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MATERIAL SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

Product Name: NYVAC FR 200D
Product Description: Water-glycol

Product Code: 201560108020, 602151-89
Intended Use: Hydraulic fluid

COMPANY IDENTIFICATION

Manufacturer/Supplier:
For details contact Mobil Korea Lube Oil Inc.
Level 22, Seoul Square bd., 416
Hangang-daero, Jung-gu,
Seoul Republic of Korea

Emergency Response Number	00-308-13-2549 / +1-703-527-3887
Supplier General Contact	82-2-750-8700
FAX	82-2-3671-5000

SECTION 2 HAZARDS IDENTIFICATION

This material is hazardous according to regulatory guidelines (see (M)SDS Section 15).

CLASSIFICATION:

Acute oral toxicant: Category 4. Specific target organ toxicant (repeated exposure): Category 2.

LABEL:

Symbol:



Signal Word: Warning

Hazard Statements:

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Health: H302: Harmful if swallowed. H373: May cause damage to organs through prolonged or repeated exposure. Kidney

Precautionary Statements:

Prevention: P260: Do not breathe mist / vapours. P264: Wash skin thoroughly after handling. P270: Do not eat, drink or smoke when using this product.
 Response: P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. P315: Get immediate medical advice/attention. P309 + P311: IF exposed or if you feel unwell: Call a POISON CENTER or doctor/physician. P330: Rinse mouth.
 Storage: P405: Store locked up.
 Disposal: P501: Dispose of contents and container in accordance with local regulations.

Other hazard information:

PHYSICAL / CHEMICAL HAZARDS
 No significant hazards.

HEALTH HAZARDS
 High-pressure injection under skin may cause serious damage. Ingestion may cause serious adverse effects and may be fatal. May cause kidney failure and central nervous system effects. Prolonged exposure to elevated concentrations of mist or liquid may cause irritation of the skin, eyes, and respiratory tract.

ENVIRONMENTAL HAZARDS
 No significant hazards.

NFPA Hazard ID: Health: 1 Flammability: 1 Reactivity: 0
HMIS Hazard ID: Health: 1* Flammability: 1 Reactivity: 0

NOTE: This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

This material is defined as a mixture.

Hazardous Substance(s) or Complex Substance(s) required for disclosure

Name	CAS#	Concentration*	GHS Hazard Codes
ETHANOL, 2,2-OXYBIS-	111-46-6	40 - < 50%	H302, H373
MORPHOLINE	110-91-8	0.1 - < 1%	H226, H302, H311, H331, H314(1A), H402

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Other Substances

Name	CAS #	Concentration
Trade Secret 01	Trade Secret	30-40%
Trade Secret 02	Trade Secret	10-20%
Total concentration of all substances		100%

ISHL - Prohibited, Subject to an Approval for Manufacturing and Controlled Hazardous Substances: None.

CCA - Toxic, Banned and Restricted Toxic Chemicals, Authorization substances, Accidental Release Prevention Substances and Priority Existing Chemicals to Registration: None.

* All concentrations are percent by weight unless material is a gas. Gas concentrations are in percent by volume.

SECTION 4 FIRST AID MEASURES**EYE CONTACT**

Flush thoroughly with water. If irritation occurs, get medical assistance.

SKIN CONTACT

Wash contact areas with soap and water. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

INHALATION

Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

INGESTION

Seek immediate medical attention. Seek medical attention.

ACUTE AND DELAYED SYMPTOMS/EFFECTS

See Toxicological Section

NOTE TO PHYSICIAN

This product contains ethylene glycol and/or diethylene glycol which, if ingested, are metabolized to toxic metabolites by the enzyme alcohol dehydrogenase, for which ethanol and 4-methylpyrazole {U.S. drug name Fomepizole, trade name Antizol} are antagonists. Administration of oral or intravenous ethanol or intravenous 4-methylpyrazole may arrest further metabolism of this material and thereby ameliorate the toxicity. Use of ethanol or 4-methylpyrazole does not affect toxic

metabolites that are already present and is not a substitute for hemodialysis.

PRE-EXISTING MEDICAL CONDITIONS WHICH MAY BE AGGRAVATED BY EXPOSURE

None.

SECTION 5	FIRE FIGHTING MEASURES
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FLAMMABILITY PROPERTIES

Flash Point [Method]: >101° C (214° F)

Autoignition Temperature: 407° C (765° F)

Flammable Limits (Approximate volume % in air): LEL: N/D UEL: N/D

CLASSIFICATION UNDER THE LAW OF SAFETY MANAGEMENT OF DANGEROUS SUBSTANCES

Category 4. Class 3 petroleum chemicals–water insoluble liquids

EXTINGUISHING MEDIA

Appropriate Extinguishing Media: Use water fog, alcohol-resistant foam, dry chemical or carbon dioxide (CO₂) to extinguish flames.

Fire Fighting Instructions: Evacuate area. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply. Firefighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

Unusual Fire Hazards: Pressurized mists may form a flammable mixture. Hazardous material. Firefighters should consider protective equipment indicated in Section 8.

Hazardous Combustion Products: Aldehydes, Incomplete combustion products, Oxides of carbon, Smoke, Fume

SECTION 6	ACCIDENTAL RELEASE MEASURES
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PROTECTIVE MEASURES

Avoid contact with spilled material. Warn or evacuate occupants in surrounding and downwind areas if required due to toxicity or flammability of the material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders.

NOTIFICATION PROCEDURES

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations.

ENVIRONMENTAL PRECAUTIONS

Remove debris in path of spill and remove contaminated debris from shoreline and water surface and dispose of according to local regulations. Large Spills: Dike far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

SPILL MANAGEMENT

Land Spill: Stop leak if you can do it without risk. Do not touch or walk through spilled material. Recover by pumping or with suitable absorbent.

Water Spill: Stop leak if you can do it without risk. Seek advice of a specialist. This product emulsifies, disperses or is miscible in water.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

SECTION 7	HANDLING AND STORAGE
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HANDLING

Avoid breathing mists or vapors. Avoid all personal contact. Prevent small spills and leakage to avoid slip hazard. Contains amines. Do not add sodium nitrite or other nitrosating agents which may form cancer causing nitrosamines.

Static Accumulator: This material is not a static accumulator.

STORAGE

Do not store in open or unlabelled containers.

SECTION 8	EXPOSURE CONTROLS / PERSONAL PROTECTION
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Control parameters/Exposure limits:

Exposure limits/standards (Note: Exposure limits are not additive)

Substance Name	Form	Limit / Standard			Note	Source	Year
ETHANOL, 2,2-OXYBIS-		TWA	10 mg/m ³			OARS WEEL	2017
MORPHOLINE		STEL	30 ppm		Skin	Korea OELs	2016
MORPHOLINE		TWA	20 ppm		Skin	Korea OELs	2016
MORPHOLINE		TWA	20 ppm		Skin	ACGIH	2018

NOTE: Limits/standards shown for guidance only. Follow applicable regulations.

Biological limits

No biological limits allocated.

ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:

No special requirements under ordinary conditions of use and with adequate ventilation.

PERSONAL PROTECTION

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

Respiratory Protection: If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:

No protection is ordinarily required under normal conditions of use and with adequate ventilation. Organic vapor, Particulate

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapor warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

Eye Protection: If contact is likely, safety glasses with side shields are recommended.

Hand Protection: Any specific glove information provided is based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

No protection is ordinarily required under normal conditions of use. If prolonged or repeated contact is likely, chemical resistant gloves are recommended. If contact with forearms is likely, wear gauntlet style gloves. Nitrile, Viton

Skin and Body Protection: Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:

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No skin protection is ordinarily required under normal conditions of use. In accordance with good industrial hygiene practices, precautions should be taken to avoid skin contact. If prolonged or repeated contact is likely, chemical, and oil resistant clothing is recommended.

Specific Hygiene Measures: Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

ENVIRONMENTAL CONTROLS

Comply with applicable environmental regulations limiting discharge to air, water and soil. Protect the environment by applying appropriate control measures to prevent or limit emissions.

SECTION 9	PHYSICAL AND CHEMICAL PROPERTIES
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Note: Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.

GENERAL INFORMATION

Physical State: Liquid
Color: Red
Odor: Characteristic
Odor Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

pH: 9.5
Solubility in Water: Complete
Boiling Point / Range: 102° C (216° F)
Melting Point: N/D
Freezing Point: N/D
Explosive Properties: N/D
Decomposition Temperature: N/D
Oxidizing Properties: See Sections 2, 15, 16.
Vapor Pressure: 1.756 kPa (13.2 mm Hg) at 20 ° C
Relative Density (at 15 ° C): 1.08
Log Pow (n-Octanol/Water Partition Coefficient): N/D
Vapor Density (Air = 1): N/D
Viscosity: [N/D at 40 ° C]
Molecular Weight: N/D
Flammability (Solid, Gas): N/A
Flash Point [Method]: >101° C (214° F)
Flammable Limits (Approximate volume % in air): LEL: N/D UEL: N/D

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Autoignition Temperature: 407° C (765° F)
Evaporation Rate (n-butyl acetate = 1): N/D

OTHER INFORMATION

Pour Point: -40° C (-40° F) [ASTM D97]

SECTION 10	STABILITY AND REACTIVITY
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STABILITY: Material is stable under normal conditions.

CONDITIONS TO AVOID: Excessive heat. High energy sources of ignition.

MATERIALS TO AVOID: Strong Acids, Strong Bases, Strong oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS: Material does not decompose at ambient temperatures.

POSSIBILITY OF HAZARDOUS REACTIONS: Hazardous polymerization will not occur.

SECTION 11	TOXICOLOGICAL INFORMATION
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INFORMATION ON TOXICOLOGICAL EFFECTS

<u>Hazard Class</u>	<u>Conclusion / Remarks</u>
Inhalation	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Irritation: No end point data for material.	Negligible hazard at ambient/normal handling temperatures.
Ingestion	
Acute Toxicity: No end point data for material.	Moderately toxic. Based on assessment of the components.
Skin	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Skin Corrosion/Irritation: No end point data for material.	Negligible irritation to skin at ambient temperatures. Based on assessment of the components.
Eye	
Serious Eye Damage/Irritation: No end point data for material.	May cause mild, short-lasting discomfort to eyes. Based on assessment of the components.
Sensitization	
Respiratory Sensitization: No end point data for material.	Not expected to be a respiratory sensitizer.
Skin Sensitization: No end point data for material.	Not expected to be a skin sensitizer. Based on assessment of the components.
Aspiration: No end point data for	Not expected to be an aspiration hazard. Based on physico-

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material.	chemical properties of the material.
Germ Cell Mutagenicity: No end point data for material.	Not expected to be a germ cell mutagen. Based on assessment of the components.
Carcinogenicity: No end point data for material.	Not expected to cause cancer. Based on assessment of the components.
Reproductive Toxicity: No end point data for material.	Not expected to be a reproductive toxicant. Based on assessment of the components.
Lactation: No end point data for material.	Not expected to cause harm to breast-fed children.
Specific Target Organ Toxicity (STOT)	
Single Exposure: No end point data for material.	Not expected to cause organ damage from a single exposure.
Repeated Exposure: No end point data for material.	Concentrated, prolonged or deliberate exposure may cause organ damage. Based on assessment of the components.

TOXICITY FOR SUBSTANCES

NAME	ACUTE TOXICITY
MORPHOLINE	Dermal Lethality: LD50 500 mg/kg (Rabbit); Oral Lethality: LD50 1900 mg/kg (Rat)

OTHER INFORMATION

For the product itself:

Target Organs Repeated Exposure: Kidney

Contains:

DIETHYLENE GLYCOL (DEG): Orally, DEG is more toxic to humans than animal test data indicate. Probable lethal dose for an adult is about 50 ml (2 oz.), or 2 -3 swallows. Smaller amounts may cause kidney degeneration and failure. Benign urinary bladder tumors were observed in rats, no tumors were observed in mice.

IARC Classification:

The following ingredients are cited on the lists below: None.

--REGULATORY LISTS SEARCHED--

1 = IARC 1

2 = IARC 2A

3 = IARC 2B

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The information given is based on data for the material, components of the material, or for similar materials, through the application of bridging principals.

ECOTOXICITY

Material -- Not expected to be harmful to aquatic organisms.

MOBILITY

Material -- Expected to remain in water or migrate through soil.

PERSISTENCE AND DEGRADABILITY

Biodegradation:

Material -- Expected to be readily biodegradable.

Atmospheric Oxidation:

Material -- Expected to degrade rapidly in air

BIOACCUMULATION POTENTIAL

Material -- Potential to bioaccumulate is low.

SECTION 13

DISPOSAL CONSIDERATIONS

WASTE TREATMENT LAW: Waste Oil is a designated waste.

DISPOSAL METHODS

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

DISPOSAL RECOMMENDATIONS

Even though this product is biodegradable, it must not be indiscriminately discarded into the environment. Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products. Protect the environment. Dispose of used oil at designated sites. Minimize skin contact. Do not mix used oils with solvents, brake fluids or coolants.

Empty Container Warning Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF

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IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

SECTION 14 TRANSPORT INFORMATION

REGULATION ON SHIP-TRANSPORTATION AND STORAGE OF DANGEROUS SUBSTANCES (SEA (IMDG)) Not Regulated for Sea Transport according to IMDG-Code

Marine Pollutant: No

CAUTIONS FOR TRANSPORT: Not applicable

INTERNATIONAL CLASSIFICATION AND RESTRICTIONS

LAND : Not Regulated for Land Transport

AIR (IATA): Not Regulated for Air Transport

SECTION 15 REGULATORY INFORMATION

This material is considered hazardous according to the Korean Standards for Classification and Labeling of Chemical Substances and Material Safety Data Sheets.

REGULATORY STATUS AND APPLICABLE LAWS AND REGULATIONS

INDUSTRIAL SAFETY AND HEALTH LAW: Regulated. See Hazards Identification Section

CHEMICAL CONTROL ACT (CCA): See Composition/Ingredient Section

LAW OF SAFETY MANAGEMENT OF DANGEROUS SUBSTANCES: See Fire Fighting Measures Section

WASTE TREATMENT LAW: See Disposal Considerations Section

OTHER REGULATIONS BASED ON FOREIGN LAWS

Listed or exempt from listing/notification on the following chemical inventories (May contain substance(s) subject to notification to the EPA Active TSCA inventory prior to import to USA):
AICS, DSL, IECSC, PICCS, TCSI, TSCA

Special Cases:

Inventory	Status
ENCS	Not determined
KECI	Restrictions Apply

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SECTION 16	OTHER INFORMATION
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REFERENCES: Sources of information used in preparing this SDS included one or more of the following: results from in house or supplier toxicology studies, CONCAWE Product Dossiers, publications from other trade associations, such as the EU Hydrocarbon Solvents REACH Consortium, U.S. HPV Program Robust Summaries, the EU IUCLID Data Base, U.S. NTP publications, and other sources, as appropriate.

OTHER INFORMATION

N/D = Not determined, N/A = Not applicable

KEY TO THE H-CODES CONTAINED IN SECTION 3 OF THIS DOCUMENT (for information only):

- H226: Flammable liquid and vapor; Flammable Liquid, Cat 3
- H302: Harmful if swallowed; Acute Tox Oral, Cat 4
- H311: Toxic in contact with skin; Acute Tox Dermal, Cat 3
- H314(1A): Causes severe skin burns and eye damage; Skin Corr/Irritation, Cat 1A
- H331: Toxic if inhaled; Acute Tox Inh, Cat 3
- H373: May cause damage to organs through prolonged or repeated exposure; Target Organ, Repeated, Cat 2
- H402: Harmful to aquatic life; Acute Env Tox, Cat 3

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:

- Section 01: Company Mailing Address information was modified.
- Section 08: Exposure Limits Table information was modified.
- Section 08: Respiratory GEN Standards – AP information was modified.
- Section 12: information was modified.

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