, EDEMA OF THE GLOTTIS AND SECONDARY BRONCHIAL PNEUMONIA MAY OCCUR. HEMATOLOGIC EFFECTS INCLUDING TRANSIENT POLYCYTHEMIA, LEUKOCYTOSIS, EOSINOPHILIA OR PANCYTOPENIA, LYMPHATIC EFFECTS AND LIVER AND KIDNEY DAMAGE WITH PROTEINURIA, HEMATURIA, AND INCREASED BUN HAVE BEEN REPORTED. HUMAN DEATHS HAVE OCCURRED. DEATH FROM MASSIVE OVEREXPOSURE MAY BE DUE TO EFFECTS ON THE CENTRAL NERVOUS SYSTEM.

ADDITIONAL EFFECTS REPORTED IN ANIMALS MAY INCLUDE HYPEREMIA, HEMORRHAGIC CONGESTION OF ALL INTERNAL ORGANS, MYOCARDIAL DEGENERATION, EXTRACAPILLARY GLOMERULONEPHRITIS AND NECROSIS OF KIDNEY TUBULAR EPITHELIUM. REPRODUCTIVE EFFECTS HAVE BEEN REPORTED IN ANIMALS.

CHRONIC EXPOSURE- INHALATION OF 0.01 MG/L, 4 HOURS DAILY FOR 1.5 MONTHS PRODUCED CATARRHAL BRONCHITIS, DIMINISHING OF LYMPHATIC ELEMENTS IN LYMPH GLANDS AND DEGENERATIVE CHANGES IN THE LIVER AND KIDNEYS IN RATS. REPEATED EXPOSURES TO 35 PPM CAUSED ILLNESS AND DEATH IN SEVERAL SPECIES. 19 MG/M3 FOR 1.5 MONTHS CAUSED TESTICULAR ATROPHY, DEFORMATION OF SPERMATOCYTES, AND DECREASED SPERM MOBILITY IN RATS. 10 MG/M3 FOR 20 DAYS RESULTED IN A SIGNIFICANT DEPRESSION IN BODY WEIGHT GAIN OF PREGNANT RATS AND A DECREASE IN THE RELATIVE NUMBER OF PREGNANT RATS AND FETUSES WITH HEMATOMAS.

SKIN CONTACT:

ETHYLENEIMINE:

CORROSIVE/SENSITIZER/HIGHLY TOXIC.

ACUTE EXPOSURE- CONTACT MAY CAUSE IMMEDIATE OR DELAYED SEVERE IRRITATION, INFLAMMATION, VESICULATION, SLOW HEALING LESIONS AND PAINLESS, BUT SEVERELY NECROTIZING BURNS. SKIN ABSORPTION MAY READILY OCCUR AND RESULT IN SYSTEMIC POISONING AS DETAILED IN ACUTE INHALATION. DEATH HAS BEEN

MATERIAL SAFETY DATA SHEET

REPORTED. SENSITIZATION DERMATITIS MAY OCCUR IN PREVIOUSLY EXPOSED INDIVIDUALS.

CHRONIC EXPOSURE- A SLOW HEALING DERMATITIS HAS BEEN REPORTED IN TWO WORKERS INVOLVED IN SMALL SCALE PRODUCTION. PROLONGED CONTACT HAS RESULTED IN A SLIGHT INCREASE IN THE SERUM TRANSAMINASES. EFFECTS DEPEND ON CONCENTRATION AND DURATION OF EXPOSURE. EFFECTS SIMILAR TO THOSE FOR ACUTE EXPOSURE MAY OCCUR. REPEATED OR PROLONGED CONTACT MAY LEAD TO SENSITIZATION DERMATITIS.

EYE CONTACT:

ETHYLENEIMINE:

CORROSIVE.

ACUTE EXPOSURE- VAPORS AT A CONCENTRATION EQUAL TO, OR GREATER THAN 100 PPM MAY CAUSE SEVERE IRRITATION, LACRIMATION, BLURRED VISION AND KERATOCONJUNCTIVITIS WITHIN 30 MINUTES TO 3 HOURS. CONTACT WITH THE LIQUID MAY RESULT IN SEVERE BURNS, CONJUNCTIVAL SCARRING AND POSSIBLY PERMANENT CORNEAL DAMAGE. APPLICATION OF 0.005 ML OF LIQUID ETHYLENIMINE, OR 0.5 ML OF A 1% AQUEOUS SOLUTION, TO RABBIT EYES CAUSED DESTRUCTION OF THE CORNEA AND DEATH OF THE ANIMAL. SYSTEMIC EFFECTS MAY POSSIBLY OCCUR FROM EYE CONTACT.

CHRONIC EXPOSURE- EFFECTS DEPEND ON CONCENTRATION AND DURATION OF EXPOSURE. REPEATED OR PROLONGED CONTACT MAY CAUSE CONJUNCTIVITIS OR EFFECTS AS IN ACUTE EXPOSURE.

INGESTION:

ETHYLENEIMINE:

CORROSIVE/CARCINOGEN/HIGHLY TOXIC.

ACUTE EXPOSURE- INGESTION MAY CAUSE A CORROSIVE ACTION WITH SORE THROAT, ESOPHAGEAL SCARRING, ABDOMINAL SPASMS, VOMITING AND DIARRHEA. SYSTEMIC POISONING MAY OCCUR AS DETAILED IN ACUTE INHALATION. A SINGLE DOSE OF 5-20 MG/KG, AS A 1% SOLUTION, ADMINISTERED TO CATS PRODUCED SELECTIVE ATROPHY OF THE CONES AND RODS IN THE OUTER GRANULAR LAYER OF THE RETINA. MYDRIASIS AND BLINDNESS BECAME EVIDENT IN 1-6 DAYS, WITH PROGRESSIVE NARROWING AND DISAPPEARANCE OF RETINAL VESSELS. DEATH HAS BEEN REPORTED FROM INGESTION.

CHRONIC EXPOSURE- REPEATED ADMINISTRATION PRODUCED AN INCREASED INCIDENCE OF LIVER-CELL AND PULMONARY TUMORS IN MICE. DEPENDING ON THE CONCENTRATION, REPEATED INGESTION MAY RESULT IN INFLAMMATORY AND ULCERATIVE EFFECTS ON THE ORAL MUCOUS MEMBRANES.

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL IMPACT RATING (0-4): NO DATA AVAILABLE

ACUTE AQUATIC TOXICITY: NO DATA AVAILABLE

DEGRADABILITY: NO DATA AVAILABLE

LOG BIOCONCENTRATION FACTOR (BCF): NO DATA AVAILABLE

LOG OCTANOL/WATER PARTITION COEFFICIENT: NO DATA AVAILABLE

13. DISPOSAL CONSIDERATIONS

DATE CREATED: 15 February 85

DATE REVISED: 24 March 93

MATERIAL SAFETY DATA SHEET

(REFERENCES TO CFR & NFPA ARE APPLICABLE TO U.S. OPERATIONS)
OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN DISPOSING OF THIS
SUBSTANCE.

DISPOSAL MUST BE IN ACCORDANCE WITH STANDARDS APPLICABLE TO
GENERATORS OF HAZARDOUS WASTE, 40CFR 262. EPA HAZARDOUS WASTE NUMBER P054.

US EPA RCRA HAZARDOUS WASTE NUMBER: RCRA P054

14. TRANSPORT INFORMATION

UN NUMBER:

UN 1185

FOR UNITED STATES GROUND TRANSPORT (DOT REQUIREMENTS):

DEPARTMENT OF TRANSPORTATION HAZARD CLASSIFICATION 49-CFR 172.101:
FLAMMABLE LIQUID

DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS 49-CFR 172.101 AND
SUBPART E:
FLAMMABLE LIQUID AND POISON

DEPARTMENT OF TRANSPORTATION PACKAGING REQUIREMENTS: 49-CFR 173.139
EXCEPTIONS: NONE

FINAL RULE ON HAZARDOUS MATERIALS REGULATIONS (HMR, 49 CFR PARTS 171-180),
DOCKET NUMBERS HM-181, HM-181A, HM-181B, HM-181C, HM-181D AND HM-204.
EFFECTIVE DATE OCTOBER 1, 1991. HOWEVER, COMPLIANCE WITH THE REGULATIONS IS
AUTHORIZED ON AND AFTER JANUARY 1, 1991. (55 FR 52402, 12/21/90)

EXCEPT FOR EXPLOSIVES, INHALATION HAZARDS, AND INFECTIOUS SUBSTANCES, THE
EFFECTIVE DATE FOR HAZARD COMMUNICATION REQUIREMENTS IS EXTENDED TO
OCTOBER 1, 1993. (56 FR 47158, 09/18/91)

U.S. DEPARTMENT OF TRANSPORTATION SHIPPING NAME-ID NUMBER, 49 CFR 172.101:
ETHYLENEIMINE-UN 1185

U.S. DEPARTMENT OF TRANSPORTATION HAZARD CLASS OR DIVISION, 49 CFR 172.101:
6.1 - POISONOUS MATERIALS

U.S. DEPARTMENT OF TRANSPORTATION PACKING GROUP, 49 CFR 172.101:
PG I

U.S. DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS, 49 CFR 172.101
AND SUBPART E:
POISON, FLAMMABLE LIQUID

U.S. DEPARTMENT OF TRANSPORTATION PACKAGING AUTHORIZATIONS:
EXCEPTIONS: NONE
NON-BULK PACKAGING: 49 CFR 173.226
BULK PACKAGING: 49 CFR 173.244

U.S. DEPARTMENT OF TRANSPORTATION QUANTITY LIMITATIONS 49 CFR 172.101:

DATE CREATED: 15 February 85

DATE REVISED: 24 March 93

MATERIAL SAFETY DATA SHEET

PASSENGER AIRCRAFT OR RAILCAR: FORBIDDEN
CARGO AIRCRAFT ONLY: FORBIDDEN

15. REGULATORY INFORMATION

FOR EC CLASSIFICATION, PACKAGING AND LABELLING REQUIREMENTS:

FIRE RISK CLASSIFICATION

HIGHLY FLAMMABLE

HEALTH RISK CLASSIFICATION

TOXIC

RISK PHRASES:

HIGHLY FLAMMABLE. (R11)

VERY TOXIC BY INHALATION, IN CONTACT WITH SKIN AND IF SWALLOWED. (R26/27/28)

POSSIBLE RISK OF IRREVERSIBLE EFFECTS. (R40)

SAFETY PHRASES: .

KEEP CONTAINER IN A WELL VENTILATED PLACE. (S9)

DO NOT EMPTY INTO DRAINS. (S29)

WEAR SUITABLE PROTECTIVE CLOTHING. (S36)

IN CASE OF ACCIDENT OR IF YOU FEEL UNWELL, SEEK MEDICAL ADVICE IMMEDIATELY (S45)

SYMBOL:

FLAME(F) & SKULL AND CROSS BONES(T)

FOR UNITED STATES EPA REQUIREMENTS:

TSCA STATUS: Y

CERCLA SECTION 103 (40CFR302.4):	Y	1 POUND RQ
SARA SECTION 302 (40CFR355.30):	Y	500 POUNDS TPQ
SARA SECTION 304 (40CFR355.40):	Y	1 POUND RQ
SARA SECTION 313 (40CFR372.65):	Y	
OSHA PROCESS SAFETY (29CFR1910.119):	Y	1000 POUNDS TQ
CALIFORNIA PROPOSITION 65:	Y	

SARA HAZARD CATEGORIES, SARA SECTIONS 311/312 (40 CFR 370.21)

ACUTE HAZARD: Y

CHRONIC HAZARD: Y

FIRE HAZARD: Y

REACTIVITY HAZARD: Y

SUDDEN RELEASE HAZARD: N

REPORTABLE QUANTITY (RQ): 1 POUND

THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) SECTION 304 REQUIRES THAT A RELEASE EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY FOR THIS SUBSTANCE BE IMMEDIATELY REPORTED TO THE LOCAL EMERGENCY PLANNING COMMITTEE AND THE STATE EMERGENCY RESPONSE COMMISSION (40 CFR 355.40). IF THE RELEASE OF THIS SUBSTANCE IS REPORTABLE UNDER CERCLA SECTION 103, THE NATIONAL RESPONSE CENTER MUST BE NOTIFIED IMMEDIATELY AT (800) 424-8802 OR (202) 426-2675 IN THE METROPOLITAN WASHINGTON, D.C. AREA (40 CFR 302.6).

ETHYLENEIMINE IS SUBJECT TO THE FOLLOWING US STATE REQUIREMENTS.

CA -HWCL HAZARDOUS WASTES

DATE CREATED: 15 February 85

DATE REVISED: 24 March 93

MATERIAL SAFETY DATA SHEET

CA -HWCL EXTREMELY HAZARDOUS WASTES
 CA -PROPOSITION 65 CARCINOGENS
 CA -ACUTELY HAZARDOUS MATERIALS (AB3777)
 CA -STATE SUPERFUND HAZARDOUS SUBSTANCES
 CA -DIRECTOR'S LIST OF HZRD SUBST (CAL-OSHA)
 CA -WORKPLACE AIRBORNE CONTAMINANTS (CAL-OSHA)
 CA -CALIFORNIA WORKPLACE CARCINOGENS
 FL -TOXIC SUBSTANCES IN THE WORKPLACE
 IL -ILL TOXIC SUBSTANCES DISCLOSURE TO EMPLOYEES LIST
 IL -ILLINOIS HAZARDOUS WASTES
 MI -CRITICAL MATERIALS REGISTER
 NJ -RIGHT-TO-KNOW "HAZARDOUS SUBSTANCES"
 NJ -TCPA "EXTRAORDINARILY HAZARDOUS SUBSTANCES"
 RQ=1.00 POUNDS
 OH -OHIO EMERGENCY RESPONSE LAW TOXIC CHEMICALS
 OH -OHIO HAZARDOUS WASTES
 PA -RIGHT-TO-KNOW LIST OF HAZARDOUS SUBSTANCES
 TX -TEXAS HAZARDOUS WASTES LIST
 TX -AIR CONTAMINANTS WITH HEALTH EFFECTS SCREENING LEV
 30 m(mcgm) = Ann(mcgm)30 = m(ppb) = Ann(ppb) =

16. OTHER INFORMATION

HAZARD LABEL:

**** HIGHLY FLAMMABLE ****
 **** TOXIC ****

** HIGHLY FLAMMABLE.
 ** VERY TOXIC BY INHALATION, IN CONTACT WITH SKIN AND IF SWALLOWED.
 ** POSSIBLE RISK OF IRREVERSIBLE EFFECTS.
 ** KEEP CONTAINER IN A WELL VENTILATED PLACE.
 ** DO NOT EMPTY INTO DRAINS.
 ** WEAR SUITABLE PROTECTIVE CLOTHING.
 ** IN CASE OF ACCIDENT OR IF YOU FEEL UNWELL, SEEK MEDICAL ADVICE IMMEDIATELY

** TARGET ORGAN-TO BE DETERMINED

REFERENCES:

OHS MSDS-OHS09590

OTHER INFORMATION:

CERCLA RATINGS (SCALE 0-3): HEALTH=3 FIRE=3 REACTIVITY=2
 PERSISTENCE=0
 NFPA RATINGS (SCALE 0-4): HEALTH=3 FIRE=3 REACTIVITY=2

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