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THE POWER OF THREE³

PHARMCO-AAPER

AND COMMERCIAL ALCOHOLS

Product Information (203) 740-3471 / Emergency Assistance CHEMTREC 1-800-424-9300

MATERIAL SAFETY DATA SHEETS

Manufacturer: PHARMCO-AAPER
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TETRAETHYLENE GLYCOL

PRODUCT NAME: TETRAETHYLENE GLYCOL

I. IDENTIFICATION

PRODUCT NAME: TETRAETHYLENE GLYCOL
CHEMICAL NAME: TETRAETHYLENE GLYCOL
CHEMICAL FAMILY: ETHYLENE GLYCOL
FORMULA: HO (C₂H₄O)₄ H
MOLECULAR WEIGHT: 194.23
SYNONYMS: TTEG; TETRAGLYCOL; T4EG; TETRA
CAS # AND NAME:
112-60-7 ETHANOL, 2, 2' {OXYBIS (2,1-ETHANEDIYLOXY)} BIS-

II. PHYSICAL DATA (DETERMINED ON TYPICAL MATERIAL)

BOILING POINT, 760 MM HG: DECOMPOSES ABOVE 760 MMHG
BP EXTRAPOLATED TO BE
329.7'C - 625.5'F
SPECIFIC GRAVITY(H₂O = 1): 1.126 AT 20/20'C

FREEZING POINT: -4'C (25'F)
VAPOR PRESSURE AT 20'C: <0.01 MMHG
VAPOR DENSITY (AIR = 1): 6.7
EVAPORATION RATE:
(BUTYL ACETATE = 1): <0.01
SOLUBILITY IN WATER BY WT: 100% AT 20'C
APPEARANCE: TRANSPARENT COLORLESS
ODOR: MILD
PHYSICAL STATE: LIQUID
PERCENT VOLATILES (BY WEIGHT): 0.15

III. INGREDIENTS

%	MATERIAL	CAS#	EXPOSURE LIMIT
<100	TETRAETHYLENE GLYCOL	112-60-7	NONE ESTABLISHED
<3	TRIETHYLENE GLYCOL	112-27-6	NONE ESTABLISHED

IV. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (TEST METHOD(S)):
 380 F (193 C)
 CLEVELAND OPEN CUP ASTM D 92
 390 F (199 C)
 PENSKY-MARTENS CLOSED CUP ASTM D 93
 FLAMMABLE LIMITS IN AIR, BY VOLUME:
 LOWER: NOT DETERMINED
 UPPER: NOT DETERMINED
 EXTINGUISHING MEDIA:
 APPLY ALCOHOL-TYPE OR ALL-PURPOSE-TYPE FOAM BY MANUFACTURER'S RECOMMENDED TECHNIQUES FOR LARGE FIRES. USE CARBON DIOXIDE OR DRY CHEMICAL MEDIA FOR SMALL FIRES.
 SPECIAL FIRE FIGHTING PROCEDURES:
 DO NOT DIRECT A SOLID STREAM OF WATER OR FOAM INTO HOT, BURNING POOLS; THIS MAY CAUSE FROTHING AND INCREASE FIRE INTENSITY.
 USE SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING.
 UNUSUAL FIRE AND EXPLOSION HAZARDS:
 SEE "OTHER PRECAUTIONS" IN SECTION IX.

V. HEALTH HAZARD DATA

TLV AND SOURCE:
 NONE ESTABLISHED BY ACGIH OR OSHA.
 EFFECTS OF SINGLE OVEREXPOSURE:
 SWALLOWING: SLIGHTLY TOXIC. MAY CAUSE ABDOMINAL DISCOMFORT, NAUSEA, AND VOMITING.
 SKIN ABSORPTION:
 NO EVIDENCE OF HARMFUL EFFECTS FROM AVAILABLE INFORMATION.
 INHALATION:
 SHORT-TERM HARMFUL HEALTH EFFECTS ARE NOT EXPECTED FROM VAPOR GENERATED AT AMBIENT TEMPERATURE.
 SKIN CONTACT:
 BRIEF CONTACT IS NOT IRRITATING.
 PROLONGED CONTACT CAUSES MILD TO MODERATE LOCAL REDNESS AND SWELLING.
 EYE CONTACT:
 INJURY TO THE CORNEA IS NOT EXPECTED.
 EXCESS REDNESS AND SWELLING OF THE CONJUNCTIVA MAY OCCUR.
 EFFECTS OF REPEATED OVEREXPOSURE:
 NO ADVERSE EFFECTS ANTICIPATED FROM AVAILABLE INFORMATION.
 MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE:
 A KNOWLEDGE OF THE AVAILABLE TOXICOLOGY INFORMATION AND OF THE PHYSICAL AND CHEMICAL PROPERTIES OF THE MATERIAL SUGGESTS THAT OVEREXPOSURE IS UNLIKELY TO AGGRAVATE EXISTING MEDICAL CONDITIONS.
 SIGNIFICANT LABORATORY DATA WITH POSSIBLE RELEVANCE TO HUMAN HEALTH HAZARD EVALUATION:
 CONTAINS TETRAETHYLENE GLYCOL WHICH DID NOT PRODUCE ANY ACTIVITY CONSISTENT WITH MUTAGENIC EVENTS IN EITHER AN AMES TEST OR A FORWARD GENE MUTATION ASSAY IN CHINESE HAMSTER OVARY CELLS. AN APPARENT WEAK CLASTOGENIC EFFECT WAS SEEN IN VITRO AS AN INCREASED INCIDENCE OF CHROMOSOME ABERRATIONS IN CHINESE HAMSTER OVARY CELLS. A WEAK POSITIVE MICRONUCLEUS TEST WAS OBTAINED IN MALE, BUT NOT IN FEMALE, MICE. HOWEVER, HIGH DOSES OF TETRAETHYLENE GLYCOL (UP TO 5 G/KG GIVEN PERORALLY) DID NOT CAUSE ANY INCREASE IN THE INCIDENCE OF CHROMOSOMAL ABERRATIONS IN MALE OR FEMALE RATS. THE WEAK NATURE OF THE IN VITRO AND MICRONUCLEUS RESULTS, COUPLED WITH THE INABILITY OF TETRAETHYLENE GLYCOL TO INDUCE CHROMOSOMAL ABERRATIONS IN VIVO IN RAT BONE MARROW, SUGGESTS THAT IF TETRAETHYLENE GLYCOL POSSESSES A CLASTOGENIC POTENTIAL IT MUST BE OF A VERY LOW ORDER OF POTENCY IN THIS RESPECT.
 OTHER EFFECTS OF OVEREXPOSURE:
 NONE CURRENTLY KNOWN.
 EMERGENCY AND FIRST AID PROCEDURES:
 SWALLOWING:
 IF A LARGE QUANTITY (SEVERAL OUNCES) HAS BEEN SWALLOWED, AND IF PATIENT IS FULLY CONSCIOUS, GIVE TWO GLASSES OF WATER. INDUCE VOMITING. OBTAIN MEDICAL ATTENTION.

SKIN: WASH SKIN WITH SOAP AND WATER.

INHALATION:

NO EMERGENCY CARE ANTICIPATED.

EYES: IMMEDIATELY FLUSH EYES WITH WATER AND CONTINUE WASHING FOR SEVERAL MINUTES. REMOVE CONTACT LENSES, IF WORN. OBTAIN MEDICAL ATTENTION IF DISCOMFORT PERSISTS.

NOTES TO PHYSICIAN:

TOXICOLOGY STUDIES HAVE SHOWN THIS OR SIMILAR MATERIAL TO BE OF VERY LOW ACUTE TOXICITY. THERE IS NO SPECIFIC ANTIDOTE. TREATMENT OF OVEREXPOSURE SHOULD BE DIRECTED AT THE CONTROL OF SYMPTOMS AND THE CLINICAL CONDITION OF THE PATIENT.

VI. REACTIVITY DATA

STABILITY: STABLE

CONDITIONS TO AVOID: NONE KNOWN.

INCOMPATIBILITY (MATERIALS TO AVOID):

EXPLOSIVE DECOMPOSITION MAY OCCUR IF COMBINED WITH STRONG ACIDS OR STRONG BASES AND SUBJECTED TO ELEVATED TEMPERATURES. THEREFORE, AVOID STRONG ACIDS AND STRONG BASES AT ELEVATED TEMPERATURES. AVOID CONTAMINATION WITH STRONG OXIDIZING AGENTS AND MATERIALS REACTIVE WITH HYDROXYL COMPOUNDS.

HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS:

BURNING CAN PRODUCE THE FOLLOWING PRODUCTS: CARBON MONOXIDE AND/OR CARBON DIOXIDE.

CARBON MONOXIDE IS HIGHLY TOXIC IF INHALED; CARBON DIOXIDE IN SUFFICIENT CONCENTRATIONS CAN ACT AS AN ASPHYXIANT.

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: NONE KNOWN.

VII. SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:

SMALL SPILLS CAN BE FLUSHED WITH LARGE AMOUNTS OF WATER; LARGER SPILLS SHOULD BE COLLECTED FOR DISPOSAL.

WASTE DISPOSAL METHOD:

INCINERATE IN A FURNACE WHERE PERMITTED UNDER FEDERAL, STATE, AND LOCAL REGULATIONS.

SEE SECTION IX, "OTHER PRECAUTIONS."

VIII. SPECIAL PROTECTION

RESPIRATORY PROTECTION (SPECIFY TYPE):

NONE EXPECTED TO BE NEEDED.

VENTILATION:

GENERAL (MECHANICAL) ROOM VENTILATION IS EXPECTED TO BE SATISFACTORY.

PROTECTIVE GLOVES: PVC-COATED

EYE PROTECTION: SAFETY GLASSES OR MONOGOGGLES

OTHER PROTECTIVE EQUIPMENT: EYE BATH, SAFETY SHOWER

IX. SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:

NORMAL PRECAUTIONS SHOULD BE FOLLOWED IN HANDLING, STORAGE AND USE.

FOR INDUSTRY USE ONLY

OTHER PRECAUTIONS:

DISPOSAL - THIS PRODUCT IS RESISTANT TO RAPID BIODEGRADATION; THUS, INCINERATION IS THE PREFERRED METHOD OF DISPOSAL.

PRODUCT INFORMATION BULLETIN ON TETRAETHYLENE GLYCOL.

PROCESS HAZARD: SUDDEN RELEASE OF HOT ORGANIC CHEMICAL VAPORS OR MISTS FROM PROCESS EQUIPMENT OPERATING AT ELEVATED TEMPERATURE AND PRESSURE, OR SUDDEN INGRESS OF AIR INTO HOT EQUIPMENT UNDER A VACUUM, MAY RESULT IN IGNITIONS WITHOUT THE PRESENCE OF OBVIOUS IGNITION SOURCES. PUBLISHED "AUTOIGNITION" OR "IGNITION" TEMPERATURE VALUES CANNOT BE TREATED AS SAFE OPERATING TEMPERATURES IN CHEMICAL PROCESSES WITHOUT ANALYSIS OF THE ACTUAL PROCESS CONDITIONS.

ANY USE OF THIS PRODUCT IN ELEVATED-TEMPERATURE PROCESSES SHOULD BE THOROUGHLY EVALUATED TO ESTABLISH AND MAINTAIN SAFE OPERATING CONDITIONS. FURTHER INFORMATION IS AVAILABLE IN A TECHNICAL BULLETIN ENTITLED "IGNITION HAZARDS OF ORGANIC CHEMICAL VAPORS."

X. REGULATORY INFORMATION

STATUS ON SUBSTANCE LISTS:

THE CONCENTRATIONS SHOWN ARE MAXIMUM OR CEILING LEVELS (WEIGHT %) TO BE

USED FOR CALCULATIONS FOR REGULATIONS. TRADE SECRETS ARE INDICATED BY "TS".

FEDERAL EPA

COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION, AND LIABILITY ACT OF 1980 (CERCLA) REQUIRES NOTIFICATION OF THE NATIONAL RESPONSE CENTER OF RELEASE OF QUANTITIES OF HAZARDOUS SUBSTANCES EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITIES (RQS) IN 40 CFR 302.4.

COMPONENTS PRESENT IN THIS PRODUCT AT A LEVEL WHICH COULD REQUIRE REPORTING UNDER THE STATUTE ARE:

NONE

SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (SARA) TITLE III REQUIRES EMERGENCY PLANNING BASED ON THRESHOLD PLANNING QUANTITIES (TPQS) AND RELEASE REPORTING BASED ON REPORTABLE QUANTITIES (RQS) IN 40 CFR 355 (USED FOR SARA 302, 311 AND 312).

COMPONENTS PRESENT IN THIS PRODUCT AT A LEVEL WHICH COULD REQUIRE REPORTING UNDER THE STATUTE ARE:

NONE

SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (SARA) TITLE III REQUIRES SUBMISSION OF ANNUAL REPORTS OF RELEASE OF TOXIC CHEMICALS THAT APPEAR IN 40 CFR 372 (FOR SARA 313). THIS INFORMATION MUST BE INCLUDED IN ALL MSDSS THAT ARE COPIED AND DISTRIBUTED FOR THIS MATERIAL.

COMPONENTS PRESENT IN THIS PRODUCT AT A LEVEL WHICH COULD REQUIRE REPORTING UNDER THE STATUTE ARE:

THIS PRODUCT DOES NOT CONTAIN TOXIC CHEMICALS AT LEVELS WHICH REQUIRE REPORTING UNDER THE STATUTE.

TSCA INVENTORY STATUS:

THE INGREDIENTS OF THIS PRODUCT ARE ON THE TSCA INVENTORY.

STATE RIGHT-TO-KNOW

CALIFORNIA PROPOSITION 65

THIS PRODUCT CONTAINS NO LISTED SUBSTANCES KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER, BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM, AT LEVELS WHICH WOULD REQUIRE A WARNING UNDER THE STATUTE.

MASSACHUSETTS 105 CMR 670.000 RIGHT-TO-KNOW, SUBSTANCE LIST (MSL)

HAZARDOUS SUBSTANCES AND EXTRAORDINARILY HAZARDOUS SUBSTANCES ON THE MSL MUST BE IDENTIFIED WHEN PRESENT IN PRODUCTS.

COMPONENTS PRESENT IN THIS PRODUCT AT A LEVEL WHICH COULD REQUIRE REPORTING UNDER THE STATUTE ARE:

NONE

PENNSYLVANIA RIGHT-TO-KNOW, HAZARDOUS SUBSTANCE LIST

HAZARDOUS SUBSTANCES AND SPECIAL HAZARDOUS SUBSTANCES ON THE LIST MUST BE IDENTIFIED WHEN PRESENT IN PRODUCTS.

COMPONENTS PRESENT IN THIS PRODUCT AT A LEVEL WHICH COULD REQUIRE REPORTING UNDER THE STATUTE ARE:

HAZARDOUS SUBSTANCES (=> 1%)

UPPER BOUND

CHEMICAL CAS NUMBER CONCENTRATION %

TRIETHYLENE GLYCOL 112-27-6 3.0

CALIFORNIA SCAQMD RULE 443.1 VOC'S:

VAPOR PRESSURE <0.01 MMHG AT 20'C

VOC 6 G/L

VOC 6 G/L LESS WATER AND LESS EXEMPTED SOLVENTS

OTHER REGULATORY INFORMATION:

EPA HAZARD CATEGORIES: NONE

REVISED SECTIONS

REVISIONS IN THIS MSDS HAVE OCCURRED IN THE FOLLOWING SECTIONS:

SECTION V - HEALTH HAZARD DATA

SECTION VI - REACTIVITY DATA

SECTION IX - SPECIAL PRECAUTIONS

SECTION X - REGULATORY INFORMATION

The information contained herein is based on data considered to be accurate based on the material as packaged. However, no warranty is expressed regarding the accuracy of these data or the results to be obtained from the use thereof. If this product is combined with other materials, deteriorates, or becomes contaminated, it may pose hazards not mentioned in this MSDS. It is the user's obligation to determine the conditions of safe use of the product. While this MSDS is based on technical data judged to be reliable, PHARMCO-AAPER assumes not responsibility for the completeness or accuracy of the information contained herein.