

Two Butanol

***BUTANOL-ISO**

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MATERIAL SAFETY DATA SHEET

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SUBSTANCE IDENTIFICATION

SUBSTANCE: ***BUTANOL-ISO**

CAS-NUMBER 78-83-1

TRADE NAMES/SYNONYMS:

ISOBUTANOL; FERMENTATION BUTYL ALCOHOL; ISOPROPYL CARBINOL;
2-METHYLPROPYL ALCOHOL; 1-HYDROXYMETHYLPROPANE; 2-METHYL-1-PROPANOL;
2-METHYLPROPAN-1-OL; ISO-BUTYL ALCOHOL; 1-PROPANOL; 2-METHYL-; U140;
STCC 4909131; UN 1212; ISOBUTYL ALCOHOL; A-424; A-397; A-379; C4H10O;

CHEMICAL FAMILY:
HYDROXYL, ALIPHATIC

MOLECULAR FORMULA: (C-H3)2-C-H-C-H2-O-H

MOLECULAR WEIGHT: 74.12

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

COMPONENTS AND CONTAMINANTS

COMPONENT: BUTANOL-ISO

PERCENT: 100

OTHER CONTAMINANTS: NONE

EXPOSURE LIMITS:

ISOBUTYL ALCOHOL:
50 PPM (150 MG/M3) OSHA TWA
50 PPM (150 MG/M3) ACGIH TWA

5000 POUNDS CERCLA SECTION 103 REPORTABLE QUANTITY

PHYSICAL DATA

DESCRIPTION: COLORLESS, VOLATILE LIQUID WITH A MILD, SWEET, NON-RESIDUAL ODOR

BOILING POINT: 226 F (108 C) MELTING POINT: -162 F (-108 C)

SPECIFIC GRAVITY: 0.8018 VISCOSITY: 4 CP @ 20C

VAPOR PRESSURE: 8.8 MMHG @ 20 C EVAPORATION RATE: (BUTYL ACETONE=1) 0.8

SOLUBILITY IN WATER: 8.5% ODOR THRESHOLD: 0.003 PPM VAPOR DENSITY: 2.6

SOLVENT SOLUBILITY: ALCOHOL, ETHER, ACETONE

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:

DANGEROUS FIRE HAZARD WHEN EXPOSED TO HEAT, FLAME, OR OXIDIZERS.

VAPOR-AIR MIXTURES ARE EXPLOSIVE ABOVE FLASH POINT.

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

FLASH POINT: 82 F (28 C) (CC) UPPER EXPLOSIVE LIMIT: 10.6% @ 202 F

LOWER EXPLOSIVE LIMIT: 1.7% @ 123 F AUTOIGNITION TEMP.: 780 F (415 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 WATER FROM SIDE UNTIL WELL AFTER FIRE IS OUT. STAY AWAY FROM STORAGE TANK

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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 WATER IN FLOODING AMOUNTS AS A 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.

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

ALCOHOL FOAM (NFPA 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

ISOBUTYL ALCOHOL (BUTANOL-ISO):

20 MG/24 HOURS SKIN-RABBIT MODERATE IRRITATION; 2 MG OPEN EYE-RABBIT SEVERE IRRITATION; 2 MG/24 HOURS EYE-RABBIT SEVERE IRRITATION; 3400 MG/KG SKIN-RABBIT LD50; 2460 MG/KG ORAL-RAT LD50; 3750 MG/KG ORAL-RABBIT LD50; 417 MG/KG INTRAVENOUS-MOUSE LD50; 340 MG/KG INTRAVENOUS-RAT LD50; 725 MG/KG INTRAVENOUS-CAT LD50; 1201 MG/KG INTRAPERITONEAL-GUINEA PIG LD50; 1401 MG/KG INTRAPERITONEAL-HAMSTER LD50; 1801 MG/KG INTRAPERITONEAL-MOUSE LD50; 720 MG/KG INTRAPERITONEAL-RAT LD50; 323 MG/KG INTRAPERITONEAL-RABBIT LD50; MUTAGENIC DATA (RTECS); TUMORIGENIC DATA (RTECS).
CARCINOGEN STATUS: NONE.

ISOBUTYL ALCOHOL IS AN EYE AND MUCOUS MEMBRANE IRRITANT, AND A CENTRAL NERVOUS SYSTEM DEPRESSANT. POISONING MAY AFFECT THE LIVER AND KIDNEYS. PERSONS WITH A HISTORY OF RESPIRATORY OR SKIN DISEASE MAY BE AT AN INCREASED RISK FROM EXPOSURE. USE OF ALCOHOLIC BEVERAGES ENHANCES THE NARCOTIC EFFECT.

HEALTH EFFECTS AND FIRST AID

INHALATION:

ISOBUTYL ALCOHOL (BUTANOL-ISO):

IRRITANT/NARCOTIC. 8000 PPM IMMEDIATELY DANGEROUS TO LIFE OR HEALTH.

ACUTE EXPOSURE- INHALATION OF HIGH VAPOR CONCENTRATIONS MAY CAUSE IRRITATION OF THE RESPIRATORY TRACT WITH SORE THROAT, COUGHING, AND SHORTNESS OF BREATH, HEADACHE, NAUSEA, DIZZINESS, DULLNESS, DROWSINESS, NARCOSIS, AND UNCONSCIOUSNESS. EXPOSURE TO 10,600 PPM FOR 300 MINUTES AND 15,950 PPM FOR 250 MINUTES RESULTED IN DEATH IN MICE.

CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE TO HIGH MIXED VAPOR CONCENTRATIONS OF ISOBUTYL ALCOHOL AND BUTYL ACETATE RESULTED IN IRRITATION OF MUCOUS MEMBRANES AND LOSS OF APPETITE AND WEIGHT IN WORKERS. INTERMITTENT EXPOSURE TO 6400 PPM FOR 136 HOURS RESULTED IN NARCOSIS AND SLIGHT ORGANIC CHANGES IN THE LIVER AND KIDNEYS IN MICE; NO DEATHS WERE REPORTED.

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:

ISOBUTYL ALCOHOL (BUTANOL-ISO):

ACUTE EXPOSURE- CONTACT WITH VAPOR OR LIQUID MAY CAUSE MILD IRRITATION AND REDNESS. APPLICATION OF THE SUBSTANCE TO HUMAN SKIN CAUSED SLIGHT ERYTHEMA AND HYPEREMIA, BUT WITHOUT THE FORMATION OF WHEELS.

CHRONIC EXPOSURE- REPEATED OR PROLONGED CONTACT MAY DEGRADE THE SKIN RESULTING IN DRYING, CRACKING, AND ECZEMATOID DERMATITIS.

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:

ISOBUTYL ALCOHOL (BUTANOL-ISO):

IRRITANT.

ACUTE EXPOSURE- VAPOR CONCENTRATIONS OF >100 PPM MAY CAUSE IRRITATION, REDNESS, PAIN, AND BLURRED VISION. APPLICATION OF A DROP IN RABBIT EYES RESULTED IN MODERATE TO SEVERE IRRITATION THAT WAS GRADED 5-7 ON A SCALE OF 1-10; NO PERMANENT DAMAGE TO THE CORNEA OCCURRED.

CHRONIC EXPOSURE- REPEATED 8 HOUR EXPOSURE TO 100 PPM INDICATED NO EVIDENCE OF IRRITATION IN HUMANS. EXPOSURE TO HIGH MIXED VAPOR CONCENTRATIONS OF ISOBUTYL ALCOHOL AND BUTYL ACETATE RESULTED IN IRRITATION OF THE EYES AND VACUOLAR KERATITIS IN WORKERS.

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:

ISOBUTYL ALCOHOL (BUTANOL-ISO);

NARCOTIC.

ACUTE EXPOSURE- MAY CAUSE ABDOMINAL PAIN, HEADACHE, NAUSEA, VOMITING, DIZZINESS, DULLNESS, DROWSINESS, NARCOSIS, AND UNCONSCIOUSNESS. ADMINISTRATION OF 1.4 G/KG PRODUCED NARCOSIS IN RABBITS.

CHRONIC EXPOSURE- REPEATED GASTRIC INTUBATION RESULTED IN MALIGNANT AND BENIGN TUMORS IN RATS.

FIRST AID- REMOVE INGESTED MATERIAL BY GASTRIC LAVAGE OR EMESIS. GIVE ARTIFICIAL RESPIRATION WITH OXYGEN IF RESPIRATION IS DEPRESSED. (DREISBACH HANDBOOK OF POISONING, 11TH ED.). GET MEDICAL ATTENTION IMMEDIATELY. ADMINISTRATION OF GASTRIC LAVAGE SHOULD BE PERFORMED BY QUALIFIED MEDICAL PERSONNEL.

ANTIDOTE:

NO SPECIFIC ANTIDOTE. TREAT SYMPTOMATICALLY AND SUPPORTIVELY.

REACTIVITY

REACTIVITY:

STABLE UNDER NORMAL TEMPERATURES AND PRESSURES.

INCOMPATIBILITIES:

ISOBUTYL ALCOHOL (BUTANOL-ISO);

ALKALI METALS: REACTS WITH FORMATION OF FLAMMABLE HYDROGEN GAS.

ALUMINUM (METALLIC): MAY REACT AT HIGH TEMPERATURES.

OXIDIZERS (STRONG): REACTS WITH FORMATION OF FLAMMABLE HYDROGEN GAS.

PLASTICS: ATTACKED.

SEE ALSO ALCOHOLS.

ALCOHOLS:

ACETALDEHYDE: VIOLENT CONDENSATION REACTION.

BARIUM PERCHLORATE: FORMATION OF HIGHLY EXPLOSIVE PERCHLORIC ESTER ON REFLUXING.

CHLORINE: FORMATION OF HIGHLY EXPLOSIVE ALKYL HYPOCHLORITES.

DIETHYL ALUMINUM BROMIDE: SPONTANEOUS IGNITION.

ETHYLENE OXIDE: POSSIBLE EXPLOSION.

HEXAMETHYLENE DIISOCYANATE: POSSIBLE EXPLOSION IN ABSENCE OF SOLVENT.

HYDROGEN PEROXIDE + SULFURIC ACID: POSSIBLE EXPLOSION.

HYPOCHLOROUS ACID: FORMATION OF HIGHLY EXPLOSIVE ALKYL HYPOCHLORITES.

ISOCYANATES: POSSIBLE EXPLOSION IN ABSENCE OF SOLVENT.

LITHIUM ALUMINUM HYDRIDE: VIGOROUS REACTION.

NITROGEN TETROXIDE: POSSIBLE EXPLOSION.

PERCHLORIC ACID (HOT): DANGEROUS INTERACTION.

PERMONOSULFURIC ACID: POSSIBLE EXPLOSION ON CONTACT WITH PRIMARY OR SECONDARY ALCOHOLS.

TRI-ISO-BUTYL ALUMINUM: VIOLENT REACTION.

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.

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.

SPILL AND LEAK PROCEDURES

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.

REPORTABLE QUANTITY (RQ): 5000 POUNDS
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).

PROTECTIVE EQUIPMENT

VENTILATION:
PROVIDE LOCAL EXHAUST OR 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.

ISOBUTYL ALCOHOL:

- 500 PPM- ANY SUPPLIED-AIR RESPIRATOR,
ANY SELF-CONTAINED BREATHING APPARATUS,
ANY CHEMICAL CARTRIDGE RESPIRATOR WITH ORGANIC VAPOR CARTRIDGE(S).
- 1000 PPM- ANY POWERED AIR-PURIFYING RESPIRATOR WITH ORGANIC VAPOR
CARTRIDGE(S).
ANY CHEMICAL CARTRIDGE RESPIRATOR WITH A FULL FACEPIECE AND ORGANIC
VAPOR CARTRIDGE(S).
- 1250 PPM- ANY SUPPLIED-AIR RESPIRATOR OPERATED IN A CONTINUOUS FLOW MODE.
- 2500 PPM- 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.
ANY SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE.
- 5000 PPM- ANY SUPPLIED-AIR RESPIRATOR WITH A HALF-MASK AND OPERATED IN A
PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.
- 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 TO PREVENT
EYE CONTACT WITH THIS SUBSTANCE. CONTACT LENSES SHOULD NOT BE WORN.

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