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MATERIAL SAFETY DATA SHEET

SECTION 1	PRODUCT AND COMPANY IDENTIFICATION
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PRODUCT

Product Name: MOBIL 1 FS X2 5W-50
Product Description: Synthetic Base Stocks and Additives

Product Code: 2015101010V3, 486845-80
Intended Use: Engine oil

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
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This material is not hazardous according to regulatory guidelines (see (M)SDS Section 15).

CLASSIFICATION: Not Applicable
LABEL: Not Applicable
Symbol: Not Applicable
Signal Word: Not Applicable
Hazard Statements: Not Applicable
Precautionary Statements: Not Applicable

Other hazard information:

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PHYSICAL / CHEMICAL HAZARDS

No significant hazards.

HEALTH HAZARDS

High-pressure injection under skin may cause serious damage. Excessive exposure may result in eye, skin, or respiratory irritation.

ENVIRONMENTAL HAZARDS

No significant hazards.

NFPA Hazard ID: Health: 0 Flammability: 1 Reactivity: 0
HMIS Hazard ID: Health: 0 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
1-DECENE, HOMOPOLYMER HYDROGENATED	68037-01-4	10 - < 20%	H304
2-PENTANOL, 4-METHYL-, HYDROGEN PHOSPHORODITHIOATE, ZINC SALT	2215-35-2	0.1 - < 1%	H303, H315, H318, H401, H411
C14-16-18 ALKYL PHENOL	Confidential	0.1 - < 1%	H317, H373
DISTILLATES, HEAVY, C18-50 - BRANCHED, CYCLIC AND LINEAR	848301-69-9	20 - < 40%	H304
PHOSPHORODITHIOIC ACID, MIXED O,O BIS (1,3-DIMETHYLBUTYL AND ISO-PR)ESTERS, ZINC SALTS	84605-29-8	0.1 - < 1%	H303, H315, H318, H401, H411

Other Substances

Name	CAS #	Concentration
Trade Secret 01	Trade Secret	1-5%
Trade Secret 02	Trade Secret	10-20%
Trade Secret 03	Trade Secret	5-10%
Trade Secret 04	Trade Secret	1-5%
Trade Secret 05	Trade Secret	20-30%
Trade Secret 06	Trade Secret	30-40%
Trade Secret 07	Trade Secret	0.1-1%
Trade Secret 08	Trade Secret	1-5%
Trade Secret 09	Trade Secret	1-5%
Trade Secret 10	Trade Secret	10-20%
Total concentration of all substances		100%

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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
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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

First aid is normally not required. Seek medical attention if discomfort occurs.

ACUTE AND DELAYED SYMPTOMS/EFFECTS

See Toxicological Section

NOTE TO PHYSICIAN

None

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]: >200° C (392° F) [ASTM D-92]

Autoignition Temperature: N/D

Flammable Limits (Approximate volume % in air): LEL: 0.9 UEL: 7.0

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EXTINGUISHING MEDIA

Appropriate Extinguishing Media: Use water fog, 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: None

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

Inappropriate Extinguishing Media: Straight Streams of Water

SECTION 6

ACCIDENTAL RELEASE MEASURES

PROTECTIVE MEASURES

Avoid contact with spilled 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

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. Recover by pumping or with suitable absorbent.

Water Spill: Stop leak if you can do it without risk. Confine the spill immediately with booms. Warn other shipping. Remove from the surface by skimming or with suitable absorbents. Seek the advice of a specialist before using dispersants.

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

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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 contact with used product. Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges which may cause an electrical spark (ignition source). When the material is handled in bulk, an electrical spark could ignite any flammable vapors from liquids or residues that may be present (e.g., during switch-loading operations). Use proper bonding and/or ground procedures. However, bonding and grounds may not eliminate the hazard from static accumulation. Consult local applicable standards for guidance. Additional references include American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practice on Static Electricity) or CENELEC CLC/TR 50404 (Electrostatics – Code of practice for the avoidance of hazards due to static electricity).

Static Accumulator: This material is a static accumulator.

STORAGE

The type of container used to store the material may affect static accumulation and dissipation. Do not store in open or unlabelled containers. Keep away from incompatible materials.

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
1-DECENE, HOMOPOLYMER HYDROGENATED	Aerosols (thoracic fraction)	TWA	5 mg/m ³			ExxonMobil	2020
DISTILLATES, HEAVY, C18-50 – BRANCHED, CYCLIC AND LINEAR		TWA	400 ppm			Korea OELs	2018

Exposure limits/standards for materials that can be formed when handling this product: When mists/aerosols can occur the following is recommended: 5 mg/m³ – ACGIH TLV (inhalable fraction).

Biological limits

No biological limits allocated.

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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 special requirements under ordinary conditions of use and with adequate ventilation.

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. 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:

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.

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.

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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

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: Brown

Odor: Characteristic

Odor Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

pH: N/A

Solubility in Water: Negligible

Boiling Point / Range: > 316° C (600° F)

Melting Point: N/A

Freezing Point: N/D

Explosive Properties: N/D

Decomposition Temperature: N/D

Oxidizing Properties: See Sections 2, 15, 16.

Vapor Pressure: < 0.013 kPa (0.1 mm Hg) at 20 ° C

Relative Density (at 15 ° C): 0.85

Log Pow (n-Octanol/Water Partition Coefficient): > 3.5

Vapor Density (Air = 1): > 2 at 101 kPa

Viscosity: 104.3 cSt (104.3 mm²/sec) at 40 ° C | 17.4 cSt (17.4 mm²/sec) at 100 ° C

Molecular Weight: N/D

Flammability (Solid, Gas): N/A

Flash Point [Method]: >200° C (392° F) [ASTM D-92]

Flammable Limits (Approximate volume % in air): LEL: 0.9 UEL: 7.0

Autoignition Temperature: N/D

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

OTHER INFORMATION

Pour Point: -36° C (-33° F)

SECTION 10

STABILITY AND REACTIVITY

STABILITY: Material is stable under normal conditions.

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

MATERIALS TO AVOID: 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.	Minimally 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: Data available.	Not expected to be an aspiration hazard. Based on physico-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	Not expected to cause organ damage from a single exposure.

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

TOXICITY FOR SUBSTANCES

NAME	ACUTE TOXICITY
2-PENTANOL, 4-METHYL-, HYDROGEN PHOSPHORODITHIOATE, ZINC SALT	Oral Lethality: LD50 2230 mg/kg (Rat)

OTHER INFORMATION

For the product itself:

Component concentrations in this formulation would not be expected to cause skin sensitization, based on tests of the components, this formulation, or similar formulations.

Diesel engine oils: Not carcinogenic in animals tests. Used and unused diesel engine oils did not produce any carcinogenic effects in chronic mouse skin painting studies.

Oils that are used in gasoline engines may become hazardous and display the following properties: Carcinogenic in animal tests. Caused mutations in vitro. Possible allergen and photoallergen. Contains polycyclic aromatic compounds (PAC) from combustion products of gasoline and/or thermal degradation products.

Contains:

Synthetic base oils: Not expected to cause significant health effects under conditions of normal use, based on laboratory studies with the same or similar materials. Not mutagenic or genotoxic. Not sensitizing in test animals and humans.

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

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

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Base oil component -- Low solubility and floats and is expected to migrate from water to the land. Expected to partition to sediment and wastewater solids.

SECTION 13	DISPOSAL CONSIDERATIONS
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WASTE CONTROL ACT: 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

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
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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
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This material is not considered hazardous according to Korean GHS classification criteria.

REGULATORY STATUS AND APPLICABLE LAWS AND REGULATIONS

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

ACT ON THE SAFETY CONTROL OF HAZARDOUS SUBSTANCES: Category 4. Class 4 petroleum chemicals

WASTE CONTROL ACT: 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):
AIIIC, DSL, ENCS, IECSC, ISHL, KECI, PICCS, TCSI, TSCA

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):

H303: May be harmful if swallowed; Acute Tox Oral, Cat 5

H304: May be fatal if swallowed and enters airways; Aspiration, Cat 1

H315: Causes skin irritation; Skin Corr/Irritation, Cat 2

H317: May cause allergic skin reaction; Skin Sensitization, Cat 1

H318: Causes serious eye damage; Serious Eye Damage/Irr, Cat 1

H373: May cause damage to organs through prolonged or repeated exposure; Target Organ, Repeated, Cat 2

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

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

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:

Composition: Component Table information was modified.

Section 01: Hazard Classification information was deleted.

Section 05: Dang. Sub. Safety Control Law information was deleted.

Section 08: Exposure Control – Note information was deleted.

Section 08: Exposure Limits Table information was modified.

Section 09: Flash Point C(F) information was deleted.

Section 09: Korea Flash Point C(F) information was added.

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Section 11 Substance Toxicology table information was added.
Section 15: Korean Classification Statement information was deleted.
Section 15: Korean Hazard Statement information was added.
Section 15: National Chemical Inventory Listing information was modified.
Section 15: Special Cases Table information was deleted.
Section 16: HCode Key information was modified.

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