MINNESOTA MINING AND MFG CO PERFOMANCE CHEM AND FLUIDS DIV -- 98-0211-9364-8, HFE-7200 3M NOVEC ENGINEERED FLUID -- 6850-01-459-0130

========== Product Identification ==========

Product ID:98-0211-9364-8, HFE-7200 3M NOVEC ENGINEERED FLUID
MSDS Date:07/06/2000
FSC:6850
NIIN:01-459-0130
Status Code:A
MSDS Number: CLDCZ
=== Responsible Party ===
Company Name:MINNESOTA MINING AND MFG CO PERFOMANCE CHEM AND FLU
IDS DIV
Address:3M CTR
City:SAINT PAUL
State:MN
ZIP:55144-1000
Country:US
Info Phone Num:800-364-3577/651-737-6501
Emergency Phone Num:651-737-6501
Resp. Party Other MSDS Num.:DOCUMENT: 08-1308-9
CAGE:28112
=== Contractor Identification ===
Company Name:MINNESOTA MINING AND MFG CO PERFOMANCE CHEM AND FLUIDS DIV
Address:3M CTR
Box:City:SAINT PAUL
State:MN
ZIP:55144-1000
Country:US
Phone:800-364-3577/651-737-6501
CAGE:28112

========== Composition/Information on Ingredients ==========

Ing
red Name:ETHYL NONAFLUOROISOBUTYL ETHER
CAS:163702-06-5
Minumum % Wt:50.
Maxumum % Wt:70.
Other REC Limits:200 PPM TWA (3M)

Ingred Name:ETHYL NONAFLUOROBUTYL ETHER
CAS:163702-05-4
Minumum % Wt:30.
Maxumum % Wt:50.
Other REC Limits:200 PPM TWA (3M)

========== Hazards Identification ==========

LD50 LC50 Mixture:ORAL, ALBINO RAT, LD50: >2 G/ KG.
Routes of Entry: Inhalation:UNKNOWN Skin:UNKNOWN Ingestion:NO
Health Hazards Acute and Chronic:EYE CONTACT: CONTACT DURING PR

ODUCT
USE IS NOT EXPECTED TO RESULT IN SIGNIFICANT IRRITATION. SKIN CONTACT: CONTACT DURING PRODUCT USE IS NOT EXPECTED TO RESULT IN SIGNIFICANT IRRITATION. INHALATION: H EALTH EFFECTS FROM INHALATION ARE NOT EXPECTED UNLESS PRODUCT IS OVER HEATED AND DECOMPOSITION OCCURS. MINIMAL KIDNEY EFFECTS WERE OBSERVED IN A 28-DAY INHALATION STUDY IN RATS. THESE EFFECTS WERE NOT OBSERVED BELOW 8700 PPM. BASED ON THE HIGH EXPOSURES NECESSARY TO CAUSE THESE EFFECTS, THEY ARE
NOT ANTICIPATED DURING NORMAL INDUSTRIAL PRODUCT HANDLING AND USE. INGESTION: NOT A LIKELY ROUTE OR EXP OSURE.
Effects of Overexposure:EYES: IRRITATION. SKIN: IRRIATION. INHALATION: MINIMAL KIDNEY EFFECTS.

========== First Aid Measures ==========

First Aid:EYE CONTACT: FLUSH WITH LARGE AMOUNTS OF WATER. GET IMMEDIATE MEDICAL ATTENTION. SKIN CONTACT:WASH AFFECTED AREA WITH SOAP AND WATER. INHALATION: IF SIGNS / SYMPTOMS OCCUR, REMOVE TO FRESH AIR.

IF SIG NS / SYMPTOMS CONTINUE, CALL A PHYSICIAN. INGESTION: NO NEED FOR FIRST AID IS ANTICIPATED. NOTE TO PHYSICIANS: EXPOSURE TO HIGH CONCENTRATION MAY INCREASE 'MYOCARDIAL IRRITABILITY". DO NOT ADMINISTER SYMPATHOMIMETIC DRUGS (I.E.ADRENALINE) UNLESS ABSOLUTELY NECESSARY.

========== Fire Fighting Measures ==========

Flash Point Method:TCC
Flash Point:NONE
Lower Limits:210 G/M3
Upper Limits:1070 G/M3
Extinguishing Media:NONFLAMMABLE.
Fire Fighting Pro
cedures:FOR SEVERE SURROUNDING FIRE, WEAR FULL PROTECTIVE CLOTHING, INCLUDING HELMET, SELF-CONTAINED, POSITIVE PRESS. OR PRESS. DEMAND BREATHING APARATUS, BUNKER COAT AND PANTS, BANDS AROUND ARMS, WAIST, LEGS , FACE MASK, PROTECTIVE COVERING FOR EXPOSED AREAS OF HEAD. KEEP CONTAINERS COOL WITH WATER SPRAY TO AVOID RUPTURE.
Unusual Fire/Explosion Hazard:EXTREME CONDITIONS OF HEAT (WELDING, OPEN FLAME, MISUSE, OR EQUIPMENT FAILURE) MAY PRODUCE DECOMPOSITION PRODUCTS THA

T INCLUDE HYDROGEN FLUORIDE. NO SMOKING. NFPA HAZARD CODES: HEALTH: 3; FIRE: 1; RE ACTIVITY: 0; UNUSUAL REACTION HAZARD: NONE.

========== Accidental Release Measures ==========

Spill Release Procedures:VENTILATE AREA. CONTAIN SPILL. EVACUTE UNPROTECTED PERSONNEL. COVER WITH ABSORBENT. COLLECT SPILLED MATERIAL. CLEAN UP RESIDUE WITH AN ORGANIC SOLVENT. READ AND FOLLOW PRECAUTIONS ON SOLVENT LABEL AN D MSDS. PLACE IN METAL CONTAINER AND SEAL CONTAINER.

IN CASE OF LARGE SPILLS IN A CONFINED AREA, WARN OTHERS AND LEAVE IMMEDIATELY. EXPOSURE TO EXCESSIVE VAPOR CONCENTRATION MAY CAUSE INJURY.

========== Handling and Storage ==========

Handling and Storage Precautions:STORE UNDER NORMAL WAREHOUSE CONDITIONS. AVOID EXPOSING TO EXTREME CONDITIONS OF HEAT, I.E., ABOVE 150C (WELDING, OPEN FLAME). NO SMOKING: SMOKING WHILE USING THIS PRODUCT CAN RESULT IN CONTAMINATION OF THE TOBACCO AND/OR SMOKE AND
LEAD TO FORMATION OF HAZARDOUS DECOMPOSITION PRODUCTS.

Other Precautions:FOR ADDITIONAL HEALTH AND PRECAUTIONARY INFORMATION, INCLUDING AIR MONITORING METHODOLOGY, CONTACT 3M. NFPA CODES ARE DESIGNED FOR USE BY FIREFIGHTERS, SHERIFFS, OR OTHER EMERGENCY RESPONSE TEAMS WHO ARE CONCERNED WITH THE HAZARDS OF BURNING OR EXPLODING MATERIALS.

========== Exposure Controls/Personal Protection ==========

Respiratory Protection:IF EXHAUST VENTILATION IS NOT ADEQUATE USE APPRO
PRIATE RESPIRATORY PROTECTION. AVOID BREATHING THERMAL DECOMPOSITION PRODUCTS. SELECT ONE OF THE FOLLOWING NIOSH APPROVED RESPIRATORS BASED ON AIRBORNE CONCENTRATION OF CONTAMINANTS AND IN ACCORDANCE WITH OSHA REGULATIONS: HALF- MASK SUPPLIED AIR RESPIRATOR, FULL-FACE SUPPLIED AIR RESPIRATOR.

Ventilation:USE IN WELL-VENTILATED AREA. PROVIDE SUFFICIENT VENTILATION TO MAINTAIN EMISSIONS BELOW RECOMMENDED EXPOSURE LIMITS.

Protective Gloves:WEAR A PAIR OF GLOVES MADE FROM NEOPRE

NE OR NITRILE
RUBBER.
Eye Protection:WEAR SAFETY GLASSES WITH SIDE SHIELDS AS A GOOD INDUSTRIAL HYGENE PRACTICE.
Work Hygienic Practices:AVOID SKIN CONTACT, WEAR APPROPRIATE GLOVES WHEN HANDLING THIS MATERIAL; WEAR SAFETY GLASSES WITH SIDE SHIELDS; USE IN WELL VENTILATED AREA; AVOID BREATHING VAPORS, MISTS, OR SPRAY.
Supplemental Safety and Health
ID NUMBER/ U.P.C.: 98-0211-9362-2, 98-0211-9364-8, 98-0211-9366-3, 98-0211-9368-9, 00-51135-11191-8, 00-51135-11193-2, 00-
51135-11195-6, 00-51135-11197-0, 98-0211-9363-0, 98-0211-9365-5, 98-0211-9367- 1,98-0211-9369-7, 00-51135-11192-5, 00-51135-11194-9, 00-51135-11196-3, 0051135-11198-7.

========== Physical/Chemical Properties ==========

HCC:T6
Boiling Pt:=76.C, 168.8F
Decomp Temp:=-138.C, -216.4F
Vapor Pres:109 MM HG @ 25C
Vapor Density:9.1 (AIR=1
Spec Gravity:1.43 (WATER=1)
Viscosity:0.43 CENTISTOKE
Solubility in Water:INSOLUBLE
Appearance and Odor:CLEAR, COLORLESS LIQUID. FAINT ODOR.
,
Percent Volatiles by Volume:100

========== Stability and Reactivity Data ==========

Stability Indicator/Materials to Avoid:YES
STRONG ACIDS, STRONG BASES, STRONG OXIDIZING AGENTS.
Stability Condition to Avoid:AVOID TEMPERATURES ABOVE BOILING POINT (76C).
Hazardous Decomposition Products:HYDROGEN FLUORIDE. ATMOSPHERIC DEGRADATION PRODUCTS INCLUDE: FOR ETHYL NONAFLUOROISOBUTYL ETHER: ISO-PERFLUOROBUTYRIC ACID, CO2, HF, CF3COOH; FOR NONAFLUOROBUTYL ETHER: N-PERFL

UOROBUTYRIC ACID, CO2, HF.
Conditions to Avoid Polymerization:WILL NOT OCCUR.

========== Toxicological Information ==========

Toxicological Information:ORAL TOXICITY: PRACTICALLY NON-TOXIC, ORAL, ALBINO RATS, LD50 = 2 G/KG. PRIMARYOCULAR IRRITATION: MINIMALLY IRRITATING. PRIMARY DERMAL IRRITATION: NON-IRRITATING. ACUTE INHALATION LETHAL CONCENTRATION : RAT: >92000 PPM (4 HOUR). DERMAL SENSITIZATION: NOT A SKIN SENSITIZER. DEVELOPMENTAL TOXICITY: NO SIGNIF
ICANT EFFECTS WERE OBSERVED. MUTAGENICITY: NOT A MUTAGENIN REVERSE MUTATION OR CHROMOSOMAL ABE RATION ASSAYS. IN VIVO MOUSE MICRONUCLEUS ASSAY: NEGATIVE.

========== Ecological Information ==========

Ecological:ZERO OZONE DEPLETTION POTENTIAL (0DP). 0.8 YEAR ATMOSPHERIC LIFETIME. 55 GLOBAL WARMING POTENTIAL (GWP) (100 YEAR ITH, WMO 1998 METHOD). 96-HR LC50, FATHEAD MINNOW (PIMEPHALES PROMELAS): >2.75 MG/L. 4 8-HR EC50, WATER FLEA (SAPHNIA MAGNA): >2.5
5 MG/L. 96-HR
EC50 (AV. SPEC. GROWTH RATE), ALGAE (SELENASTRUM CAPROCORNUTUM): >2.32 MG/L. BIODEGRADABILITY: THEORETICAL OXYGEN DEMAND (THOD): 0.82 MG02/MG. 28-DAY BIOCHEMICAL OXYGEN DEMAND (BOD28) : NIL. U.S. CLEAN WATER ACT, SECTION 307, TOXIC POLLUTANTS = NONE (NOT U.S. EPA HAZARDOUS).

========== Disposal Considerations ==========

Waste Disposal Methods:RECLAIM IF FEASIBLE. FOR INFORMATION ON PRODUCT RETURN, CONTACT YOUR DISTRIBUTOR. DISPOSAL
ATERNATIVE: INCINERATE
IN AN INDUSTRIAL OR COMMERCIAL FACILITY IN THE PRESENCE OF A COMBUSTIBLE MATERIAL.

========== MSDS Transport Information ==========

Transport Information:NOT REGULATED, ALL TRANSPORTATION MODES.

========== Regulatory Information ==========

SARA Title III Information:EPCRA 311/312 REPORTABLE QUANTITY: NOT REPORTABLE. OTHER ENVIRONMENTAL INFORMATION: THIS LOW-SOLUBILITTY SUBSTANCE HAS INSIGNIFICANT TOXICITY TO A

QUATIC ORGANISMS. TAKE
PRECAUTIONS TO PREVENT DIRECT R ELEASE OF THIS SUBSTANCE TO THE ENVIRONMENT. THE HIGHLY VOLITILE INGREDIENTS ARE EXPECTED TO MOVE RAPIDLY THROUGH EVAPORATION IN AN AQUATIC OR ASOIL SURFACE TO THE ATMOSPHERE. THE HIGH POTENTIAL OF TH IS SUBSTANCE TO MOVE FROM WATER TO THE ATMOSPHERE ACCOUNTS FOR ITS LOW TOXICITY AND MAKE IT UNLIKELY THAT THIS SUBSTANCE WILL BIOCONCENTRATE IN AEROBIC ENVIRONMENTS.

Federal Regulatory Information:THE COMPONENTS OF T
HIS PRODUCT ARE IN
COMPLIANCE WITH THE CHEMICAL REISTRATION REQUIREMENTA OF TSCA, ELINCS, MITI, CICS. THE U.S. ENVIRONMENTAL PROTECTIVE AGENCY (EPA) HAS LISTED 3M HFE-7200 AS AN ACC EPTABLE SUBSTITUTE FOR OZONE DEPLETING SUBSTANCES IN SPECIFIC SOLVENT CLEANING AND AEROSOL INDUSTRY APPLICATIONS UNDER ITS SIGNIFICANT NEW ALTERNATIVES PROGRAM (SNAP). SECTION 612 OF THE CLEAN AIR ACT REQUIRES THE EPA TO ADMINISTER THIS PROGRAM TO EVALUATE AND APPROVE ALTERNATIVES FOR

OZONE DEPLETIN G SUBSTANCES. VOLATILE ORGANIC COMPOUNDS: N/A. VOC LESS H2O & EXEMPT SOLVENTS:N/A.

State Regulatory Information:AQUATIC TOXICITY (JUNE 1997): FATHEAD MINNOW (PIMEPHALES PROMELAS) 96-HR LC50: >750 MG/L. NOTE: THE DATA ABOVE REFLECTS THE CA METHOD WHICH WAS USED TO SATISFY THE CALIFORNIA (CA) TITLE 22 HAZARD EVA LUATION BIOASSAY.

========== Other Information ==========

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