**DIMETHYL SULFOXIDE**
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**MATERIAL SAFETY DATA SHEET**

FISHER SCIENTIFIC

EMERGENCY NUMBER: (201) 796-7100

CHEMICAL DIVISION

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**SUBSTANCE IDENTIFICATION**

SUBSTANCE: **DIMETHYL SULFOXIDE**
CAS-NUMBER 67-68-5
TRADE NAMES/SYNONYMS: SULFINYLISOMETHANE, METHYL SULFOXIDE, DMOS, DEMESO, DEMASORB, DIMETHYL SULFOXIDE, DMS-70, DMS-90, DOLICUR, DOMOSO, DROMISOL, HYDAR, INFILTRINA, RIMSO-50, RIMSO-100, D-128, D-126, BP231, CSH60, AC207760

CHEMICAL FAMILY:
SULFOXIDE

MOLECULAR FORMULA: C2-H6-O-5
MOLECULAR WEIGHT: 78.13

CERCLA RATING (SCALE 0-3): HEALTH-3 FIRE-2 REACTIVITY-0 PERSISTENCE-2

NRC RATING (SCALE 0-4): HEALTH-1 FIRE-1 REACTIVITY-0

COMPONENTS AND CONTAMINANTS

COMPONENT: DIMETHYL SULFOXIDE
CAS# 67-68-5
PERCENT: 100.0

OTHER CONTAMINANTS: NONE.

EXPOSURE LIMITS: THERE ARE NO RELATIVE EXPOSURE LIMITS ESTABLISHED BY OSHA, ACGIH, OR NIOSH.

**PHYSICAL DATA**

DESCRIPTION: CLEAR, WATER WHITE, HYGROSCOPIC LIQUID WITH A SLIGHTLY BITTER TASTE AND A MILD GARLIC ODOR. BOILING POINT: 372 F (189 C) (DECOMPOSES)

MELTING POINT: 64 F (18 C) SPECIFIC GRAVITY: 1.1014

VISCOITY: 1.1 CPS @ 27 C VAPOR PRESSURE: 0.37 mmHg @ 20 C

EVAPORATION RATE: 4.3 (CARBON TETRACHLORIDE = 1)

SOLUBILITY IN WATER: MISCEBLE VAPOR DENSITY: 2.7

SOLVENT SOLUBILITY: SOLUBLE IN ALCOHOL, ETHER, ACETONE, BENZENE AND CHLOROFORM.

**FIRE AND EXPLOSION DATA**

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

VAPOR 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 LIMIT.

FLASH POINT: 192 F (89 C) (CC) UPPER EXPLOSIVE LIMIT: 42%
LOWER EXPLOSIVE LIMIT: 2.6% AUTOIGNITION TEMP: 419 F (215 C)

FLAMMABILITY CLASS(OSHA): IIIA

FIREFIGHTING MEDIA:
DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR REGULAR FOAM (1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).

FOR LARGER FIRES USE WATER SPRAY, FOG OR REGULAR FOAM (1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).


FIREFIGHTING:
MOVE CONTAINER FROM FIRE AREA IF YOU CAN DO IT WITHOUT RISK. APPLY COOLING WATER OR USE A FIRE SupPRESSANT THAT IS ACCEPTABLE TO THE USER. IF THE CONTAINER IS ON FIRE, WAIT FOR FIRE IS OUT. STAY AWAY FROM ENDS OF TANKS. FOR MASSIVE FIRE IN CARGO AREA, USE UNIFORMED FIRE OR HEALTH SAFETY DEVICES OR MONITOR NOZZLES OR EXTINGUISHERS. WITHDRAW FROM AREA AND LET FIRE BURN. WITHDRAW IMMEDIATELY IN CASE OF RISING SOUND FROM VEHICLE OR LOSS OF SAFETY DEVICE OR ANY DISCOMFORT OR IRRITATION. DO NOT SELF-CONTAINING MULTIPLE-UNIT TANKS 1/2 MILE IN ALL DIRECTIONS IF TANK. RAIL CAR OR TANK TRUCK IS INVOLVED IN FIRE (1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5, GUIDE PAGE 27).

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

TRANSPORTATION DATA

DEPARTMENT OF TRANSPORTATION HAZARD CLASSIFICATION 49-CFR 172.101: COMBUSTIBLE LIQUID

DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS 49-CFR 172.101 AND SUPPORT E:
NONE

DEPARTMENT OF TRANSPORTATION PACKAGING REQUIREMENTS: NONE

EXCEPTIONS: 49-CFR 173.11B

**TOXICITY**

DIMETHYL SULFOXIDE

IRRITANT DATA: 10 MG/24 HOURS OPEN SKIN-RABBIT MILD, 500 MG/24 HOURS SKIN-RABBIT MILD, 100 MG EYE-RABBIT, 500 MG/24 HOURS EYE-RABBIT MILD

TUMOR DATA: 1600 MG/4 HOURS INHALATION-RAT LOD50 12 MG/4 HOURS INHALATION-RAT LOD50 60 MG/4 HOURS INHALATION-RAT LOD50 150 MG/4 HOURS INHALATION-RAT LOD50 250 MG/4 HOURS INHALATION-RAT LOD50 350 MG/4 HOURS INHALATION-RAT LOD50 450 MG/4 HOURS INHALATION-RAT LOD50 550 MG/4 HOURS INHALATION-RAT LOD50 600 MG/4 HOURS INHALATION-RAT LOD50 700 MG/4 HOURS INHALATION-RAT LOD50 800 MG/4 HOURS INHALATION-RAT LOD50 900 MG/4 HOURS INHALATION-RAT LOD50 1000 MG/4 HOURS INHALATION-RAT LOD50 1100 MG/4 HOURS INHALATION-RAT LOD50 1200 MG/4 HOURS INHALATION-RAT LOD50 1300 MG/4 HOURS INHALATION-RAT LOD50 1400 MG/4 HOURS INHALATION-RAT LOD50 1500 MG/4 HOURS INHALATION-RAT LOD50 1600 MG/4 HOURS INHALATION-RAT LOD50 1700 MG/4 HOURS INHALATION-RAT LOD50 1800 MG/4 HOURS INHALATION-RAT LOD50 1900 MG/4 HOURS INHALATION-RAT LOD50 2000 MG/4 HOURS INHALATION-RAT LOD50 2100 MG/4 HOURS INHALATION-RAT LOD50 2200 MG/4 HOURS INHALATION-RAT LOD50 2300 MG/4 HOURS INHALATION-RAT LOD50 2400 MG/4 HOURS INHALATION-RAT LOD50 2500 MG/4 HOURS INHALATION-RAT LOD50 2600 MG/4 HOURS INHALATION-RAT LOD50 2700 MG/4 HOURS INHALATION-RAT LOD50 2800 MG/4 HOURS INHALATION-RAT LOD50 2900 MG/4 HOURS INHALATION-RAT LOD50 3000 MG/4 HOURS INHALATION-RAT LOD50 3100 MG/4 HOURS INHALATION-RAT LOD50 3200 MG/4 HOURS INHALATION-RAT LOD50 3300 MG/4 HOURS INHALATION-RAT LOD50 3400 MG/4 HOURS INHALATION-RAT LOD50 3500 MG/4 HOURS INHALATION-RAT LOD50 3600 MG/4 HOURS INHALATION-RAT LOD50 3700 MG/4 HOURS INHALATION-RAT LOD50 3800 MG/4 HOURS INHALATION-RAT LOD50 3900 MG/4 HOURS INHALATION-RAT LOD50 4000 MG/4 HOURS INHALATION-RAT LOD50 4100 MG/4 HOURS INHALATION-RAT LOD50 4200 MG/4 HOURS INHALATION-RAT LOD50 4300 MG/4 HOURS INHALATION-RAT LOD50 4400 MG/4 HOURS INHALATION-RAT LOD50 4500 MG/4 HOURS INHALATION-RAT LOD50 4600 MG/4 HOURS INHA...
ODOR TO THE BREATH AND SKIN. LARGE AMOUNTS MAY CAUSE NAUSEA, VOMITING, CRAMPS, DIARRHEA, ANOREXIA, LETHARGY, DROWSINESS, HEADACHE, CHILLS, CHEST PAIN, BURNING OR ACHING EYES, AND TRANSIENT DISURBANCES OF COLOR VISION AND PHOTOPHOBIA. TRANSIENT HEMOLYSIS WITH HEMOLYSINURIA HAS BEEN REPORTED. ENHANCED IRRITATION, EPIDERMAL FLACCIDULATION, HISTOLOGICAL EVIDENCE OF DERMAL DEATH, AND PERIVASCULAR DERMAL INFILTRATES WITH SYMPTOMS AFTER OCCLUDED PATCH TESTING OCCASIONAL HYPERSENSITIVITY REACTIONS INCLUDING ANAPHYLAXIS HAVE BEEN REPORTED. DUE TO ITS SOLVENT PROPERTIES, DMFC FACILITATES THE ABSORPTION OF SUBSTANCES PRESENT ON THE SKIN WHICH MAY RESULT IN TOXIC EFFECTS.

CHRONIC EXPOSURE: 9 MILLILITERS OF 80% DMFC WAS APPLIED TO THE ENTIRE TRUNK OF 20 MEN ONCE DAILY FOR 28 WEEKS. THE EFFECTS NOTED WERE BAD BREATH, TRANSIENT BURNING, AND STINGING. THE DERMATITIS, ACCOMPANIED BY ONLY MODERATE INFLAMMATION REGRESSED AS TREATMENT CONTINUED. DERMAL CONTAMINATION WITH OCLUSION PRODUCED HARDENING OF THE SKIN IN MOST SUBJECTS WITHIN 1 MONTH. CRYSTALLINE LENS ALTERATIONS, RESEMBLING JUVENILE NUCLEAR SCLEROSIS, HAVE BEEN PRODUCED IN SOME ANIMAL SPECIES, BUT NOT IN HUMANS. NO LARGE ANIMAL SPECIES WERE FOUND IN 25 PATIENTS TREATED DAILY WITH UP TO 30 ML APPLIED TOPICALLY FOR 19 MONTHS.

FIRST AID - REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH MILD DETERGENT AND LARGE AMOUNTS OF WATER. NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

EYE CONTACT:
DIMETHYL SULFOXIDE:
IRRITANT.
ACUTE EXPOSURE - DIRECT CONTACT MAY CAUSE IRRITATION WITH REDNESS, PAIN, AND BLURRED VISION. ACIDOS SOLUTIONS CONTAINING 75-90% DMFC MAY CAUSE IRRITATION WITH TEMPORARY STINGING AND BURNING. FIFTY PERCENT SOLUTIONS HAVE CAUSED A TRANSIENT BURNING SENSATION. LOWER CONCENTRATIONS HAVE BEEN TOLERATED WELL WITHOUT INJURY TO THE EYE. APPLICATION FULL STRENGTH ACIDS OR KMDS TO THE EYES HAS CAUSED RATIONED EPITHELIUM INTO RABBIT EYES CAUSED PAIN. MODERATE DISCHARGE, CORNEAL EPITHELIAL INJURY, AND DILATION OF CONJUNCTIVAL BLOOD VESSELS BUT NO NEOMERRHAGING. THE EYES RETURNED TO NORMAL IN 2 DAYS.

CHRONIC EXPOSURE: REPEATED OR 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.

INHALATION:
DIMETHYL SULFOXIDE:
ACUTE EXPOSURE - INHALATION OF LARGE AMOUNTS MAY CAUSE NAUSEA, VOMITING, DIARRHEA, ABDOMINAL PAIN, LETHARGY, AND DROWSINESS. CHRONIC EXPOSURE - REPEATED EXPOSURE PRODUCED CRISTALINE LENS CHANGES, RESEMBLING JUVENILE NUCLEAR SCLEROSIS IN ANIMAL SPECIES, WHILE HUMAN RISKS REMAIN IN UNKOWN. IN ANIMAL STUDIES, REPEATED DOSES OF 1.5 G/KG RESULTED IN LIVER NEPHROSIS AND RENAL LESIONS. REPORORATIC EFFECTS HAVE BEEN REPORTED IN ANIMALS.

FIRST AID - REMOVE CHEMICAL BY INDUCING EMESIS. GASTRIC LAVAGE. ACTIVATED CHARCOAL MAY BE CONSIDERED. DIURESIS MAY ALSO BE CONSIDERED. PHYSICIAN'S DESK REFERENCE, 40TH ED. MAINTAIN BLOOD PRESSURE AND RESPIRATION. GIVE OXYGEN IF NECESSARY. IMMEDIATE MEDICAL ATTENTION REQUIRED. REPEATED OR PROLONGED EXPOSURE TO LAVAGE OR OXYGEN SHOULD BE PERFORMED BY QUALIFIED MEDICAL PERSONNEL.

ANTIDOTES:
NO SPECIFIC ANTIDOTE. TREAT SYMPTOMATICALLY AND SUPPORTIVELY.

REACTIVITY:
STABLE UNDER NORMAL THERMOCICAL AND PRESSURES.

INCOMPATIBILITIES:
DIMETHYL SULFOXIDE:
ACID ANHYDROUS: POSSIBLE EXPLOSIVE REACTION.
ACID HALIDES: POSSIBLE EXPLOSIVE REACTION.
ALKY HALIDES: VIOLENT OR EXPLOSIVE REACTION.
ARYL HALIDES: VIOLENT DECOMPOSITION REACTION.
BLENDED HYDRAZINE: MAY FORM EXPLOSIVE MIXTURE.
BONC DIMETHOXYDIAMINE: MAY FORM EXPLOSIVE MIXTURE.
CHLORINATED HYDROCARBONS: MAY EXPLODE AT ELEVATED TEMPERATURES.
CARBONYL DISOHCYANATE: EXPLOSIVE REACTION.
CHLOROPHENOL: VIOLENT OR EXPLOSIVE REACTION.
IODINE PENTAFLUORIDE: POSSIBLE EXPLOSIVE REACTION.
IODINE NITRATES: FORMS AN EXTREMELY EXPLOSIVE MIXTURE.
METAL PERCHLORATES: FORMS AN EXTREMELY EXPLOSIVE MIXTURE.
NITRIC ACID: POSSIBLE EXPLOSION HAZARD.
PERCHLORIC ACID: EXPLOSION HAZARD.
PERIODIC ACID: POSSIBLE EXPLOSIVE REACTION.
PHOSPHORUS(V): POSSIBLE EXPLOSIVE REACTION.
PHOSPHORYLCHLORIDE: POSSIBLE EXPLOSION HAZARD.
POTASSIUM: POSSIBLE EXPLOSIVE REACTION.
POTASSIUM NITRATE: EXPLOSION HAZARD.
POTASSIUM PERMANGANATE: IGNITION ON CONTACT.

SILVER DIFLUORIDE: VIOLENT REACTION
SODIUM HYDROXIDE: POSSIBLE FIRE AND EXPLOSION AT ELEVATED TEMPERATURES.
SULFUR TRIOXIDE: EXPLOSION HAZARD.

DECOMPOSITION:
THERMOCIAL DECOMPOSITION PRODUCTS MAY INCLUDE FORMALDEHYDE, METHYL MERCAPTAN, AND SULFUR DIOXIDE VAPORS.

POLYMIZATION:
HAZARDOUS POLYMIZATION HAS NOT BEEN REPORTED TO OCCUR UNDER NORMAL THERMOCICAL AND PRESSURES.

STORAGE AND DISPOSAL

OBSERVE ALL FEDERAL STATE AND LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE.

**STORAGE**

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 SPECIFICATIONS IN NPFA 77 1983, RECOMMENDED PRACTICE ON STATIC ELECTRICITY.

STORE IN ACCORDANCE WITH 29 CFR 1910.106.

STORE AWAY FROM INCOMPATIBLE SUBSTANCES.

AVOID CONTACT WITH HEAT, SPARKS, FLAMES, OR OTHER SOURCES OF IGNITION. VAPORS MAY BE EXPLOSIVE. AVOID OVERHEATING OF CONTAINERS; CONTAINERS MAY VIOLATE IN HEAT OF FIRE. AVOID CONTAMINATION OF WATER SOURCES.

**SPILL AND LEAK PROCEDURES**

OCCUPATIONAL SPILL:
SHUT OFF ALL 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. SAVE CONTAINERS FOR LATER DISPOSAL. FOR LARGER SPILLS, LIKE FAR AHEAD OF SPILL. FOR LATER DISPOSAL. NO SMOKING, FLAMES OR FLARES IN HAZARD AREA. KEEP UNNECESSARY PEOPLE AWAY. ISOLATE HAZARD AREA AND RESCUE ENTRY.

PROTECTIVE EQUIPMENT

VENTILATION:
PROCESS AIR EXHAUST RECOMMENDED. VENTILATION EQUIPMENT MUST BE EXPLOSION-PROOF.

RESPIRATOR:
THE FOLLOWING RESPIRATORS ARE RECOMMENDED BASED ON INFORMATION FOUND IN THE PHYSICAL DATA, TOXICITY AND HEALTH EFFECTS SECTIONS. THEY ARE RANKED IN ORDER FROM MINIMUM TO MAXIMUM RESPIRATORY PROTECTION. THE SPECIFIC RESPIRATOR SELECTED MUST BE BASED ON CONTRIBULATIONS FOUND IN THE WORK PLACE. MUST BE BASED ON THE SPECIFIC OPERATION. MUST NOT EXCEED THE LIMITS OF THE RESPIRATOR. RESPIRATORS MUST BE SELECTED AND ISOTED APPROVED BY THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH AND THE MINE SAFETY AND HEALTH ADMINISTRATION (NIOSH/MSHA).

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

ANY SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE 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 FACEPIECE AND IS OPERATED IN A 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:
EMLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES TO PREVENT EYE CONTACT WITH THIS SUBSTANCE.

EMERGENCY EYE WASH: WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES MAY BE EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHOULD PROVIDE AN EYE WASH FOUNTAIN WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

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