**MERCAPTOETHANOL**
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**MATERIAL SAFETY DATA SHEET**

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**SUBSTANCE IDENTIFICATION**

**CAS NUMBER** 60-24-2

**SUBSTANCE:** MERCAPTOETHANOL

**TRADE NAMES/SYNONYM:**  
- MERCAPTOETHANOL
- MERCAPTOETHANOL 2-Mercaptoethanol
- 2-Mercaptoethanol
- MONOETHYLENEGLYCOL  
- 2-HYDROXYETHYL MERCAPTON  
- THIODIGLYCOL  
- THIODIOXETHANETHIOL
- MONOETHYLENEGLYCOL  2-HYDROXYETHANETHIOL
- 2-HYDROXYETHYL MERCAPTON
- 2-MERCAPTON
- 2-MERCAPTOETHANOL
- MERCAPTON
- THIODIOXYETHANETHIOL
- UN 2666, C28075, ACC19740

**CHEMICAL FAMILY:**  
THIOL (MERCAPTON)

**PHYSICAL DATA**

- **DESCRIPTION:** CLEAR, COLORLESS, MOBILE LIQUID WITH A STRONG, DISGUSTING ODOR.
- **BOILING POINT:** 315 F (157 C) @ 742 MMHG (DECOMPOSE)
- **MELTING POINT:** -148 F (-100 C) SPECIFIC GRAVITY: 1.114
- **VOLATILITY:** 100%@21 C
- **VAPOR PRESSURE:** 1 MMHG @ 20 C
- **EVAPORATION RATE:** NOT AVAILABLE
- **PH:** 5.2 (0.1 M SOLUTION)
- **SOLUBILITY IN WATER:** SOLUBLE
- **ODOR THRESHOLD:** 0.12-345 PPM
- **VAPOR DENSITY:** 2.89
- **SOLVENT SOLUBILITY:** SOLUBLE IN ETHANOL, ETHER, BENZENE, MOST ORGANIC SOLVENTS
- **VISCOSITY:** 3.43 CP @ 20 C
- **REFRACTIVE INDEX:** 1.4966 @ 20 C
- **SATURATED VAPOR CONC.:** 81000 PPM (8.2%) @ 20 C
- **ACIDITY:** PHA: 9.43-9.7

**FIRE AND EXPLOSION DATA**

- **FIRE AND EXPLOSION HAZARD:** MILD
- **MODERATE FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME.
- **VAPORS ARE HEAVIER THAN AIR AND MAY RISE ON A CONVECTION CURRENT TO A SOURCE OF IGNITION AND EXPLODE BACK.
- **VAPOR-AIR MIXTURES ARE EXPLOSIVE ABOVE FLASH POINT.**

**FLASH POINT:** 165 (74 C) (COC)
**UPPER EXPLOSIVE LIMIT:** 18%
**LOWER EXPLOSIVE LIMIT:** 2.3%
**AUTOIGNITION TEMP:** 563 F (290 C)

**FLAMMABILITY CLASS:** IIIA

**FIREFIGHTING MEDIA:**
- DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY 3R REGULAR FOAM
- (1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P5800.5)

**FOR LARGER FIRES:** USE WATER SPRAY, FOAM OR REGULAR FOAM
- (1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P5800.5)

**ALCOHOL FOAM**
- NFPA 305M, FIRE HAZARD PROPERTIES OF FLAMMABLE LIQUIDS, GASES, AND VOLATILE SOLID
- (1981)

**FIREFIGHTING:**
- MOVE CONTAINER FROM FIRE AREA IF YOU CAN DO IT WITHOUT RISK. COOL CONTAINER WITH WATER SPRAY UNTIL FIRE IS OUT. FIRE FIRE FIGHTER TO MAXIMUM DISTANCE TO AVOID CONTACT WITH FOG. SCATTER MATERIAL. (1980 EMERGENCY RESPONSE GUIDEBOOK, DOT P5800.5, GUIDE PAGE 57)
- EXTINGUISH ONLY IF FLOW CAN BE STOPPED. USE FLOODING AMOUNTS OF WATER AS A FOAM ANTITERROR STRATEGIES MAY BE INEFFECTIVE. COOL CONTAINERS WITH FLOODING AMOUNTS OF WATER FROM AS FAR AWAY AS POSSIBLE. AVOID BREATHING POISONOUS VAPORS, KEEP UPWIND.

**TRANSPORTATION DATA**

DEPARTMENT OF TRANSPORTATION HAZARD CLASSIFICATION 49 CFR 172.101:  
- POISON II

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

DEPARTMENT OF TRANSPORTATION PACKAGING REQUIREMENTS 49 CFR 172.345:  
- EXCEPTIONS: 49 CFR 172.345

FINAL RULE ON HAZARDOUS MATERIALS REGULATIONS (HMR, 49 CFR PARTS 171-180).  
- EFFECTIVE DATE: OCTOBER 1, 1991. HOWEVER, COMPLIANCE WITH THE REGULATIONS IS AUTHORIZED ON OR AFTER JANUARY 1, 1991

EXCEPT FOR EXPLOSIVES, INHALATION HAZARDS, AND INFECTIOUS SUBSTANCES. THE EFFECTIVE DATE FOR HAZARD COMMUNICATION REQUIREMENTS IS EXTENDED TO OCTOBER 1, 1993

U.S. DEPARTMENT OF TRANSPORTATION SHIPMENT NAME-ID NUMBER: 49 CFR 172.101:  
- THIODIOXYETHANETHIOL (UN 2666)

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 II

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

U.S. DEPARTMENT OF TRANSPORTATION PACKAGING AUTHORIZATIONS:  
- EXCEPTIONS: NONE
- NON-BULK PACKAGING: 49 CFR 172.202
- BULK PACKAGING: 49 CFR 172.443

U.S. DEPARTMENT OF TRANSPORTATION QUANTITY LIMITATIONS: 49 CFR 172.101:  
- PASSENGER AIRCRAFT OR RAILCARS: 5 L
- CARGO AIRCRAFT ONLY: 60 L

**SPECIAL PROTECTION TOXICITY**

MERCAPTOETHANOL  
- ORAL-MALE LD50: 200 MG/KG INTRAPERITONEAL-MICE LD50: 480 MG/KG UNREPORTED-MOUSE LD50: MUTAGENIC DATA (RTCS)

CARCINOGENICITY: NON
- LOCAL EFFECTS: IRRITANT- INHALATION, SKIN, EYE
- ACUTE TOXICITY LEVEL: HIGHLY TOXIC BY INHALATION, INGESTION
- TARGET EFFECTS: POISONING MAY AFFECT THE CENTRAL NERVOUS SYSTEM

**HEALTH EFFECTS AND FIRST AID**
INHALATION:
MERCAPTOETHANOL:
IRRITANT/TOXIC.
ACUTE EXPOSURE - EXPOSURE MAY CAUSE SUFFOCATION OF THE RESPIRATORY TRACT DEPENDING ON VAPOR CONCENTRATION. A LOW CONCENTRATION MAY CAUSE HEADACHE AND NOSE. A HIGH CONCENTRATION MAY CAUSE COUGHING, WHEEZING, SHORTNESS OF BREATH, AND EYES. MERCAPTOETHANOL MAY CAUSE EYES TO SMART OR WATER. NO ADDITIONAL INFORMATION AVAILABLE IN A STUDY INVOLVING RATS. THE MAXIMUM TIME FOR NO DEATHS TO OCCUR FROM INHALATION IS 6 MINS. MERCAPTOETHANOL SATURATES THE LUNGS TO THE DEGREE OF A ROSE. NO ADDITIONAL INFORMATION AVAILABLE ON THE THIO GROUP. MERCAPTOETHANOL MAY ALSO CAUSE SHAKINESS, DIZZINESS, MUSCLE WEAKNESS, TENDRONS, NARCOSIS, UNCONSCIOUSNESS, CYANOSIS, COLD EXTREMITIES, RAPID PULSE, DYSPEIA, FEVER. INHIBITORY DEPRESSION OF CENTRAL NERVOUS SYSTEM FUNCTION, CONCENTRATION, OR VISION. MERCAPTOETHANOL MAY CAUSE DELIRIUM, DELAYED PNEUMONIC EDema, AND NEURAL DAMAGE WITH HEMATOMA. ALBUMINURIA, AND CASTS IN URINE. DEAFNESS. NEUTROPHILIC ANEMIA AND MEGALOBLASTIC LEUKEMIA HAS ALSO BEEN REPORTED IN AN INDUSTRIAL ACCIDENT. A MAN EXPOSED TO UNDETERMINED QUANTITIES OF THIOs FOR AN ESTIMATED 2 HOURS WAS FOUND UNCONSCIOUS AND DEEPLY COMA. TWO YEARS LATER HE DEVELOPED A LUNG MALIGNANCY. EXPERIMENTAL ANIMALS HAVE COMMONLY SHOWN LATE PULMONARY INFECTION AND/OR PREMATURE DEATH.
CHRONIC EXPOSURE - CENTRAL NERVOUS SYSTEM STIMULATION HAS BEEN SHOWN IN ANIMALS.

FIRST AID:
REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY IF BREATHING HAS STOPPED. PERFORM ARTIFICIAL RESPIRATION. KEEP PERSON WARM AND AT REST. TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN CONTACT:
MERCAPTOETHANOL:
IRRITANT/HIGHLY TOXIC.
ACUTE EXPOSURE - MAY CAUSE REDNESS, PAIN, MODERATE ERYTHEMA OR EDema. CONCENTRATED VAPOr OR LIQUID CAN CAUSE SEvere IRRITATION AND CAN POSSIBLY BE PROGRESSIVE. OCCUPATIONAL EXPOSURE TO MERCAPTOETHANOL MAY CAUSE SYMPTOMS OF ACUTE INHALATION.
CHRONIC EXPOSURE - CAN CAUSE CONTACT DERMATITIS. MERCAPTOETHANOL HAS BEEN REPORTED TO CAUSE CENTRAL NERVOUS SYSTEM STIMULATION IN ANIMALS.

FIRST AID:
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 (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

EYE CONTACT:
MERCAPTOETHANOL:
IRRITANT.
ACUTE EXPOSURE - MAY CAUSE WATERING OF EYES, SNEEZING, REDNESS, AND PAIN. CONCENTRATED VAPOr OR LIQUID MAY CAUSE SEve IRRITATION AND CAN BE PROGRESSIVE. OCCUPATIONAL EXPOSURE TO MERCAPTOETHANOL MAY CAUSE SYMPTOMS OF ACUTE INHALATION. UNDIrTED MERCAPTOETHANOL AFFECTED THE CONJUNCTIVA AND CAUSED LONG-LASTING MODERATELY SEVERE CORNEAL OPACITY. CHRONIC EXPOSURE - REPEATED AND PROLONGED CONTACT WITH IRRITANTS MAY CAUSE CONJUNCTIVITIS.

FIRST AID:
WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER OR NORMAL SALINE, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:
MERCAPTOETHANOL:
TOXIC.
ACUTE EXPOSURE - MAY CAUSE IRRITATION OF THE GASTROINTESTINAL TRACT WITH SEVERE THROAT, LARYNGITIS, A BURNING SENSATION, COUGHING, WHEEZING, SHORTNESS OF BREATH, HEADACHE, ABDOMINAL PAIN, NAUSEA AND VOMITING. MASSIVE EXPOSURE MAY BE FATAL. DOSES OF LESS THAN 480 MG/KG IN MICE CAUSED SUFFOCATION AND DEEPENED RESPIRATION, RETARDER STIMULI RESPONSE, COMA, AND DEATH IN 1-3 DAYS. DOSES OF 480 MG/KG AND GREATER CAUSED INTERMITTENT TACHYCARDIA, ASTRAGAL CARDIAC COORDINATION, LONG DURATION CLINIC CORVULSIONS, SALIVATION, URINATION AND DEATH IN 1-2 HOURS. BASED ON GROUP INFORMATION CHOSEN, THIS SUBSTANCE MAY OCCUR ANXIOUS, DELIGHTED, ISOLATED OR POISON HAZARD INDICATOR, OR INSEWERS.
CHRONIC EXPOSURE - BASED ON ANIMAL DATA, MAY CAUSE CENTRAL NERVOUS SYSTEM STIMULATION.

FIRST AID:
IF EXTENSIVE VOMITING HAS NOT OCCURRED, THE SUBSTANCE SHOULD BE REMOVED BY EMESIS OR GAUGES. GASTRIC LAVAGE PROVIDED THAT THE PATIENT IS CONSCIOUS AND ASPIRATION IS NOT PRESENT. KEEP HEAD BELOW HIPS AND EXPANDING TO PREVENT ASPIRATION. DO NOT ATTEMPT TO MAKE AN UNCONSCIOUS PERSON VOMIT SYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY (DREISBACH HANDBOOK OF POISONING, 12TH ED.). TREATMENT SHOULD BE PERFORMED BY QUALIFIED MEDICAL PERSONNEL.

ANTIDOTE:
THE FOLLOWING ANTIDOTE HAS BEEN RECOMMENDED. HOWEVER, THE DECISION AS TO

ANY TYPE 'C' SUPPLIED-AIR RESPIRATOR WITH A FULL FACEMASK OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE OR WITH A FULL FACEPIECE, HELMET OR HOOD OPERATED IN CONTINUOUS-FLOW MODE.

ANY SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEMASK OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

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

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

ANY SUPPLIED-AIR RESPIRATOR THAT HAS A FULL FACEMASK 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.

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

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

EYE PROTECTION:
EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES AND A FACE SHIELD 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.

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