

Product Name: NYVAC FR 200D
Revision Date: 12 May 2022
Page 1 of 13

MATERIAL SAFETY DATA SHEET

MSDS No.: AA00985-0000000042

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

A. Product Name: NYVAC FR 200D

Product Description: Water-glycol

Product Code: 201560108020, 602151-89

B. Recommended Use of Product and Restrictions in Use.

Recommended use of the product: Hydraulic fluids and additives

Restrictions in Use: This product is not recommended for any industrial, professional or consumer use other than the identified uses above.

C. Manufacturer/Supplier information:

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	82-2-750-8751

SECTION 2 HAZARDS IDENTIFICATION

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

A. Hazard Classification:

Acute oral toxicant: Category 4.

B. Label Elements Including Precautionary Statements:

Hazard Pictogram:



Product Name: NYVAC FR 200D
Revision Date: 12 May 2022
Page 2 of 13

Signal Word: Warning

Hazard Statements:

Health: H302: Harmful if swallowed.

Precautionary Statements:

General: P101: If medical advice is needed, have product container or label at hand. P102: Keep out of reach of children. P103: Read label before use.

Prevention: 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.

C. Other Hazards Which Are Not Included In The Classification Criteria

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: 2*	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
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This material is defined as a mixture.

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

Product Name: NYVAC FR 200D

Revision Date: 12 May 2022

Page 3 of 13

Name	Other Name	CAS # or Id. No.	Concentration*	GHS Hazard Codes
ETHANOL, 2,2-OXYBIS-	-	KE-27694	25 - < 50%	H302
MORPHOLINE	-	KE-33492	0.3 - < 1%	H226, H302, H311, H331, H361(D), H361(F), H314(1B), H402
SODIUM 4 (OR 5) -METHYL-1H-BENZOTRIAZOLE	-	KE-23499	0.1 - < 0.2%	H302, H361(D), H314(1B), H401, H411

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

SECTION 4	FIRST AID MEASURES
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A. Eye Contact

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

B. Skin Contact

Wash contact areas with soap and water. Remove contaminated clothing. Launder contaminated clothing before reuse. 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.

C. Inhalation

Immediately remove from further exposure. Get immediate medical assistance. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. Give supplemental oxygen, if available. If breathing has stopped, assist ventilation with a mechanical device.

D. Ingestion

Seek immediate medical attention.

E. Other 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 W{U.S. drug name Fomepizole, trade name AntizolW} 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.

Acute and Delayed Symptoms/Effects

See Toxicological Section

Product Name: NYVAC FR 200D
Revision Date: 12 May 2022
Page 4 of 13

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]: >100° C (212° F)

Autoignition Temperature: 407° C (765° F)

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

A. Suitable (and Unsuitable) Extinguishing Media

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

Inappropriate Extinguishing Media: Straight Streams of Water or Regular Foam

B. Specific Hazards arising from the Chemical

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

C. Special Protective Equipment and Precautions for Fire-fighters

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.

SECTION 6	ACCIDENTAL RELEASE MEASURES
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A. Personal Precautions and Protective Equipment

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.

B. Environmental Precautions and Protective Procedure

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

Remove debris in path of spill and remove contaminated debris from shoreline and water surface and

Product Name: NYVAC FR 200D

Revision Date: 12 May 2022

Page 5 of 13

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.

C. Methods and Materials for Containment and Cleaning Up

Land Spill: Stop leak if you can do it without risk. 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

A. Precautions for Safe Handling

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.

B. Conditions for Safe Storage

Do not store in open or unlabelled containers.

SECTION 8 EXPOSURE CONTROLS AND PERSONAL PROTECTION

A. Exposure Limit Values, Biological Limit Values

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	2018
MORPHOLINE		STEL	30 ppm		Skin	Korea OELs	2020
MORPHOLINE		TWA	20 ppm		Skin	Korea OELs	2020
MORPHOLINE		TWA	20 ppm		Skin	ACGIH	2020

No biological limits allocated.

B. Appropriate Engineering Controls

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:
Adequate ventilation should be provided so that exposure limits are not exceeded.

C. Personal Protective Equipment

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:
Chemical resistant gloves are recommended. 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:
Chemical/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

Product Name: NYVAC FR 200D

Revision Date: 12 May 2022

Page 7 of 13

emissions.

SECTION 9

PHYSICAL AND CHEMICAL PROPERTIES

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.

A. Appearance

Physical State: Liquid

Color: Red

B. Odor: Characteristic

C. Odor Threshold: N/D

D. pH: 9.5

E. Melting Point: N/D

Freezing Point: N/D

F. Initial Boiling Point / Range: 102° C (216° F)

G. Flash Point [Method]: >100° C (212° F)

H. Evaporation Rate (n-butyl acetate = 1): N/D

I. Flammability (Solid, Gas): N/A

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

K. Vapor Pressure: 1.756 kPa (13.2 mm Hg) at 20 ° C

L. Solubility in Water: Complete

M. Vapor Density (Air = 1): N/D

N. Relative Density (at 15 ° C): 1.08 [ASTM D1298]

O. Log Pow (n-Octanol/Water Partition Coefficient): N/D

P. Autoignition Temperature: 407° C (765° F)

Q. Decomposition Temperature: N/D

R. Viscosity: 40 cSt (40 mm²/sec) at 40 ° C [ASTM D 445]

S. Molecular Weight: N/D

Other Information

Pour Point: -50° C (-58° F) [ASTM D97]

SECTION 10

STABILITY AND REACTIVITY

A. Chemical Stability and Possibility of Hazard Reactions

Chemical Stability: Material is stable under normal conditions.

Possibility of Hazardous Reactions: Hazardous polymerization will not occur.

B. Conditions to Avoid: Excessive heat. High energy sources of ignition.

C. Incompatible Materials: Strong Acids, Strong Bases, Strong oxidizers

D. Hazardous Decomposition Products: Material does not decompose at ambient temperatures.

SECTION 11	TOXICOLOGICAL INFORMATION
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A. Information on Likely Routes of Exposure

No data available

B. Information on Health Hazards

Acute Toxicity (Inhalation):

Product

No end point data for material. Minimally Toxic. Based on assessment of the components.

Inhalation Irritation: No end point data for material. Negligible hazard at ambient/normal handling temperatures.

Component

MORPHOLINE Inhalation Lethality: 4 hour(s) LC50 8 mg/l (Vapor) (Rat)

Acute Toxicity (Ingestion):

Product

(Human) LDLo 100 ml Moderately toxic. Based on assessment of the components.

Component

MORPHOLINE Oral Lethality: LD50 1900 mg/kg (Rat)

SODIUM 4 (OR 5) -METHYL-1H-BENZOTRIAZOLE Oral Lethality: LD50 735 mg/kg (Rat)

Acute Toxicity (Dermal)

Product

No end point data for material. Minimally Toxic. Based on assessment of the components.

Component

MORPHOLINE Dermal Lethality: LD50 500 mg/kg (Rabbit)

Skin corrosion/irritation

Product

No end point data for material. Negligible irritation to skin at ambient temperatures. Based on assessment of the components.

Serious eye damage/irritation

Product

No end point data for material. May cause mild, short-lasting discomfort to eyes. Based on assessment of the components.

Respiratory sensitization

Product

No end point data for material. Not expected to be a respiratory sensitizer.

Skin sensitization

Product

No end point data for material. Not expected to be a skin sensitizer. Based on assessment of the components.

Carcinogenicity

Product

No end point data for material. Not expected to cause cancer. Based on assessment of

Product Name: NYVAC FR 200D

Revision Date: 12 May 2022

Page 9 of 13

the components.

Germ cell mutagenicity

Product

No end point data for material. Not expected to be a germ cell mutagen. Based on assessment of the components.

Reproductive toxicity

Product

No end point data for material. Contains a substance that may be a reproductive toxicant. Based on assessment of the components.

Specific target organ toxicity – single exposure

Product

No end point data for material. Not expected to cause organ damage from a single exposure.

Specific target organ toxicity – repeat exposure

Product

No end point data for material. Not expected to cause organ damage from prolonged or repeated exposure. Based on assessment of the components.

Aspiration hazard

Product

No end point data for material. Not expected to be an aspiration hazard. Based on physico-chemical properties of the material.

Other Information

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

SECTION 12	ECOLOGICAL INFORMATION
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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.

Product Name: NYVAC FR 200D
Revision Date: 12 May 2022
Page 10 of 13

A. Ecotoxicity

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

B. Persistence and Degradability

Biodegradation:

Material -- Expected to be readily biodegradable.

Atmospheric Oxidation:

Material -- Expected to degrade rapidly in air

C. Bioaccumulation

Material -- Potential to bioaccumulate is low.

D. Mobility

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

E. Other adverse effects: Not applicable

SECTION 13

DISPOSAL CONSIDERATIONS

A. 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.

B. Disposal precautions

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 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

Product Name: NYVAC FR 200D

Revision Date: 12 May 2022

Page 11 of 13

Transport according to IMDG-Code

- A. UN Number: Not applicable
- B. Proper Shipping Name: Not applicable
- C. Hazard Class & Division: Not applicable
- D. Packing Group: Not applicable
- E. Marine Pollutant: Not applicable
- F. Special Precautions which a user needs to be aware of, or needs to comply with, in connection with transport or conveyance: Not applicable

LAND (ADR/RID) Not Regulated for Land Transport

- A. UN Number: Not applicable
- B. Proper Shipping Name: Not applicable
- C. Hazard Class & Division: Not applicable
- D. Packing Group: Not applicable
- E. Marine pollutants: Only applicable for sea transport
- F. Special Precautions which a user needs to be aware of, or needs to comply with, in connection with transport or conveyance: Not applicable

AIR (IATA) Not Regulated for Air Transport

- A. UN Number: Not applicable
- B. Proper Shipping Name: Not applicable
- C. Hazard Class & Division: Not applicable
- D. Packing Group: Not applicable
- E. Marine pollutants: Only applicable for sea transport
- F. Special Precautions which a user needs to be aware of, or needs to comply with, in connection with transport or conveyance: Not applicable

SECTION 15

REGULATORY INFORMATION

This material is considered hazardous according to Korean GHS classification criteria.

Regulatory Status and Applicable Laws and Regulations

- A. Industrial Safety & Health Act : Prohibited, Subject to an Approval for Manufacturing and Controlled Hazardous Substances: None.
- B. Chemicals Control Act : Toxic, Banned and Restricted Toxic Chemicals, Authorization substances, Accidental Release Prevention Substances and Priority Existing Chemicals to Registration: None.
- C. ACT ON THE SAFETY CONTROL OF HAZARDOUS SUBSTANCES: Category 4. Class 3 petroleum chemicals-water insoluble liquids
- D. Waste Control Act: Waste Oil is a designated waste.

Product Name: NYVAC FR 200D

Revision Date: 12 May 2022

Page 12 of 13

E. Other requirements in domestic and other countries

Listed or exempt from listing/notification on the following chemical inventories : AIIC, DSL, ENCS, IECSC, ISHL, PICCS, TCSI, TSCA

Special Cases:

Inventory	Status
KECI	Restrictions Apply

SECTION 16

OTHER INFORMATION

A. Information sources and 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.

B. The first Issuing date: 17Nov2006

C. Revision number and latest revision date

Revision Number:1

Revision Date: 12 May 2022

D. Others

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(1B): Causes severe skin burns and eye damage; Skin Corr/Irritation, Cat 1B

H331: Toxic if inhaled; Acute Tox Inh, Cat 3

H361(D): Suspected of damaging the unborn child; Repro Tox, Cat 2 (Develop)

H361(F): Suspected of damaging fertility; Repro Tox, Cat 2 (Fertility)

H401: Toxic to aquatic life; Acute Env Tox, Cat 2

H402: Harmful to aquatic life; Acute Env Tox, Cat 3

H411: Toxic to aquatic life with long lasting effects; Chronic Env Tox, Cat 2

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:MSDS reformatted and Implementation of new GHS adoption according to regulation requirements.

Product Name: NYVAC FR 200D

Revision Date: 12 May 2022

Page 13 of 13

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