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MATERIAL SAFETY DATA SHEET

TRIS(1,3-DICHLORO-2-PROPYL)PHOSPHATE

-IDENTIFIERS

*CATALOG ID NUMBER: 001035

*CAS NUMBER: 13674-87-8

*BASE CHEMICAL NAME: DICHLOROPROPYLPHOSPHATE,TRIS,1,3-,2-

*PRIMARY NAME: TRIS(1,3-DICHLORO-2-PROPYL)PHOSPHATE

*CHEMICAL FORMULA: C9H15Cl6O4P

*STRUCTURAL FORMULA: O=P(OCH(CH2Cl)2)3

*WLN: G1Y1GOPO&OY1G1GOY1G1G

*SYNONYMS:
- FYROL FR 2
- 1,3-DICHLORO-2-PROPANOL PHOSPHATE (3:1)
- TRIS(2-CHLORO-1-(CHLOROMETHYL)ETHYL)PHOSPHATE
- TRIS(1-CHLOROMETHYL-2-CHOROETHYL)PHOSPHATE
- TRIS(1,3-DICHLOROISOPROPYL)PHOSPHATE
- TRI(BETA,BETA'-DICHLOROISOPROPYL)PHOSPHATE
- TCPP
- EMULSION 212
- TDCPP
- PHOSPHORIC ACID TRIS(1,3-DICHLORO-2-PROPYL)ESTER
- PF 38

-PHYSICAL CHEMICAL DATA

*PHYSICAL DESCRIPTION: LITERATURE: Clear, viscous liquid
REPOSITORY: Clear, colorless, viscous liquid

*MOLECULAR WEIGHT: 430.91

*SPECIFIC GRAVITY: Not available

*DENSITY: 1.508 g/cm3 @ 22.2 C (RAD)

*MP (DEG C): Not available

*BP (DEG C): 236-237 C @ 5 mm Hg [031,043]

*SOLUBILITIES:
WATER : <1 mg/mL @ 24 C (RAD)

DMSO : 50-100 mg/mL @ 21 C (RAD)

95% ETHANOL : >=100 mg/mL @ 21 C (RAD)

METHANOL : Not available

ACETONE : >=100 mg/mL @ 21 C (RAD)

TOLUENE : Not available

OTHER SOLVENTS:
Alcohols: Soluble [058]
Ketones: Soluble [058]
Chlorinated hydrocarbons: Soluble [058]
Aliphatic hydrocarbons: Insoluble [058]

*VOLATILITY:
Vapor pressure: 10.3 mm Hg @ 25 C [600]
Vapor density : Not available

*FLAMMABILITY(FLASH POINT):
This chemical has a flash point of 252 C (485 F) [058]. It is combustible. Fires involving this material can be controlled with a dry chemical, carbon dioxide or Halon extinguisher. A water spray may also be used. The autoignition temperature of this compound is 513 C (955 F) [058].

*UEL: Not available LEL: Not available

*REACTIVITY:
This chemical hydrolyzes slowly when refluxed with an aqueous acid. Under alkaline conditions, it exhibits a slow cleavage. It has plasticizing properties and, as such, may soften or deteriorate certain plastics and elastomers (particularly vinyl-based resin, neoprene and natural rubbers) [058].

*STABILITY:
This chemical is stable at ambient temperature and pressure. Acidity may change at temperatures >54 C [058]. Solutions of this chemical in water, DMSO, 95% ethanol or acetone should be stable for 24 hours under normal lab conditions (RAD).

*OTHER PHYSICAL DATA:
  Density: 1.52 g/mL @ 25 C [058]
  Freezing point: 27 C [058]
  Boiling point: 200 C @ 4 mm Hg [058]
  Refractive index: 1.5022 @ 20 C [031,043]
  Viscosity: 22000 centipoise @ 0 C; 1800 centipoise @ 25 C [058]
  Viscosity: 540 centipoise @ 40 C [058]
  Generally exists as a super-cooled liquid at room temperature (it can,
   however, occasionally solidify when exposed to low temperatures for
   prolonged periods) [058]

-TOXICITY
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*NIOSH REGISTRY NUMBER: UB1473000

*TOXICITY: **(abbreviations)**

typ. dose	mode	specie	amount	units	other	
LD50	orl	rat	1850	mg/kg		
LD50	orl	mus	7500	mg/kg		[058]
LD50	orl	rbt	6800	mg/kg		[058]
LD50	skn	rbt	>23900	mg/kg		[058]

*AQTX/TLM96: Not available

*SAX TOXICITY EVALUATION:
  THR: Moderately toxic by ingestion. Experimental reproductive effects.
       Mutagenic data.

*CARCINOGENICITY:
  Tumorigenic Data:
    TDLo: orl-rat 58400 mg/kg/2Y-C
    TDLo: orl-rat   20 mg/kg/2Y-C [058]

*MUTATION DATA:

test	lowest dose	test	lowest dose
mma-sat	100 ug/plate	mmo-sat	100 umol/plate
otr-ham:emb	20 umol/L		

*TERATOGENICITY:
  Reproductive Effects Data:
    TDLo: orl-rat 3600 mg/kg (7-15D preg)

*STANDARDS, REGULATIONS & RECOMMENDATIONS:
  OSHA: None
  ACGIH: None
  NIOSH Criteria Document: None
  NFPA Hazard Rating: Health (H): None
                      Flammability (F): None
                      Reactivity (R): None

*OTHER TOXICITY DATA:
  Review: Toxicology Review
  Status: EPA Genetox Program 1988, Inconclusive: Histidine reversion-Ames test
          EPA TSCA Chemical Inventory, 1986
          EPA TSCA Section 8(e) Status Report 8EHQ-1280-0401 S
          EPA TSCA Test Submission (TSCATS) Data Base, January 1989
          Meets criteria for proposed OSHA Medical Records Rule

-OTHER DATA (Regulatory)
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*PROPER SHIPPING NAME (IATA): Not restricted

*UN/ID NUMBER:

*HAZARD CLASS: SUBSIDIARY RISK: PACKING GROUP:

*LABELS REQUIRED:

*PACKAGING: PASSENGER: PKG. INSTR.: MAXIMUM QUANTITY:
            CARGO   : PKG. INSTR.: MAXIMUM QUANTITY:

*SPECIAL PROVISIONS:

*USES:
      This compound is a flame retardant formerly used in children's
 sleepwear.

*COMMENTS: Not available

-HANDLING PROCEDURES
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*ACUTE/CHRONIC HAZARDS:
      This compound may cause irritation of the skin and respiratory tract
 [058]. When heated to decomposition it emits toxic fumes of chlorine,
 phosphorus oxides and hydrogen chloride gas [043,058]. This compound is
 a CHOLINESTERASE INHIBITOR.

*MINIMUM PROTECTIVE CLOTHING:
      If Tyvek-type disposable protective clothing is not worn during
 handling of this chemical, wear disposable Tyvek-type sleeves taped to
 your gloves.

*RECOMMENDED GLOVE MATERIALS:
 GlovES+ Expert System Glove Types For The Neat (Undiluted) Chemical:
      This chemical has not been tested for permeation by Radian Corporation;
 however, the GlovES+ expert system was used to extrapolate permeation test
 information from compounds in the same chemical class. The GlovES+ system uses
 permeation data from literature sources; therefore, extra safety margins should
 be used with the estimated protection time(s). If this chemical makes direct
 contact with your glove, or if a tear, puncture or hole develops, replace them

at once.

The GlovES+ expert system is a tool that can help people better manage protection from chemicals, however this tool cannot replace sound judgment nor make technical decisions. Our GlovES+ expert system is designed to offer initial advice and assistance in glove selection while the final glove selection should be made by knowledgeable individuals based on the specific circumstances involved.

Glove Type	Model Number	Thickness	Estimated Protection Time
Neoprene	Edmont 29-865	0.51 mm	240 min
Nitrile	Edmont 37-175	0.46 mm	240 min
PE/EVAL/PE	Safety 4 4H	0.07 mm	240 min
Butyl rubber	North B-174	0.68 mm	240 min

*RECOMMENDED RESPIRATOR:
Where the neat test chemical is weighed and diluted, wear a NIOSH-approved half face respirator equipped with an organic vapor/acid gas cartridge (specific for organic vapors, HCl, acid gas and SO2) with a dust/mist filter.

*OTHER: Not available

*STORAGE PRECAUTIONS:
You should store this material under ambient temperatures.

*SPILLS AND LEAKAGE:
If you spill this chemical, FIRST REMOVE ALL SOURCES OF IGNITION. Then, use absorbent paper to pick up all liquid spill material. Your contaminated clothing and absorbent paper should be sealed in a vapor-tight plastic bag for eventual disposal. Solvent wash all contaminated surfaces with 60-70% ethanol followed by washing with a soap and water solution. Do not reenter the contaminated area until the Safety Officer (or other responsible person) has verified that the area has been properly cleaned.

*DISPOSAL AND WASTE TREATMENT: Not available

-EMERGENCY PROCEDURES

*SKIN CONTACT:
IMMEDIATELY flood affected skin with water while removing and isolating all contaminated clothing. Gently wash all affected skin areas thoroughly with soap and water.
IMMEDIATELY call a hospital or poison control center even if no symptoms (such as redness or irritation) develop.
IMMEDIATELY transport the victim to a hospital for treatment after washing the affected areas.

*INHALATION:

IMMEDIATELY leave the contaminated area; take deep breaths of fresh air. IMMEDIATELY call a physician and be prepared to transport the victim to a hospital even if no symptoms (such as wheezing, coughing, shortness of breath, or burning in the mouth, throat, or chest) develop.

Provide proper respiratory protection to rescuers entering an unknown atmosphere. Whenever possible, Self-Contained Breathing Apparatus (SCBA) should be used; if not available, use a level of protection greater than or equal to that advised under Respirator Recommendation.

*EYE CONTACT:

First check the victim for contact lenses and remove if present. Flush victim's eyes with water or normal saline solution for 20 to 30 minutes while simultaneously calling a hospital or poison control center.

Do not put any ointments, oils, or medication in the victim's eyes without specific instructions from a physician.

IMMEDIATELY transport the victim after flushing eyes to a hospital even if no symptoms (such as redness or irritation) develop.

*INGESTION:

DO NOT INDUCE VOMITING. If the victim is conscious and not convulsing, administer a slurry of activated charcoal in water and simultaneously call a hospital or poison control center. IMMEDIATELY transport the victim to a hospital.

If the victim is convulsing or unconscious, do not give anything by mouth, ensure that the victim's airway is open and lay the victim on his/her side with the head lower than the body. DO NOT INDUCE VOMITING. IMMEDIATELY transport the victim to a hospital.

*SYMPTOMS:

Symptoms of exposure to this compound may include irritation of the skin and respiratory tract, breathing difficulty and pulmonary edema [058].

Symptoms of exposure to experimental animals include decreased physical activity, ataxia, increased irritability, tetany, head nodding, prostration, labored respiration, teeth grinding, salivation, diarrhea, pupillary constriction and death [058].