

MINNESOTA MINING AND MFG CO PERFORMANCE 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 PERFORMANCE 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 PERFORMANCE 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

PRODUCT

USE IS NOT EXPECTED TO RESULT IN SIGNIFICANT IRRITATION. SKIN CONTACT: CONTACT DURING PRODUCT USE IS NOT EXPECTED TO RESULT IN SIGNIFICANT IRRITATION. INHALATION: HEALTH 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 OF EXPOSURE.

Effects of Overexposure:EYES: IRRITATION. SKIN: IRRITATION. 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 SIGNS / 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 Procedures:

FOR SEVERE SURROUNDING FIRE, WEAR FULL PROTECTIVE CLOTHING, INCLUDING HELMET, SELF-CONTAINED, POSITIVE PRESS. OR PRESS. DEMAND BREATHING APPARATUS, 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 THAT

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

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

Spill Release Procedures: VENTILATE AREA. CONTAIN SPILL. EVACUATE
UNPROTECTED PERSONNEL. COVER WITH ABSORBENT. COLLECT SPILLED
MATERIAL. CLEAN UP RESIDUE WITH AN ORGANIC SOLVENT. READ AND FOLLOW
PRECAUTIONS ON SOLVENT LABEL AND 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 (ODP). 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 RELEASE OF THIS SUBSTANCE TO THE ENVIRONMENT. THE HIGHLY VOLATILE INGREDIENTS ARE EXPECTED TO MOVE RAPIDLY THROUGH EVAPORATION IN AN AQUATIC OR A SOIL SURFACE TO THE ATMOSPHERE. THE HIGH POTENTIAL OF THIS 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 THIS PRODUCT ARE IN

COMPLIANCE WITH THE CHEMICAL REGISTRATION REQUIREMENTS OF TSCA, ELINCS, MITI, CICS. THE U.S. ENVIRONMENTAL PROTECTIVE AGENCY (EPA) HAS LISTED 3M HFE-7200 AS AN ACCEPTABLE 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 DEPLETING 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 EVALUATION BIOASSAY.

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

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