

***1-PROPANOL**

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MATERIAL SAFETY DATA SHEET

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SUBSTANCE IDENTIFICATION

CAS-NUMBER 71-23-8

SUBSTANCE: ***1-PROPANOL**

TRADE NAMES/SYNONYMS:

N-PROPYL ALCOHOL; ETHYL CARBINOL; PROPYL ALCOHOL; PROPANOL; N-PROPANOL;
1-HYDROXYPROPANE; OPTAL; OSMOSOL EXTRA; PROPANOL-1; PROPYLIC ALCOHOL;
1-PROPYL ALCOHOL; STCC 4909267; UN 1274; A-414; A-414-S;

CHEMICAL FAMILY:
HYDROXYL, ALIPHATIC

MOLECULAR FORMULA: C3-H8-O

MOLECULAR WEIGHT: 60.11

CERCLA RATINGS (SCALE 0-3): HEALTH=2 FIRE=3 REACTIVITY=0 PERSISTENCE=0
NFPA RATINGS (SCALE 0-4): HEALTH=1 FIRE=3 REACTIVITY=0

COMPONENTS AND CONTAMINANTS

COMPONENT: 1-PROPANOL

PERCENT: 100

OTHER CONTAMINANTS: NONE

EXPOSURE LIMITS:

N-PROPYL ALCOHOL:
200 PPM (500 MG/M3) OSHA TWA; 250 PPM (625 MG/M3) OSHA STEL
200 PPM (500 MG/M3) ACGIH TWA (SKIN); 250 PPM (625 MG/M3) ACGIH STEL

PHYSICAL DATA

DESCRIPTION: COLORLESS, LIQUID, WITH A MILD ALCOHOLIC-LIKE AND SLIGHTLY
STUPEFYING ODOR. BOILING POINT: 207 F (97 C)

MELTING POINT: -195 F (-126 C) SPECIFIC GRAVITY: 0.8053 @ 20 C

VAPOR PRESSURE: 15 MMHG @ 20 C EVAPORATION RATE: (BUTYL ACETATE=1) 1.3

SOLUBILITY IN WATER: SOLUBLE ODOR THRESHOLD: 30 PPM VAPOR DENSITY: 2.1

SOLVENT SOLUBILITY: SOLUBLE IN ETHANOL, ETHYL ETHER, ACETONE, BENZENE

VISCOSITY: 2.256 CP AT 20 C

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
DANGEROUS FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME.

MODERATE EXPLOSION 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 ABOVE FLASH POINT.

FLASH POINT: 74 F (23 C) (CC) UPPER EXPLOSIVE LIMIT: 13.7%

LOWER EXPLOSIVE LIMIT: 2.2% AUTOIGNITION TEMP.: 775 F (412 C)

FLAMMABILITY CLASS(OSHA): IB

FIREFIGHTING MEDIA:

DRY CHEMICAL, CARBON DIOXIDE, HALON, WATER SPRAY OR ALCOHOL FOAM
(1987 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.4).

FOR LARGER FIRES, USE WATER SPRAY, FOG OR ALCOHOL FOAM
(1987 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.4).

FIREFIGHTING:

MOVE CONTAINER FROM FIRE AREA IF POSSIBLE. COOL FIRE-EXPOSED CONTAINERS WITH

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WATER FROM SIDE UNTIL WELL AFTER FIRE IS OUT. STAY AWAY FROM STORAGE TANK ENDS. FOR MASSIVE FIRE IN STORAGE AREA, USE UNMANNED HOSE HOLDER OR MONITOR NOZZLES, ELSE WITHDRAW FROM AREA AND LET FIRE BURN. WITHDRAW IMMEDIATELY IN CASE OF RISING SOUND FROM VENTING SAFETY DEVICE OR ANY DISCOLORATION OF STORAGE TANK DUE TO FIRE (1987 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800, 4, GUIDE PAGE 26).

EXTINGUISH ONLY IF FLOW CAN BE STOPPED; USE FLOODING AMOUNTS OF WATER AS A FOG, SOLID STREAMS MAY BE INEFFECTIVE. COOL CONTAINERS WITH FLOODING AMOUNTS OF WATER, APPLY FROM AS FAR A DISTANCE AS POSSIBLE. AVOID BREATHING VAPORS, KEEP UPWIND.

WATER MAY BE INEFFECTIVE (NFFA FIRE PROTECTION GUIDE ON HAZARDOUS MATERIALS, EIGHTH EDITION).

ALCOHOL FOAM (NFFA FIRE PROTECTION GUIDE ON HAZARDOUS MATERIAL, EIGHTH EDITION).

TRANSPORTATION DATA

DEPARTMENT OF TRANSPORTATION HAZARD CLASSIFICATION 49CFR172.101;
FLAMMABLE LIQUID

DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS 49CFR172.101 AND 172.402;
FLAMMABLE LIQUID

DEPARTMENT OF TRANSPORTATION PACKAGING REQUIREMENTS: 49CFR173.125
EXCEPTIONS: 49CFR173.118

TOXICITY

N-PROPYL ALCOHOL (1-PROPANOL):
IRRITATION DATA: 500 MG OPEN SKIN-RABBIT MILD; 20 MG/24 HOURS
SKIN-RABBIT MODERATE; 4 MG OPEN EYE-RABBIT SEVERE; 20 MG/24 HOURS
EYE-RABBIT MODERATE.
TOXICITY DATA: 48 GM/M3 INHALATION-MOUSE LC50; 5040 MG/KG SKIN-RABBIT LD50;
5700 MG/KG ORAL-WOMAN LDLO; 1870 MG/KG ORAL-RAT LD50; 6800 MG/KG
ORAL-MOUSE LD50; 3500 MG/KG ORAL-RABBIT LDLO; 3 GM/KG
SUBCUTANEOUS-RABBIT LDLO; 3230 MG/KG SUBCUTANEOUS-MOUSE LD50; 5 MG/KG
SUBCUTANEOUS-MAMMAL LDLO; 590 MG/KG INTRAVENOUS-RAT LD50; 697 MG/KG
INTRAVENOUS-MOUSE LD50; 483 MG/KG INTRAVENOUS-RABBIT LD50; 4008 MG/KG
INTRAVENOUS-CAT LDLO; 2164 MG/KG INTRAPERITONEAL-RAT LD50; 3125 MG/KG
INTRAPERITONEAL-MOUSE LD50; 515 MG/KG INTRAPERITONEAL-RABBIT LD50;
1208 MG/KG INTRAPERITONEAL-GUINEA PIG LD50; 2338 MG/KG
INTRAPERITONEAL-HAMSTER LD50; 4500 MG/KG UNREPORTED-RABBIT LDLO; MUTAGENIC
DATA (RTECS); REPRODUCTIVE EFFECTS DATA (RTECS); TUMORIGENIC DATA (RTECS).
CARCINOGEN STATUS: NONE.
LOCAL EFFECTS: IRRITANT- INHALATION, SKIN, EYE.
ACUTE TOXICITY LEVEL: MODERATELY TOXIC BY INHALATION, INGESTION; SLIGHTLY
TOXIC BY DERMAL ABSORPTION.
TARGET EFFECTS: CENTRAL NERVOUS SYSTEM DEPRESSANT.
AT INCREASED RISK FROM EXPOSURE: PERSONS WITH PRE-EXISTING SKIN DISORDERS,
IMPAIRED LIVER, RENAL AND/OR PULMONARY FUNCTION.
ADDITIONAL INFORMATION: USE OF ALCOHOLIC BEVERAGES MAY ENHANCE TOXIC EFFECTS.

HEALTH EFFECTS AND FIRST AID

INHALATION:
N-PROPYL ALCOHOL (1-PROPANOL):
IRRITANT/NARCOTIC. 4000 PPM IMMEDIATELY DANGEROUS TO LIFE OR HEALTH.
ACUTE EXPOSURE- INHALATION OF VAPORS MAY CAUSE MODERATE IRRITATION OF THE UPPER RESPIRATORY TRACT WITH COUGHING AND SHORTNESS OF BREATH. EXPOSURE TO HIGH CONCENTRATIONS MAY CAUSE MILD CENTRAL NERVOUS SYSTEM DEPRESSION WITH DIZZINESS, DROWSINESS, ATAXIA, INCOORDINATION, HEADACHE, STUPOR AND PERSISTENT NAUSEA AND VOMITING. AREFLEXIA, HEMATEMESIS, OLIGURIA FOLLOWED BY DIURESIS, LIVER DAMAGE, DEPRESSED RESPIRATION, PROSTRATION AND UNCONSCIOUSNESS MAY OCCUR. DEATH MAY OCCUR DUE TO RESPIRATORY FAILURE. MICE EXPOSED TO VAPOR AT 3250 PPM FOR 90-120 MINUTES DEVELOPED ATAXIA; DEEP NARCOSIS OCCURRED AFTER 240 MINUTES AT 4100 PPM AND AFTER 60 MINUTES AT 24,500 PPM. EXPOSURE OF RATS FOR 2 HOURS TO SATURATED VAPOR PRODUCED NO DEATHS. HOWEVER, A 4 HOUR EXPOSURE AT 4000 PPM WAS LETHAL TO 2 OUT OF 6 ANIMALS TESTED.
CHRONIC EXPOSURE- REPRODUCTIVE EFFECTS HAVE BEEN REPORTED IN RATS.

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:
N-PROPYL ALCOHOL (1-PROPANOL):
IRRITANT.
ACUTE EXPOSURE- CONTACT MAY CAUSE IRRITATION WITH REDNESS.
CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE MAY CAUSE DEFATTING OF THE SKIN RESULTING IN DRYING, CRACKING, DERMATITIS AND POSSIBLY CORROSION. THERE IS A POSSIBILITY THAT PERSONS SENSITIVE TO ISOPROPYL ALCOHOL MAY HAVE A CROSS-REACTION WITH N-PROPYL ALCOHOL. SYSTEMIC POISONING MAY OCCUR DUE TO SKIN ABSORPTION. APPLICATION OF 38 ML/KG PER DAY TO RABBIT SKIN FOR 30 DAYS OVER A PERIOD OF 6 WEEKS RESULTED IN DEATH OF ONE THIRD OF THE TEST 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

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ATTENTION IMMEDIATELY.

EYE CONTACT:
N-PROPYL ALCOHOL (1-PROPANOL):
IRRITANT.

ACUTE EXPOSURE- VAPORS MAY CAUSE TRANSIENT EYE IRRITATION WITH REDNESS AND PAIN. INSTILLATION OF 0.1 ML OF 1-PROPYL ALCOHOL INTO THE CONJUNCTIVAL SAC OF RABBITS PRODUCED MARKED TO SEVERE CONJUNCTIVITIS, IRITIS, CORNEAL OPACITIES AND ULCERATIONS. DELAYED EFFECTS OF PANNUS FORMATION AND KERATACONUS ALSO OCCURRED.

CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE 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:
N-PROPYL ALCOHOL (1-PROPANOL):
NARCOTIC.

ACUTE EXPOSURE- INGESTION MAY CAUSE GASTROINTESTINAL PAIN, PERSISTENT NAUSEA AND VOMITING, HEMATEMESIS, CRAMPS, DIARRHEA AND DECREASED BLOOD PRESSURE. CENTRAL NERVOUS SYSTEM DEPRESSION MAY OCCUR WITH DROWSINESS, STUPOR, INCOORDINATION, ATAXIA, HEADACHE, DIZZINESS, AREFLEXIA, DEPRESSED RESPIRATION, PROSTRATION AND UNCONSCIOUSNESS. OLIGURIA FOLLOWED BY DIURESIS AND LIVER DAMAGE MAY ALSO OCCUR. ASPIRATION PNEUMONIA IS ALSO A RISK. A HUMAN DEATH HAS BEEN REPORTED AFTER INGESTION OF 400 TO 500 ML. THE PATHOLOGICAL FINDINGS INCLUDED BRAIN AND LUNG EDEMA.

CHRONIC EXPOSURE- PROLONGED TREATMENT OF RATS HAS BEEN REPORTED TO CAUSE SEVERE LIVER INJURY, HYPERPLASIA OF HEMATOPOIETIC TISSUE, MALIGNANT LIVER TUMORS AND LEUKEMIA.

FIRST AID- GASTRIC LAVAGE WITH A PROTECTED AIRWAY MAY BE USEFUL EVEN IF DELAYED. GIVE ACTIVATED CHARCOAL. IF RESPIRATION IS DEPRESSED, DO NOT ATTEMPT EMESIS, GIVE OXYGEN BY ARTIFICIAL RESPIRATION. MAINTAIN BLOOD PRESSURE. (DREISBACH, HANDBOOK OF POISONING, 11TH ED.) LAVAGE MUST BE ADMINISTERED BY QUALIFIED MEDICAL PERSONNEL.

ANTIDOTE:
NO SPECIFIC ANTIDOTE. TREAT SYMPTOMATICALLY AND SUPPORTIVELY.

REACTIVITY

REACTIVITY:
STABLE UNDER NORMAL TEMPERATURES AND PRESSURES.

INCOMPATIBILITIES:
N-PROPYL ALCOHOL (1-PROPANOL):
ALKALI AND ALKALINE EARTH METALS: REACTS VIOLENTLY, GENERATING HIGHLY FLAMMABLE HYDROGEN GAS.
COATINGS: ATTACKED.
OXIDIZERS (STRONG): POSSIBLE FIRE AND EXPLOSION.
PLASTICS: ATTACKED.
POTASSIUM TERT-BUTOXIDE: VIOLENT IGNITION MAY OCCUR.
RUBBER: ATTACKED.
SEE ALSO ALCOHOLS.

DECOMPOSITION:
THERMAL DECOMPOSITION PRODUCTS MAY INCLUDE TOXIC OXIDES OF CARBON.

POLYMERIZATION:
HAZARDOUS POLYMERIZATION HAS NOT BEEN REPORTED TO OCCUR UNDER NORMAL TEMPERATURES AND PRESSURES.

STORAGE AND DISPOSAL

OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE. FOR ASSISTANCE, CONTACT THE DISTRICT DIRECTOR OF THE ENVIRONMENTAL PROTECTION AGENCY.

****STORAGE****

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.

STORE AWAY FROM INCOMPATIBLE SUBSTANCES.

****DISPOSAL****

DISPOSAL MUST BE IN ACCORDANCE WITH STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WASTE, 40 CFR 262. EPA HAZARDOUS WASTE NUMBER D001.

CONDITIONS TO AVOID

MAY BE IGNITED BY HEAT, SPARKS OR FLAMES. CONTAINER MAY EXPLODE IN HEAT OF FIRE. VAPOR EXPLOSION HAZARD INDOORS, OUTDOORS OR IN SEWERS. RUN-OFF TO SEWER MAY CREATE FIRE OR EXPLOSION HAZARD.

OCCUPATIONAL SPILL:
SHUT OFF IGNITION SOURCES. STOP LEAK IF YOU CAN DO IT WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. FOR SMALL SPILLS, TAKE UP WITH SAND OR OTHER ABSORBENT MATERIAL AND PLACE INTO CONTAINERS FOR LATER DISPOSAL. FOR LARGER SPILLS, 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.

PROTECTIVE EQUIPMENT

VENTILATION:
PROVIDE GENERAL DILUTION VENTILATION TO MEET PUBLISHED EXPOSURE LIMITS. VENTILATION EQUIPMENT MUST BE EXPLOSION-PROOF.

RESPIRATOR:
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 OR NIOSH CRITERIA DOCUMENTS; OR DEPARTMENT OF LABOR, 29CFR1910 SUBPART Z.
THE SPECIFIC RESPIRATOR SELECTED MUST BE BASED ON CONTAMINATION LEVELS FOUND IN THE WORK PLACE AND BE JOINTLY APPROVED BY THE NATIONAL INSTITUTE OF OCCUPATIONAL SAFETY AND HEALTH AND THE MINE SAFETY AND HEALTH ADMINISTRATION.

N-PROPYL ALCOHOL:

- 1000 PPM- ANY POWERED AIR-PURIFYING RESPIRATOR WITH ORGANIC VAPOR CARTRIDGE(S).
ANY CHEMICAL CARTRIDGE RESPIRATOR WITH ORGANIC VAPOR CARTRIDGE(S).
- 2000 PPM- ANY SUPPLIED-AIR RESPIRATOR.
ANY SELF-CONTAINED BREATHING APPARATUS.
- 4000 PPM- ANY SUPPLIED-AIR RESPIRATOR OPERATED IN A CONTINUOUS FLOW MODE.
ANY SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE.
ANY AIR-PURIFYING FULL FACEPIECE RESPIRATOR (GAS MASK) WITH A CHIN-STYLE OR FRONT- OR BACK-MOUNTED ORGANIC VAPOR CANISTER.
ANY SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE.
- ESCAPE- ANY AIR-PURIFYING FULL FACEPIECE RESPIRATOR (GAS MASK) WITH A CHIN-STYLE OR 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:

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

SUPPLIED-AIR RESPIRATOR WITH FULL FACEPIECE AND OPERATED IN 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 REPEATED OR PROLONGED 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 FACESHIELD TO PREVENT CONTACT WITH THIS SUBSTANCE. CONTACT LENSES SHOULD NOT BE WORN.

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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