

MINNESOTA MINING AND MFG CO -- 98-0211-9221-0, HFE-71DE 3M NOVEC ENGINEERED FLUID --  
6850-01-459-0070

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

Product ID:98-0211-9221-0, HFE-71DE 3M NOVEC ENGINEERED FLUID

MSDS Date:11/01/2000

FSC:6850

NIIN:01-459-0070

Status Code:A

MSDS Number: CLPVW

=== Responsible Party ===

Company Name:MINNESOTA MINING AND MFG CO

Address:3M CENTER BLDG 224-5S-04

City:SAINT PAUL

Sta

te:MN

ZIP:55144-1000

Country:US

Info Phone Num:800-364-3577 OR 651-737-6501(24HR)

Emergency Phone Num:651-737-6501

Resp. Party Other MSDS Num.:07-7119-6

CAGE:76381

=== Contractor Identification ===

Company Name:MINNESOTA MINING AND MFG CO, DBA 3M

Address:3M CENTER BLDG 224-5S-04

Box:City:SAINT PAUL

State:MN

ZIP:55144-1000

Country:US

Phone:866-556 5712 / 612-733-1110

Contract Num:SP0450-02-M-M144

CAGE:76381

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

Ingred Name:METHYL

NONAFLUOROISOBUTYL ETHER

CAS:163702-08-7

Minumum % Wt:25.

Maxumum % Wt:36.

ACGIH TLV:750 PPM

Ingred Name:METHYL NONAFLUOROBUTYL ETHER

CAS:163702-07-6

Minumum % Wt:15.

Maxumum % Wt:26.

ACGIH TLV:750 PPM

Ingred Name:1,2-TRANS-DICHLOROETHYLENE

CAS:156-60-5

RTECS #:KV9400000

Minumum % Wt:49.

Maxumum % Wt:51.

OSHA PEL:200 PPM

ACGIH TLV:200 PPM

EPA Rpt Qty:1000 LBS

DOT Rpt Qty:1000 LBS

ATE EYE IRRITATION. SKIN:

MODERATE SKIN IRRITATION. INHALATION: CENTRAL NERVOUS SYSTEM DEPRESSION. IRRITATION OF UPPER RESPIRATORY. INGESTION: INGESTION IS NOT A LIKELY ROUTE OF EXPOSURE TO THIS PRODUCT. INGESTION MAY CAUSE CENTRAL NERVOUS SYSTEM DEPRESSION.

Effects of Overexposure:EYE:CAN INCLUDE REDNESS, SWELLING, PAIN, TEARING, AND HAZY VISION. SKIN: CAN INCLUE REDNESS, SWELLING, ITCHING, AND DRYNESS. INHALATION: CAN INCLUDE HEADACHE, DIZZINESS, DROWSINESS, INCOORDINATION, SLOWED REACTION TIME, SLURRED SPEECH,

GIDDINESS & UNCONSCIOUSNESS, SORENESS OF THE NOSE & THROAT, COUGHING & SNEEZING. INGESTION: CAN INCLUDE HEADACHE, DIZZINESS, DROWSINESS, MUSCULAR WEAKNESS, INCOORDINATION, SLOWED REACTION TIME, FATIGUE, BLURRED VISION, SLURRED SPEECH, GIDDINESS, TREMORS & CONVULSIONS.

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

First Aid:EYE: IMMEDIATELY FLUSH EYES WITH LARGE AMOUNTS OF WATER. GET IMMEDIATE MEDICAL ATTENTION.

SKIN: FLUSH SKIN WITH LARGE AMOUNTS OF WATER. IF IRRITATION PERSISTS, GET MEDICAL ATTENTION. INHALATION: REMOVE PERSON TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GET IMMEDIATE MEDICAL ATTENTION. IF SWALLOWED: IF SWALLOWED, DO NOT INDUCE VOMITING. GIVE VICTIM TWO GLASSES OF WATER. CALL A PHYSICIAN IMMEDIATELY. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON.

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

Autoignition Temp:=410.C, 770.F

Lower Limits:NONE

Upper Limits:NONE

Extinguishing Media:WATER, CARBON DIOXIDE, DRY CHEMICAL, DRY POWDER.

Fire Fighting Procedures:"SEE OTHER INFORMATION SECTION"

Unusual Fire/Explosion Hazard:EXTREME CONDITIONS OF HEAT (WELDING, OPEN FLAME, MISUSE, OR EQUIPMENT FAILURE) MAY PRODUCE DECOMPOSITION PRODUCTS THAT INCLUDE HYDROGEN FLUORIDE. NO SMOKING. NFPA HAZARD CODES: HEALTH: 3 FIRE: 1 REACTIVITY: 0. UNUSUAL REACTION HAZARD: NO

NE.

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

Spill Release Procedures: CONTAIN SPILL. COVER WITH ABSORBENT MATERIAL. COLLECT SPILLED MATERIAL. CLEAN UP RESIDUE WITH AN APPROPRIATE ORGANIC SOLVENT. READ AND FOLLOW SAFETY PRECAUTIONS ON THE SOLVENT LABEL AND MSDS. PLACE IN METAL CONTAINER. SEAL THE CONTAINER. FOR SPILLS RESULTING IN LARGE RELEASE IN CONFINED AREA, WARN OTHERS & LEAVE QUICKLY. EXPOSURE TO EXCESS VAPOR IN CONFINED SPACES MAY CAUSE SIGNIFICANT INJURY.

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

Handling and Storage Precautions: STORE AWAY FROM ACIDS. STORE AWAY FROM HEAT. KEEP CONTAINER CLOSED WHEN NOT IN USE. KEEP CONTAINER IN WELL-VENTILATED AREA. STORE AT TEMPERATURES BELOW THE BOILING POINT OF 41°C.

Other Precautions: NO SMOKING: SMOKING WHILE USING THIS PRODUCT CAN RESULT IN CONTAMINATION OF TOBACCO &/OR SMOKE & LEAD TO FORMATION OF HAZARDOUS DECOMPOSITION PRODUCTS CITED IN THE REACTIVITY DATA SECTION OF THIS MSDS. FOR ADDITIONAL HEALTH & PRECAUTIONARY INFORMATION, INCLUDING AIR MONITORING METHODOLOGY, CONTACT 3M.

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

Respiratory Protection: AVOID BREATHING OF VAPORS, MISTS OR SPRAY. SELECT ONE OF THE FOLLOWING NIOSH APPROVED RESPIRATORS BASED ON AIRBORNE CONCENTRATION OF CONTAMINANTS AND IN ACCORDANCE WITH OSHA REGULATIONS: HALF-MASK ORGANIC VAPOR RESPIRATOR, FULL-FACE ORGANIC

VAPOR RESPIRATOR. IF THERMAL DECOMPOSITION OCCURS WEAR SUPPLIED AIR RESPIRATORY PROTECTION.

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

Protective Gloves: POLYETHYLENE/ETHYLENE VINYL ALCOHOL.

Eye Protection: WEAR VENTED GOGGLES. WEAR SAFETY GLASSES WITH SIDE SHIELDS.

Other Protective Equipment: AVOID SKIN CONTACT. WEAR APPROPRIATE GLOVES WHEN HANDLING THIS MATERIAL. USE ONE OR MORE OF THE FOL

## LOWING

PERSONAL PROTECTION ITEMS AS NECESSARY TO PREVENT SKIN CONTACT:  
APRON.

Work Hygienic Practices:DO NOT EAT, DRINK OR SMOKE WHEN USING THIS  
PRODUCT. WASH EXPOSED AREAS THOROUGHLY WITH SOAP AND WATER. NOT AN  
EXPECTED ROUTE OF EXPOSURE.

Supplemental Safety and Health

VENTILATION: IF EXHAUST VENTILATION IS NOT ADEQUATE, USE APPROPRIATE  
RESPIRATORY PROTECTION. FOR SITUATIONS WHERE THE FLUID MIGHT BE  
EXPOSED TO EXTREME OVERHEATING, USE WITH APPROPRIATE LOCAL EXHAUST

VENTILATION SUFFICIENT TO MAINTAIN LEVELS OF THERMAL DECOMPOSITION  
PRODUCTS BELOW EXPOSURE GUIDELINES

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

HCC:N1

Boiling Pt:=41.C, 105.8F

Vapor Pres:383 MMHG @ 25C

Vapor Density:CA. 4.8

Spec Gravity:1.37 G/ML

VOC Pounds/Gallon:685

Viscosity:0.45 CENTIPOISE

Evaporation Rate & Reference:59 (BUOAC=1)

Solubility in Water:SLIGHT

Appearance and Odor:CLEAR, COLORLESS LIQUID. SLIGHT ODOR.

Percent Volatiles by Volume:100

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

Stability Indicator/Materials to Avoid:YES

STRONG ACIDS, STRONG BASES, STRONG OXIDIZING AGENTS.

Stability Condition to Avoid:STRONG ACIDS, STRONG BASES, STRONG  
OXIDIZING AGENTS.

Hazardous Decomposition Products:HYDROGEN FLUORIDE,  
PERFLUOROISOBUTYLENE (PFIB).

Conditions to Avoid Polymerization:WILL NOT OCCUR.

### ===== Toxicological Information =====

Toxicological Information:VOLATILE ORGANIC COMPOUN

DS: 685 GMS/LITER

SOUTH COAST AIR QUALITY MGMT DIST METHOD. VOC LESS H2O & EXEMPT SOLVENTS: N/A. THE TOXICITY INFORMATION ON TRANS-DICHLOROETHYLENE HAS BEEN LIMITED TO STUDIES OF QUESTIONABLE QUALITY. THESE STUDIES SUGGESTED LIVER & KIDNEY TOXICITY AT ELEVATED CONCENTRATIONS. RECENTLY A 90-DAY INHALATION STUDY WAS CONDUCTED TO CLARIFY THE TOXICITY OF TRANS-DICHLOROETHYLENE. NO ADVERSE EFFECTS WERE SEEN IN THIS STUDY WHICH HAD A HIGH DOSE OF 4000 PPM. ANIMAL

STUDIES REVEALED INCREASED LEVELS OF URINARY FLUORIDE AFTER REPEATED EXPOSURE TO THE ETHER COMPONENTS.

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

Ecological:THE ENVIRONMENTAL PROPERTIES OF THIS PRODUCT PRESENT A LOW ENVIRONMENTAL HAZARD. THE COMPONENTS LABELED "RECALCITRANT" ARE RESISTANT TO BIODEGRADATION. THEY ARE THEREFORE LIKELY TO PERSIST IN THE ENVIRONMENT. THIS PRODUCT IS ESTIMATED TO HAVE MINIMAL TOXICITY TO AQUATIC ORGANISMS (100 MG/L < L

OWEST LC50, EC50, OR

IC50 < OR = 1000 MG/L). THE ESTIMATE ASSUMES NO SYNERGISTIC, ANTAGONISTIC OR NONADDITIVE EFFECTS. TAKE PRECAUTIONS TO PREVENT DIRECT RELEASE OF THIS PRODUCT TO THE ENVIRONMENT. ATMOSPHERIC DEGRADATION PRODUCTS ARE EXPECTED TO INCLUDE:FOR METHYL NONAFLUOROISOBUTYL ETHER - CO<sub>2</sub>, HF, CF<sub>3</sub>COOH, & ISOPERFLUOROBUTYRIC ACID.

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

Waste Disposal Methods:AS A DISPOSAL ALTERNATIVE, INCINERATE IN THE

PRESENCE OF A COMBUSTIBLE MATERIAL IN AN INDUSTRIAL OR COMMERCIAL FACILITY CAPABLE OF HANDLING HALOGENATED WASTE. DISPOSE OF COMPLETELY ABSORBED WASTE PRODUCT IN A HAZARDOUS WASTE FACILITY. RECLAIM IF FEASIBLE. FOR INFORMATION ON PRODUCT RETURN, CONTACT YOUR DISTRIBUTOR.

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

Transport Information:TRANSPORTATION INFORMATION: NOT REGULATED, ALL TRANSPORTATION MODES.

===== Regulatory I

nformation =====

SARA Title III Information:EPCRA HAZARD CLASS: FIRE HAZARD: NO  
PRESSURE: NO; REACTIVITY: NO; ACUTE: YES; CHRONIC: YES. EPCRA  
311/312 REPORTABLE QUANTITY = NOT REPORTABLE.

Federal Regulatory Information:THE COMPONENTS OF THIS PRODUCT ARE IN  
COMPLIANCE WITH THE CHEMICAL NOTIFICATION REQUIREMENTS OF TSCA.  
U.S. EPA HAZARDOUS WASTE N0=NONE (NOT U.S. EPA HAZARDOUS). THE  
COMPONENTS OF THIS PRODUCT ARE IN C OMPLIANCE WITH THE CHEMICAL  
REGISTR

ATION REQUIREMENTS OF TSCA, ELINCS, MITI. THE U.S.  
ENVIRONMENTAL PROTECTION AGENCY (EPA) HAS LISTED THE INGREDIENTS OF  
3M(TM) HFE-71DE AS ACCEPTABLE SUBSTITUTES FOR OZONE DEPLETING  
SUBSTANCES IN SPECIFIC SOLVENT CLEANING & AEROSOL INDUSTRY  
APPLICATIONS UNDER ITS SIGNIFICANT NEW ALTERNATIVES PROGRAM  
(SNAP). SECTION 612 OF THE CLEAN AIR ACT REQUIRES THE EPA TO  
ADMINISTER THIS PROGRAM .

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

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vided with this information by the compiling agencies):  
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