SDS(Safety Data Sheet)

Product	Kixx Grease EP 000		
MSDS Number	List No.	Issuing date	Last revised date
-	LB2989	2012-11-30	2026-02-05

1. IDENTIFICATION

1) Product name

Kixx Grease EP 000

2) Recommended use of the chemical and restriction on use

- Recommended use Lubricants
- Restrictions on use Do not use for any other purpose.

3) Details of the supplier of the safety data sheet

○ **Manufacturer**

- Company name GS Caltex Corporation
- Address GS Tower, 508, Nonhyeon-ro, Gangnam-gu, Seoul, Korea
- Emergency telephone number 1899-5145

2. HAZARDS IDENTIFICATION

1) Classification of the product

- Not applicable

2) Label elements

○ **Hazard pictograms**

- Not applicable

○ **Signal word**

- Not applicable

○ **Hazard statements**

- Not applicable

○ **Precautionary statements**

1) Prevention

- Not applicable

2) Response

- Not applicable

3) Storage

- Not applicable

4) Disposal

- Not applicable

3) Other hazards

○ **Product NFPA Level**

(※ 0-Lack, 1-Low, 2-Moderate, 3-High, 4-Very High)

Product name	Health	Flammable	Reaction
Kixx Grease EP 000	0	0	0

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical name	Trade names and Synonyms	CAS No.	EC No.	Contain Ratio(%)
Distillates (petroleum), hydrotreated heavy paraffinic	Emulsifiable oil	64742-54-7	265-157-1	67 ~ 73
Distillates, petroleum, solvent-refined heavy naphthenic		64741-96-4	265-097-6	15 ~ 22
Polyisobutylene	Propene, 2-methyl-, polymers	9003-27-4		7 ~ 11
12-Hydroxyoctadecanoic acid monolithium salt	lithium 12-hydroxystearate	7620-77-1	231-536-5	1 ~ 3
Oils, animal, mixed with vegetable oils, sulfurized	Mixed non-marine animal oils and mixed vegetable oils, sulfurized	68991-19-5	273-639-8	1 ~ 2
Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts	; DI-C1-14 ALKYL DITHIOPHOSPHORIC ACID, ZINC SALT ;Dialkyl(C1-C14)dithiophosphoric acid, zinc salt	68649-42-3	272-028-3	1 ~ 2
Tributyl borate	Butylborate (6CI,7CI)	688-74-4	211-706-5	0 ~ 0.5
Business Secret				0 ~ 0.3
N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene		68411-46-1	270-128-1	0 ~ 0.1
(Z)-N-Methyl-N-(1-oxo-9-octadecenyl)glycine	N-Oleoylsarcosine;N-cis-Octadecenoylsarcosine;N-OLEOYLSARCOSINE	110-25-8	203-749-3	0 ~ 0.1
Paraffin oils (petroleum), catalytic dewaxed heavy	MINERAL OIL, PETROLEUM DISTILLATES CATALYTIC DEWAXED HEAVY PARAFFINIC (mild or no solvent-refining o	64742-70-7	265-174-4	0 ~ 0.1

※ Except for the above components, all components are not listed as they do not meet the criteria for hazardous risk classification in Article 104 (Classification of Hazardous Factors) of Regulated Acts and Occupational Safety and Health Act.

※ This product has less than 3% DMSO extract as measured by the IP346 method.

4. FIRST AID MEASURES

1) Eye contact	- In case of contact with material, immediately flush eyes with running water for at least 15 minutes. - If eye irritation persists: Get medical advice/attention.
2) Skin contact	- In case of contact with material, immediately flush skin with running water for at least 15 minutes. - Remove and isolate contaminated clothing and shoes. - Launder contaminated clothing and shoes before re-use. - If skin irritation occurs: Get medical advice/attention.
3) Inhalation	- Move victim to fresh air. - Give artificial respiration if victim is not breathing. - Administer oxygen if breathing is difficult. - If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician.
4) Ingestion	- If unconscious but breathing, never give anything by mouth - If swallowed do not induce vomiting, seek medical advice immediat. - Get immediate medical advice/attention. - Rinse mouth.
5) Indication of any immediate medical attention and special treatment needed	- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

5. FIRE FIGHTING MEASURES

1) Suitable (and unsuitable) extinguishing media	- Small fire: Dry sand, dry chemical, alcohol-resistant foam, water spray, regular foam, CO2 (Suitable extinguishing media) - Large fire: Water spray/fog, regular foam (Suitable extinguishing media) - High-pressure water (Unsuitable extinguishing media)
2) Special hazards arising from the substance or mixture	- May be ignited by heat, sparks or flames. - Fire may produce irritating and/or toxic gases. - May cause toxic effects if inhaled.
3) Special protective equipment and precautions for firefighters	- Substance may be transported hot. - Runoff may cause pollution. - Contact may cause burns to skin and eyes. - Dike fire-control water for later disposal; do not scatter the material. - Move containers from fire area if you can do it without risk. - Fire involving Tanks: Cool containers with flooding quantities of water until well after fire is out. - Fire involving Tanks: Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. - Fire involving Tanks: ALWAYS stay away from tanks engulfed in fire.

6. ACCIDENTAL RELEASE MEASURES

1) Health considerations and protective equipment

- Do not touch or walk through spilled material.
- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- Ventilate the contaminated area.
- Stop leak if you can do it without risk.
- Prevent dust cloud.
- Please note that materials and conditions to be avoided.

2) Environmental precautions

- Prevent entry into waterways, sewers, basements or confined areas.

3) Methods and material for containment and cleaning up

- Small Spill: Flush area with flooding quantities of water.
- Large Spill: Dike far ahead of liquid spill for later disposal.
- With clean shovel place material into clean, dry container and cover loosely; move containers from spill area.
- Cover powder spill with plastic sheet or tarp to minimize spreading and keep powder dry.
- Small Spill: Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal.

7. HANDLING AND STORAGE

1) Precautions for safe handling

- Wash ... thoroughly after handling.
- Please note that materials and conditions to be avoided.
- Handling refer to engineering control/personal protection section.
- Cuation: High temperature

2) Conditions for safe storage (including any incompatibilities)

- Store in a dry place. Store in a closed container.
- Please note that materials and conditions to be avoided.
- Store in a closed container.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

1) Control parameters

Chemical name	Exposure limits	ACGIH TLV	OSHA PEL	Biological limit values(BLV)
Distillates (petroleum), hydrotreated heavy paraffinic	TWA :Not available	TWA 5 mg/m3, Inhalable particulate matter(Mineral oil, Pure, highly and severely refined)	Not available	Not available

Distillates, petroleum, solvent-refined heavy naphthenic	TWA :Not available	TWA 5 mg/m3, Inhalable particulate matter(Mineral oil, Pure, highly and severely refined)	Not available	Not available
Polyisobutylene	Not available	Not available	Not available	Not available
12-Hydroxyoctadecanoic acid monolithium salt	Not available	Not available	Not available	Not available
Oils, animal, mixed with vegetable oils, sulfurized	Not available	Not available	Not available	Not available
Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts	Not available	Not available	Not available	Not available
Tributyl borate	Not available	Not available	Not available	Not available
Octadecanoic acid	Not available	TWA 10 mg/m3, Total particulate mass	Not available	Not available
N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene	Not available	Not available	Not available	Not available
(Z)-N-Methyl-N-(1-oxo-9-octadecenyl)glycine	Not available	Not available	Not available	Not available
Paraffin oils (petroleum), catalytic dewaxed heavy	Not available	TWA 5 mg/m3, Inhalable particulate matter(Mineral oil, Pure, highly and severely refined)	Not available	Not available

2) Appropriate engineering controls

- Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.
- Adjust the ventilation rate to suit the condition.

3) Personal protection equipment

○ **Respiratory protection**
- Wear a adequate respiratory protection equipment with certificate by considering physicochemical properties of exposured particulate material.
- In case exposured to particulate material, the respiratory protective equipments as follow are recommended. - facepiece filtering respirator or air-putifying respirator, high-efficiency particulate air(HEPA) filter media or resporator equipped with power
- In lack of oxigan(<19.6%), wear the supplied-air respiratior or self-contained breathing apparatus.
- Consider the warning characteristics beforehand.

○ **Eye protection**
- Wear breathable safety goggles to protect from material causing eye irritation or other disorder.
- An eye wash unit and safety shower station should be available nearby work place.

- In case of direct exposure or potential exposure to the substance, wear safety glasses for chemicals approved in the country.

○ **Hand protection**

- Wear appropriate protective gloves by considering physical and chemical properties of chemicals.
- In case of direct exposure or potential exposure to the substance, wear safety gloves for chemicals approved in the country.

○ **Body protection**

- Wear appropriate protective clothing by considering physical and chemical properties of chemicals.
- In case of direct exposure or potential exposure to the substance, wear protective clothing for chemicals approved in the country.

9. PHYSICAL AND CHEMICAL PROPERTIES

Item	Input Value
Apperance	Solid
Color	No Data
Smell	a specific smell of Hydrocarbon
Smell Threshold	No Data
pH (Numerical value)	No Data
Melting/Freezing Point	No Data
Boilling Point	No Data
Flash Point	No Data
Evaporating Rate	No Data
Flammability(Solid, Gas)	No Data
Explosibility Range	No Data
Steam Pressure	No Data
Solubility	No Data
Vapor Density	No Data
Specific Gravity	0.891
Distribution Coefficient	No Data
SelfIgnition Temperature	No Data
Pyrolysis Temperature	No Data
Viscosity	No Data
Molecular Weight	No Data

10. STABILITY AND REACTIVITY

1) Chemical Stability and hazardous reactivity
- Stable under normal temperatures and pressures.
- Containers may explode when heated.
- Some may burn but none ignite readily.

2) Conditions to avoid
- Ignition source(heat, spark, flame)

3) Incompatible materials
- Combustibles
- Irritating and/or toxic gas

4) Hazardous decomposition products
- Not available

11. TOXICOLOGICAL INFORMATION

1) Information on the likely routes of exposures

○ **Inhalation**

- No inhalation effects through respiratory system.

○ **Skin contact**

- No effect on skin contact.

○ **Eye contact**

- No effect on eye contact.

○ **Ingestion**

- No ingestion effect through mouth.

2) Health hazard information

○ **Acute toxicity**

*** Oral - Not classified (ATEmix > 2000 mg/kg)**

- Distillates (petroleum), hydrotreated heavy paraffinic : rat(male/female), LD50 > 5,000 mg/kg bw, no deaths (read-across: 64742-56-9) (OECD TG 401, GLP) (ECHA)
- Distillates, petroleum, solvent-refined heavy naphthenic : rat(male/female); LD50 > 5000 ㎎/㎏ bw, no deaths (OECD TG 401, GLP) (read across: 64742-56-9) (ECHA)
- Polyisobutylene : Not available
- 12-Hydroxyoctadecanoic acid monolithium salt : rat; LD50 > 5000 ㎎/㎏ bw, no deaths (equivalent or similar to guideline OECD TG 401) (ECHA)
- Oils, animal, mixed with vegetable oils, sulfurized : Not available
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : rat; LD50 = 3100 mg/kg bw (read across: zinc bis(O,O?diisooctyl) bis(dithiophosphate) (ECHA)
- Tributyl borate : rat(male/female); LD50(f) = 4080 mg/kg bw (read across : boric acid) (ECHA)
- Octadecanoic acid : rat(male/female), LD50 > 5000 mg/kg bw (OECD TG 401) (ECHA)
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : rat(male/female); LD50 > 5000 ㎎/㎏ bw, no deaths (OECD TG 401) (ECHA)
- (Z)-N-Methyl-N-(1-oxo-9-octadecenyl)glycine : Not available
- Paraffin oils (petroleum), catalytic dewaxed heavy : rat(male/female); LD50 > 5000 ㎎/㎏ bw, no deaths (OECD TG 401, GLP) (read across: 64742-56-9) (ECHA)

*** Dermal - Not classified (ATEmix > 2000 mg/kg)**

- Distillates (petroleum), hydrotreated heavy paraffinic : rabbit(male/female), LD50 > 5,000 mg/kg bw, no deaths (read-across: 64742-56-9) (OECD TG 402, GLP) (ECHA)

- Distillates, petroleum, solvent-refined heavy naphthenic : rabbit(male/female); LD50 > 5000 ㎎/㎏ bw, no deaths (OECD TG 402, GLP) (read across: 64742-56-9) (ECHA)
- Polyisobutylene : Not available
- 12-Hydroxyoctadecanoic acid monolithium salt : rat; LD50 > 2000 ㎎/㎏ bw, no deaths (ECHA)
- Oils, animal, mixed with vegetable oils, sulfurized : Not available
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : rabbit(male/female); LD50 > 3160 mg/kg bw, no deaths (ECHA)
- Tributyl borate : Not available
- Octadecanoic acid : rabbit(male/female), LD50 > 2000 mg/kg bw (equivalent or similar to guideline OECD TG 434) (ECHA)
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : rat(male/female); LD50 > 2000 ㎎/㎏ bw, no deaths (OECD TG 402) (ECHA)
- (Z)-N-Methyl-N-(1-oxo-9-octadecenyl)glycine : Not available
- Paraffin oils (petroleum), catalytic dewaxed heavy : rabbit(male/female); LD50 > 5000 ㎎/㎏ bw, no deaths (OECD TG 402, GLP) (read across: 64742-56-9) (ECHA)

*** Inhalation(Gas) - Not applicable**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Distillates, petroleum, solvent-refined heavy naphthenic : Not applicable
- Polyisobutylene : Not applicable
- 12-Hydroxyoctadecanoic acid monolithium salt : Not applicable
- Oils, animal, mixed with vegetable oils, sulfurized : Not applicable
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Not applicable
- Tributyl borate : Not applicable
- Octadecanoic acid : Not applicable
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : Not applicable
- (Z)-N-Methyl-N-(1-oxo-9-octadecenyl)glycine : Not applicable
- Paraffin oils (petroleum), catalytic dewaxed heavy : Not applicable

*** Inhalation(Vapour) - Not applicable**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not available
- Distillates, petroleum, solvent-refined heavy naphthenic : Not available
- Polyisobutylene : Not available
- 12-Hydroxyoctadecanoic acid monolithium salt : Not available
- Oils, animal, mixed with vegetable oils, sulfurized : Not available
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : rat; LC50 > 5 mg/L air, no deaths (no data for exposure time)(ECHA)
- Tributyl borate : Not available
- Octadecanoic acid : inhalation: vapour, rat(male/female), 4h-LC50 > 0.162 mg/L (read across: 124-07-2) (ECHA)
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : Not available
- (Z)-N-Methyl-N-(1-oxo-9-octadecenyl)glycine : Not available
- Paraffin oils (petroleum), catalytic dewaxed heavy : Not available

*** Inhalation(Dust, mist) - Not classified (ATEmix > 5 mg/L)**

- Distillates (petroleum), hydrotreated heavy paraffinic : inhalation: aerosol; rat(male/female); 4h-LC50 > 5.53 mg/L. No deaths (read-across: MRD-87-102) (OECD TG 403)(ECHA)
- Distillates, petroleum, solvent-refined heavy naphthenic : rat(male/female); inhalation: aerosol; LC50 > 5.53

mg/L air /4h, no deaths (OECD TG 403) (read across: MRD-87-102) (ECHA)

- Polyisobutylene : Not available
- 12-Hydroxyoctadecanoic acid monolithium salt : Not available
- Oils, animal, mixed with vegetable oils, sulfurized : Not available
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Not available
- Tributyl borate : Not available
- Octadecanoic acid : Not available
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : Not available
- (Z)-N-Methyl-N-(1-oxo-9-octadecenyl)glycine : Not available
- Paraffin oils (petroleum), catalytic dewaxed heavy : rat(male/female); inhalation: aerosol; LC50 > 5.53 mg/L air /4h, no deaths (OECD TG 403) (read across: MRD-87-102) (ECHA)

○ **Skin corrosion/Irritation : Not classified**

- Distillates (petroleum), hydrotreated heavy paraffinic	:	Solvent dewaxed light paraffinic oil is not considered to be irritating to the skin of rabbits. (read across : 64742-56-9) (GLP) (ECHA)
- Distillates, petroleum, solvent-refined heavy naphthenic	:	rabbit; not irritating (GLP) (read across: 64742-56-9) (ECHA)
- Polyisobutylene	:	Not available
- 12-Hydroxyoctadecanoic acid monolithium salt	:	human epidermis model; not irritating (read across: 20336-96-3) (OECD TG 439, GLP) (ECHA)
- Oils, animal, mixed with vegetable oils, sulfurized	:	Not available
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts	:	rabbit; irritating (PDII = 4) (read across: Cetrimonium chloride (CAS No: 112-02-7))(ECHA)
- Tributyl borate	:	rabbit; not irritating (FIFRA (40 CFR 163)) (read across : Boric acid) (ECHA)
- Octadecanoic acid	:	rabbit; not irritating (ECHA)
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene	:	rabbit; not irritating (OECD TG 404) (ECHA)
- (Z)-N-Methyl-N-(1-oxo-9-octadecenyl)glycine	:	Not available
- Paraffin oils (petroleum), catalytic dewaxed heavy	:	rabbit; not irritating (GLP) (read across: 64742-56-9) (ECHA)

○ **Serious eye damage/irritation : Not classified**

- Distillates (petroleum), hydrotreated heavy paraffinic	:	Solvent dewaxed light paraffinic oil is not considered to be an ocular irritant. (read-aross: 64742-56-9) (equivalent or similar to guideline OECD TG 405, GLP) (ECHA)
- Distillates, petroleum, solvent-refined heavy naphthenic	:	rabbit; not irritating (OECD TG 405, GLP) (read across: 64742-56-9) (ECHA)
- Polyisobutylene	:	Not available
- 12-Hydroxyoctadecanoic	:	rabbit; not irritating (read across: 20466-33-5) (OECD TG 405, GLP) (ECHA)

acid monolithium salt

- Oils, animal, mixed with vegetable oils, sulfurized : Not available
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : rabbit; irritating (read across: Stearyltrimethylammonium chloride) (OECD TG 405)(ECHA)
- Tributyl borate : rabbit; not irritating (OECD TG 405, GLP) (read across : Boric acid) (ECHA)
- Octadecanoic acid : rabbit; not irritating (ECHA)
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : rabbit; not irritating (OECD TG 405) (ECHA)
- (Z)-N-Methyl-N-(1-oxo-9-octadecenyl)glycine : Not available
- Paraffin oils (petroleum), catalytic dewaxed heavy : rabbit; not irritating (OECD TG 405, GLP) (read across: 64742-56-9) (ECHA)

○ **Respiratory sensitization : Not classified**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not available
- Distillates, petroleum, solvent-refined heavy naphthenic : Not available
- Polyisobutylene : Not available
- 12-Hydroxyoctadecanoic acid monolithium salt : Not available
- Oils, animal, mixed with vegetable oils, sulfurized : Not available
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Not available
- Tributyl borate : Not available
- Octadecanoic acid : Not available
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : Not available
- (Z)-N-Methyl-N-(1-oxo-9-octadecenyl)glycine : Not available
- Paraffin oils (petroleum), catalytic dewaxed heavy : Not available

○ **Skin sensitization : Not classified**

- Distillates (petroleum), hydrotreated heavy paraffinic : Under the conditions of the test, Solvent dewaxed light paraffinic oil is considered non-sensitizing for guinea-pigs. (read-aross: 64742-56-9) (OECD TG 406, GLP) (ECHA)
- Distillates, petroleum, solvent-refined heavy : guinea pig; not sensitising (OECD TG 406, GLP) (read across: 64742-53-6) (ECHA)

naphthenic

- Polyisobutylene : Not available
- 12-Hydroxyoctadecanoic acid monolithium salt : mouse; not sensitising (read across: 502962-81-4) (OECD TG 429, GLP) (ECHA)
- Oils, animal, mixed with vegetable oils, sulfurized : Not available
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Human(patch test); not sensitising(positive reaction index=0) (read across: Cetrimonium chloride (CAS No: 112-02-7))(ECHA)
- Tributyl borate : guinea pig; not sensitising (OECD TG 406, GLP) (read across : Boric acid) (ECHA)
- Octadecanoic acid : guinea pig; not sensitising (read across: 334-48-5) (ECHA)
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : guinea pig; not sensitising (OECD TG 406, GLP) (ECHA)
- (Z)-N-Methyl-N-(1-oxo-9-octadecenyl)glycine : Not available
- Paraffin oils (petroleum), catalytic dewaxed heavy : guinea pig; not sensitising (OECD TG 406, GLP) (read across: 64742-53-6) (ECHA)

○ **Carcinogenicity : Not classified**

- Distillates (petroleum), hydrotreated heavy paraffinic : EU CLP 1272/2008 : Carc. 1B (Note L : The classification as a carcinogen need not apply if it can be shown that the substance contains less than 3% DMSO extract as measured by IP 346)
- Distillates, petroleum, solvent-refined heavy naphthenic : EU CLP 1272/2008 : Carc. 1B (Note L : The classification as a carcinogen need not apply if it can be shown that the substance contains less than 3% DMSO extract as measured by IP 346)
- Polyisobutylene : IARC, EU CLP 1272/2008, OSHA, ACGIH, US EPA IRIS, NTP : not listed
- 12-Hydroxyoctadecanoic acid monolithium salt : IARC, EU CLP 1272/2008, OSHA, ACGIH, US EPA IRIS, NTP : not listed
- Oils, animal, mixed with vegetable oils, sulfurized : IARC, EU CLP 1272/2008, OSHA, ACGIH, US EPA IRIS, NTP : not listed
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : IARC, EU CLP 1272/2008, OSHA, ACGIH, US EPA IRIS, NTP : not listed
- Tributyl borate : IARC, EU CLP 1272/2008, OSHA, ACGIH, US EPA IRIS, NTP : not listed
- Octadecanoic acid : IARC, EU CLP 1272/2008, OSHA, ACGIH, US EPA IRIS, NTP : not listed
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : IARC, EU CLP 1272/2008, OSHA, ACGIH, US EPA IRIS, NTP : not listed
- (Z)-N-Methyl-N-(1-oxo-9-octadecenyl)glycine : IARC, EU CLP 1272/2008, OSHA, ACGIH, US EPA IRIS, NTP : not listed
- Paraffin oils (petroleum), catalytic dewaxed heavy : EU CLP 1272/2008: Carc. 1B (Note L: Lubricant base oils are non-carcinogenic if DMSO extract as measured by IP346 is less than 3% and are considered sufficiently refined.)

○ **Germ cell mutagenicity : Not classified**

- Distillates (petroleum), hydrotreated heavy paraffinic : In vitro bacterial reverse mutation assay: negative (equivalent or similar to guideline OECD TG 471) (ECHA)
In vitro mammalian chromosome aberration test: negative (read-aross : 64742-53-6) (equivalent or similar to guideline OECD TG 473, GLP) (ECHA)
In vivo micronucleus assay : negative (read-across : 64741-62-4, 64741-53-3) (equivalent or similar to guideline OECD TG 474) (ECHA)
- Distillates, petroleum, solvent-refined heavy naphthenic : In vitro Bacterial Reverse Mutation Assay : positive (OECD TG 471) (read across: 64741-50-0) (ECHA), In Vitro Mammalian Chromosome Aberration Test : negative (OECD TG 473) (read across: L-06 Light Hydrotreated Feedstock) (ECHA)
In vivo Mammalian Erythrocyte Micronucleus Test : negative (OECD TG 474) (read across: solvent-extracted, dewaxed paraffin oil) (ECHA)
- Polyisobutylene : In vitro Cell Transformation: positive (US Dashboard)
- 12-Hydroxyoctadecanoic acid monolithium salt : In Vitro Bacterial Reverse Mutation Assay : negative (OECD TG 471, GLP) (ECHA)
In Vitro Mammalian Cell Gene Mutation Test : negative (OECD TG 476, GLP) (ECHA)
In vivo : Not available
- Oils, animal, mixed with vegetable oils, sulfurized : Not available
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : In vitro - Bacterial reverse mutation test ; Negative (OECD TG 471) (read across; Cetrimonium chloride (CAS No: 112-02-7), 2',4',5',7'-tetrabromo-4,5,6,7-tetrachloro-3',6'-dihydroxy-3H-spiro[2-benzofuran-1,9'-xanthen]-3-one) (ECHA)
In vivo: Not available
- Tributyl borate : In vitro bacterial reverse mutation assay : negative (OECD TG 471) (ECHA)
In vivo : Not available
- Octadecanoic acid : in vitro bacterial reverse mutation assay : negative (OECD TG 471) (ECHA)
In vivo : not available
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : In vitro Bacterial Reverse Mutation Assay : negative (OECD TG 471) (ECHA)
In vivo rodent dominant lethal assay : negative (OECD TG 478) (ECHA)
- (Z)-N-Methyl-N-(1-oxo-9-octadecenyl)glycine : Not available
- Paraffin oils (petroleum), catalytic dewaxed heavy : In vitro Bacterial Reverse Mutation Assay : positive (OECD TG 471) (read across: 64741-50-0) (ECHA), In Vitro Mammalian Chromosome Aberration Test : negative (OECD TG 473) (read across: L-06 Light Hydrotreated Feedstock) (ECHA)
In vivo Mammalian Erythrocyte Micronucleus Test : negative (OECD TG 474) (read across: solvent-extracted, dewaxed paraffin oil) (ECHA)

○ **Reproductive toxicity : Not classified**

- Distillates (petroleum), hydrotreated heavy paraffinic : rat; screening for reproductive / developmental toxicity; Reproductive performance was not adversely affected at any dose level evaluated. There were no neonatal toxicity observed at any dose level. There were no differences in terms of systemic toxicity between either of the dose formulations. (read-aross : Chevron 100 Neutral) (OECD TG 421, GLP) (ECHA)
- Distillates, petroleum, : rat(male/female); 1000 mg/kg/day; Reproduction / Developmental Toxicity

solvent-refined heavy naphthenic		Screening Test; Reproductive performance was not adversely affected at any dose level evaluated. There were no neonatal toxicity observed at any dose level. There were no differences in terms of systemic toxicity between either of the dose formulations. (OECD TG 421, GLP) (read across: Chevron 100 Neutral) (ECHA)
- Polyisobutylene	:	Not available
- 12-Hydroxyoctadecanoic acid monolithium salt	:	rat(male/female); dermal; 0; 100; 300; 1000 mg/kg bw; did not result in any adverse reproductive effects or any definitive test article-related changes in the development or survival of the offspring. (OECD TG 422, GLP) (ECHA)
- Oils, animal, mixed with vegetable oils, sulfurized	:	Not available
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts	:	In a developmental toxicity study, Sprague-Dawley female rats were treated with Quat-Silsesquioxane in the concentration of 0, 100, 300, or 1000 mg/kg/day orally by gavage in corn oil.No maternal mortality and clinical signs or behavioral changes were observed in treated female rats as compared to control. NOAEL(P)=300 mg/kg bw, NOAEL(F1)=1000 mg/kg bw (read across : Quaternary Silsesquioxane)(ECHA)
- Tributyl borate	:	Not available
- Octadecanoic acid	:	rat(male/female); oral; 100, 300, 1000 mg/kg bw/d; NOAEL=1000 mg/kg bw/day (no adverse substance -related findings on fertility were noted.), NOAEL(maternal toxicity, developmental toxicity)=1000 mg/kg bw/day (OECD TG 422, GLP) (read across: Docosanoic acid)(ECHA)
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene	:	rat(male/female); 25, 75 and 225 mg/kg bw; No toxicologically relevant effects on reproductive parameters were noted with treatment up to 225 mg/kg bw/day. The mating, fertility and conception indices, precoital time, and number of corpora lutea and implantation sites were unaffected by treatment. No toxicologically relevant effects on the gestation index and duration, parturition, maternal care or on most aspects of early postnatal pup development (clinical signs, body weight and macroscopy) were observed up to 225 mg/kg bw/day. (OECD TG 422, GLP) (ECHA)
- (Z)-N-Methyl-N-(1-oxo-9-octadecenyl)glycine	:	Not available
- Paraffin oils (petroleum), catalytic dewaxed heavy	:	rat(male/female); 1000 mg/kg/day; Reproduction / Developmental Toxicity Screening Test; Reproductive performance was not adversely affected at any dose level evaluated. There were no neonatal toxicity observed at any dose level. There were no differences in terms of systemic toxicity between either of the dose formulations. (OECD TG 421, GLP) (read across: Chevron 100 Neutral) (ECHA)

○ **Specific target organ toxicity (single exposure) : Not classified**

- Distillates (petroleum), hydrotreated heavy paraffinic	:	Hydronephrosis of the right kidney was observed in one rat but was not considered treatment-related by the study authors. No other abnormalities were observed in any male or female rats. (read-across: 64742-56-9) (OECD TG 401, GLP)(ECHA) Dermal administration of API 78-9 at 5000 mg/kg did not result in any dermal irritation or signs of clinical toxicity. Gross necroscopy did not reveal any signs of systemic toxicity at the 5000 mg/kg dose level. (read-across: 64742-56-9)

(OECD TG 402, GLP)(ECHA)

- Distillates, petroleum, solvent-refined heavy naphthenic : oral; rat(male/female); No clinical signs of toxicity observed in either male or female rats. LD50 > 5000 ㎎/kg bw, no deaths (OECD TG 401, GLP) (read across: 64742-56-9) (ECHA)
  dermal; rabbit(male/female); No visible signs of clinical toxicity were observed in male and female rabbits dosed with API 78-9 at 5000 mg/kg. LD50 > 5000 ㎎/kg bw, no deaths (OECD TG 402, GLP) (read across: 64742-56-9) (ECHA)
  inhalation: aerosol; rat(male/female); The test material which was deposited on the animal fur during exposure diminished by observation Day 10. No mortality in either the control or exposed group was reported. There were no statistically significant differences in mean body weight between groups. LC50 > 5.53 mg/L air /4h, no deaths (OECD TG 403) (read across: MRD-87-102) (ECHA)
- Polyisobutylene : Not available
- 12-Hydroxyoctadecanoic acid monolithium salt : dermal; rat; Clinical toxicity: No toxicologically significant signs were observed. LD50 > 2000 ㎎/kg bw, no deaths (ECHA)
- Oils, animal, mixed with vegetable oils, sulfurized : Not available
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Significant effects not observed. (ECHA)
- Tributyl borate : oral; rat(male/female); Symptoms include sings of CNS depression, ataxia, convulsions, laboured breathing or rapid respiration; blood crust around nose, marked diarrhoea and ptosis. LD50(f) = 4080 mg/kg bw (read across : boric acid) (ECHA)
- Octadecanoic acid : Dermal; rabbit(male/female); Necropsy of all surviving animals revealed no macroscopic abnormalities. One animal received for necropsy on day 7 showed severe consolidation of the lungs. (OECD TG 434)(ECHA)
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : oral; rat(male/female); No compound related gross organ changes were observed. LD50 > 5000 ㎎/kg bw, no deaths (OECD TG 401) (ECHA)
  dermal; rat(male/female); No adverse findings noted. LD50 > 2000 ㎎/kg bw, no deaths (OECD TG 402) (ECHA)
- (Z)-N-Methyl-N-(1-oxo-9-octadecenyl)glycine : Not available
- Paraffin oils (petroleum), catalytic dewaxed heavy : oral; rat(male/female); No clinical signs of toxicity observed in either male or female rats. LD50 > 5000 ㎎/kg bw, no deaths (OECD TG 401, GLP) (read across: 64742-56-9) (ECHA)
  dermal; rabbit(male/female); No visible signs of clinical toxicity were observed in male and female rabbits dosed with API 78-9 at 5000 mg/kg. LD50 > 5000 ㎎/kg bw, no deaths (OECD TG 402, GLP) (read across: 64742-56-9) (ECHA)
  inhalation: aerosol; rat(male/female); The test material which was deposited on the animal fur during exposure diminished by observation Day 10. No mortality in either the control or exposed group was reported. There were no statistically significant differences in mean body weight between groups. LC50 > 5.53 mg/L air /4h, no deaths (OECD TG 403) (read across: MRD-87-102) (ECHA)

○ Specific target organ toxicity (repeated exposure) : Not classified

- Distillates (petroleum), : Dermal; The systemic toxicity NOAEL for this 28-day dermal toxicity study in the

hydrotreated heavy paraffinic		rabbit is 1,000 mg/kg, based on the lack of adverse systemic effects observed at this dose level. (read-aross : 64742-53-6) (OECD TG 410, GLP) (ECHA) Inhalation; rat; 4 weeks; 0, 50, 220 or 1000 mg/m3; No systemic effects were observed. The NOAEL for lung changes associated with oil deposition in the lungs was 220 mg/m3. As no systemic toxicity was observed, the overall NOAEL for systemic effects was > 980 mg/m3. (equivalent or similar to guideline OECD TG 412) (ECHA)
- Distillates, petroleum, solvent-refined heavy naphthenic	:	rabbit(male/female); dermal; The systemic toxicity NOAEL for this 28-day dermal toxicity study in the rabbit is 1,000 mg/kg, based on the lack of adverse systemic effects observed at this dose level. (OECD TG 410, GLP) (read across: 64742-53-6) (ECHA)
- Polyisobutylene	:	Not available
- 12-Hydroxyoctadecanoic acid monolithium salt	:	rat(male/female); dermal; 0; 100; 300; 1000 mg/kg bw; systemic effects on basis that no statistically significant adverse (treatment related) effects were observed at all test doses. (OECD TG 422, GLP) (ECHA)
- Oils, animal, mixed with vegetable oils, sulfurized	:	Not available
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts	:	Sprague-Dawley female rats were treated with Quat-Silsesquioxane in the concentration of 0, 100, 300, or 1000 mg/kg/day orally by gavage in corn oil.No maternal mortality and clinical signs or behavioral changes were observed in treated female rats as compared to control. NOAEL(P)=300 mg/kg bw, NOAEL(F1)=1000 mg/kg bw (read across : Quaternary Silsesquioxane)(ECHA)
- Tributyl borate	:	Not available
- Octadecanoic acid	:	rat(male/female); oral; 100, 300, 1000 mg/kg bw/d; NOAEL=1000 mg/kg bw/day (no adverse substance -related systemic effects were noted.) (OECD TG 422, GLP) (read across: Docosanoic acid)(ECHA)
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene	:	rat(male); oral; 28 days; Based on the absence of clinical findings and effects on body weight, dose levels of 100, 300 and 1000 mg/kg bw were chosen for subchronic dosing. (ECHA)
- (Z)-N-Methyl-N-(1-oxo-9-octadecenyl)glycine	:	Not available
- Paraffin oils (petroleum), catalytic dewaxed heavy	:	rat(male/female); dermal; 13 weeks; No systemic or local effects were considered significant, and the NOAEL is ≥ 2000 mg/kg/day. (OECD TG 411) (ECHA)

○ **Aspiration hazard : Not classified**

- Distillates (petroleum), hydrotreated heavy paraffinic	:	Viscosity: 73.9 mm2/s (40°C)(ECHA) & hydrocarbons
- Distillates, petroleum, solvent-refined heavy naphthenic	:	> 2 mm2/s (40°C) (ECHA) & hydrocarbons
- Polyisobutylene	:	Not available
- 12-Hydroxyoctadecanoic acid monolithium salt	:	Not applicable
- Oils, animal, mixed with	:	Not available

vegetable oils, sulfurized

- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Viscosity: > 9 - < 15 mm2/s (100°C; OECD TG 114)(ECHA) & not hydrocarbons
- Tributyl borate : Not available
- Octadecanoic acid : Not applicable
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : 352.7 mm²/s (40°C) (ECHA) & not hydrocarbons
- (Z)-N-Methyl-N-(1-oxo-9-octadecenyl)glycine : Not applicable
- Paraffin oils (petroleum), catalytic dewaxed heavy : >2 mm²/s (40 °C) (ECHA) & hydrocarbons

12. ECOLOGICAL INFORMATION

1) Ecotoxicity

- Acute toxicity : Not classfied (ATEmix>1mg/L)
- Chronic toxicity : Not classfied

○ **Acute (short-term) aquatic hazard:**

Fish

- Distillates (petroleum), hydrotreated heavy paraffinic : 96h-LL50(Pimephales promelas) > 100 mg/L (OECD TG 203, GLP) (ECHA)
- Distillates, petroleum, solvent-refined heavy naphthenic : 96h-LL50(Pimephales promelas) > 100 mg/L (OECD TG 203, GLP) (ECHA)
- Polyisobutylene : 96h-LC50(Rainbow Trout) > 5600 mg/L (US Dashboard)
- 12-Hydroxyoctadecanoic acid monolithium salt : 96h-LL50(Oncorhynchus mykiss) > 100 mg/L (read across: 20336-96-3) (OECD TG 203, GLP) (ECHA)
- Oils, animal, mixed with vegetable oils, sulfurized : Not available
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Water solubility : not soluble (0.000000000005072 mg/L at 25° C)(ECHA)
- Tributyl borate : Not available
- Octadecanoic acid : No toxicity effects observed within the limit of water solubility(<0.05 mg/L). (ECHA)
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : 96h-LC50(Danio rerio) > 100 mg/L (OECD TG 203) (ECHA); No toxic effects occur within the range of water solubility.
- (Z)-N-Methyl-N-(1-oxo-9-octadecenyl)glycine : No toxic effects occur within the range of water solubility. (ECOSAR)
- Paraffin oils (petroleum), catalytic dewaxed heavy : 96h-LL50(Pimephales promelas) > 100 mg/L (OECD TG 203, GLP) (ECHA)

Invertebrates

- Distillates (petroleum), hydrotreated heavy paraffinic : 48h-EL50(Daphnia magna) > 10,000 mg/L (read across : 64742-53-6 or 64741-97-5) (equivalent or similar to guideline OECD TG 202) (ECHA)
- Distillates, petroleum, solvent-refined heavy naphthenic : 48h-EL50(Daphnia magna) > 10000 mg/L (OECD TG 202) (ECHA)
- Polyisobutylene : Not available

- 12-Hydroxyoctadecanoic acid monolithium salt : 48h-EL50(Daphnia magna) > 100 mg/L (read across: 20336-96-3) (OECD TG 202, GLP) (ECHA)
- Oils, animal, mixed with vegetable oils, sulfurized : Not available
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Water solubility : not soluble (0.000000000005072 mg/L at 25° C)(ECHA)
- Tributyl borate : 48h-LC50(Daphnia magna) = 1328 mg/L (OECD TG 202, GLP) (read aross : n-Butyl Alcohol) (ECHA)
- Octadecanoic acid : No toxicity effects observed within the limit of water solubility(<0.05 mg/L). (ECHA)
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : 48h-EC50(Daphnia magna) = 51 mg/L (OECD TG 202, GLP) (ECHA); No toxic effects occur within the range of water solubility.
- (Z)-N-Methyl-N-(1-oxo-9-octadecenyl)glycine : No toxic effects occur within the range of water solubility. (ECOSAR)
- Paraffin oils (petroleum), catalytic dewaxed heavy : 48h-EL50(Daphnia magna) > 10000 mg/L (OECD TG 202) (ECHA)

Aquatic algae

- Distillates (petroleum), hydrotreated heavy paraffinic : Not available
- Distillates, petroleum, solvent-refined heavy naphthenic : Not available
- Polyisobutylene : Not available
- 12-Hydroxyoctadecanoic acid monolithium salt : 72h-ErL50(Raphidocelis subcapitata) > 160 mg/L (read across: 20336-96-3) (OECD TG 201, GLP) (ECHA)
- Oils, animal, mixed with vegetable oils, sulfurized : Not available
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Water solubility : not soluble (0.000000000005072 mg/L at 25° C)(ECHA)
- Tributyl borate : 72h-ErC50(Pseudokirchneriella subcapitata) = 52.4 mg/L (OECD TG 201, GLP) (read across : Boric Acid) (ECHA)
- Octadecanoic acid : No toxicity effects observed within the limit of water solubility(<0.05 mg/L). (ECHA)
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : 72h-ErC50(Desmodesmus subspicatus) > 100 mg/L (OECD TG 201) (ECHA); No toxic effects occur within the range of water solubility.
- (Z)-N-Methyl-N-(1-oxo-9-octadecenyl)glycine : No toxic effects occur within the range of water solubility. (ECOSAR)
- Paraffin oils (petroleum), catalytic dewaxed heavy : Not available

○ **Chronic (Long-term) aquatic hazard:**

Fish

- Distillates (petroleum), hydrotreated heavy paraffinic : Not available
- Distillates, petroleum, solvent-refined heavy naphthenic : Not available
- Polyisobutylene : Not available
- 12-Hydroxyoctadecanoic acid monolithium salt : Not available
- Oils, animal, mixed with vegetable oils, sulfurized : Not available
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Not available
- Tributyl borate : Not available
- Octadecanoic acid : Not available
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : Not available
- (Z)-N-Methyl-N-(1-oxo-9-octadecenyl)glycine : Not available
- Paraffin oils (petroleum), catalytic dewaxed heavy : Not available

Invertebrates

- Distillates (petroleum), hydrotreated heavy paraffinic : 21d-NOEL(Daphnia magna)=10 mg/L (read across: 64742-53-6) (equivalent or similar to guideline OECD TG 211, GLP) (ECHA)
- Distillates, petroleum, solvent-refined heavy naphthenic : 21d-NOEL(Daphnia magna) = 10 mg/L (OECD TG 211, GLP) (ECHA)
- Polyisobutylene : Not available
- 12-Hydroxyoctadecanoic acid monolithium salt : Not available
- Oils, animal, mixed with vegetable oils, sulfurized : Not available
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Not available
- Tributyl borate : Not available
- Octadecanoic acid : No toxicity effects observed within the limit of water solubility(<0.05 mg/L). (ECHA)
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : 21d-EL10(Daphnia magna) = 1.69 mg/L (OECD TG 211, GLP) (ECHA)
- (Z)-N-Methyl-N-(1-oxo-9-octadecenyl)glycine : Not available
- Paraffin oils (petroleum), catalytic dewaxed heavy : 21d-NOEL(Daphnia magna) = 10 mg/L (OECD TG 211, GLP) (ECHA)

Aquatic algae

- Distillates (petroleum), hydrotreated heavy paraffinic : 72h-NOErL(Pseudokirchnerella subcapitata) >= 100 mg/L (read across: 72623-87-1) (OECD TG 201) (ECHA)
- Distillates, petroleum, solvent-refined heavy naphthenic : 72h-NOErL(Pseudokirchneriella subcapitata) >=100 mg/L (OECD TG 201) (ECHA)
- Polyisobutylene : Not available
- 12-Hydroxyoctadecanoic acid monolithium salt : 72h-NOELR(Raphidocelis subcapitata) > 160 mg/L (read across: 20336-96-3) (OECD TG 201, GLP) (ECHA)
- Oils, animal, mixed with vegetable oils, sulfurized : Not available
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Not available
- Tributyl borate : 72h-NOErC(Pseudokirchneriella subcapitata) = 17.5 mg/L (OECD TG 201, GLP) (read across : Boric Acid) (ECHA)
- Octadecanoic acid : No toxicity effects observed within the limit of water solubility(<0.05 mg/L). (ECHA)
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : 72h-NOErC(Desmodesmus subspicatus) = 10-100 mg/L (OECD TG 201) (ECHA); No toxic effects occur within the range of water solubility.
- (Z)-N-Methyl-N-(1-oxo-9-octadecenyl)glycine : Not available
- Paraffin oils (petroleum), catalytic dewaxed heavy : 72h-NOErL(Pseudokirchneriella subcapitata) >=100 mg/L (OECD TG 201) (ECHA)

2) Persistence and degradability

○ **Persistence**

- Distillates (petroleum), hydrotreated heavy paraffinic : This substance is UVCB, so it is not applicable. (ECHA)
- Distillates, petroleum, solvent-refined heavy naphthenic : log Kow = 6.13 (experimental) (EPISUITE)
- Polyisobutylene : Not available
- 12-Hydroxyoctadecanoic acid monolithium salt : log Kow = 2.60 (estimated) (EPISUITE)
- Oils, animal, mixed with vegetable oils, sulfurized : Not available
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : log Kow=14.876 (estimated)(EPISUITE); not valid (over -4<log Kow < 8)(ECHA)
- Tributyl borate : log Kow = 1 (25 °C) (ECHA)
- Octadecanoic acid : log Kow = 8.23 (ECHA)

- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : log Kow=7.05 (estimated) (EPISUITE)
- (Z)-N-Methyl-N-(1-oxo-9-octadecenyl)glycine : log Kow = 6.83 (estimated) (EPISUITE)
- Paraffin oils (petroleum), catalytic dewaxed heavy : Not available

○ **Degradability**

- Distillates (petroleum), hydrotreated heavy paraffinic : The chemical constituents that comprise the other lubricant base oils category consist entirely of carbon and hydrogen and do not contain hydrolyzable groups. As such, they have a very low potential to hydrolyze. Therefore, this degradative process will not contribute to their removal from the environment. (ECHA)
- Distillates, petroleum, solvent-refined heavy naphthenic : Not available
- Polyisobutylene : Not available
- 12-Hydroxyoctadecanoic acid monolithium salt : Not available
- Oils, animal, mixed with vegetable oils, sulfurized : Not available
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Not available
- Tributyl borate : Half-life for hydrolysis:18.3 s (21 °C) (ECHA) half-life of 1-butanol: 1.552 d (12-hr day; 1.5E6 OH/cm3) (ECHA)
- Octadecanoic acid : The calculated half-lives are in the range of 15.4 hours for octanoic acid (C8) to 5.7 hours for octadecanoic acid (C18).(ECHA) Hydrolysis is not a relevant degradation pathway for the category members Fatty Acids in aquatic environment. (ECHA)
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : In contact with water no hydrolysis is expected. (ECHA)
- (Z)-N-Methyl-N-(1-oxo-9-octadecenyl)glycine : Not available
- Paraffin oils (petroleum), catalytic dewaxed heavy : Not available

3) Bioaccumulative potential

○ **Bioaccumulation**

- Distillates (petroleum), hydrotreated heavy paraffinic : This substance is UVCB, so it is not applicable. (ECHA)
- Distillates, petroleum, solvent-refined heavy naphthenic : BCF = 5147 (estimated) (EPISUITE)
- Polyisobutylene : Not available
- 12-Hydroxyoctadecanoic acid monolithium salt : BCF=2-8 (ECHA)
- Oils, animal, mixed with vegetable oils, sulfurized : Not available
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : BCF=3.162(ECHA)
- Tributyl borate : BCF = 21.4 (estimated) (EPISUITE)
- Octadecanoic acid : BCF=238 - 288 L/kg (OECD TG 305E)(ECHA)
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : BCF=1730 (ECHA)
- (Z)-N-Methyl-N-(1-oxo-9-octadecenyl)glycine : BCF = 56.23 (estimated) (EPISUITE)
- Paraffin oils (petroleum), catalytic dewaxed heavy : Not available

○ **Biodegradation**

- Distillates (petroleum), hydrotreated heavy paraffinic : Another lubricant base oil, Solvent Neutral 600 Base Oil (MRD-94 -981), was determined to be inherently biodegradable but not readily biodegradable with a mean degradation of 31.13% by day 28. (read across: Solvent Neutral 600 Base Oil (MRD-94-981)) (OECD TG 301F, GLP) (ECHA)
- Distillates, petroleum, solvent-refined heavy naphthenic : 31 % degradation after 28d; not readily biodegradable (OECD TG 301F, GLP) (ECHA)
- Polyisobutylene : Not available
- 12-Hydroxyoctadecanoic acid monolithium salt : biodegraded 78% by day 28 based on BOD; readily biodegradable (OECD TG 301C, GLP) (ECHA)

- Oils, animal, mixed with vegetable oils, sulfurized : Not available
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : 0% degradation after 28 days (Not biodegradable) (read across : Didecyl dimethyl ammonium chloride) (OECD TG 301C)(ECHA)
- Tributyl borate : 92% degradation after 20d; readily biodegradable (read across) (ECHA)
- Octadecanoic acid : 72% degradation after 28d; readily biodegradable (OECD TG 301B, GLP) (ECHA)
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : 1% degradation after 28 days; under test conditions no biodegradation observed (OECD TG 301B, GLP) (ECHA)
- (Z)-N-Methyl-N-(1-oxo-9-octadecenyl)glycine : Not available
- Paraffin oils (petroleum), catalytic dewaxed heavy : 31 % degradation after 28d; not readily biodegradable (OECD TG 301F, GLP) (ECHA)

4) Mobility in soil

- Distillates (petroleum), hydrotreated heavy paraffinic : Not available
- Distillates, petroleum, solvent-refined heavy naphthenic : Koc=208800 (EPISUITE)
- Polyisobutylene : Not available
- 12-Hydroxyoctadecanoic acid monolithium salt : Koc=15.22 (estimated) (EPISUITE)
- Oils, animal, mixed with vegetable oils, sulfurized : Not available
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Koc=3268000000
- Tributyl borate : Koc = 153.7 (EPISUITE)
- Octadecanoic acid : Koc=51054(EPISUITE)
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : Koc=60460 (EPISUITE)
- (Z)-N-Methyl-N-(1-oxo-9-octadecenyl)glycine : Koc = 7696 (EPISUITE)
- Paraffin oils (petroleum), catalytic dewaxed heavy : Not available

5) Hazard to the ozone layer

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Distillates, petroleum, solvent-refined heavy naphthenic : Not applicable
- Polyisobutylene : Not applicable
- 12-Hydroxyoctadecanoic acid monolithium salt : Not applicable
- Oils, animal, mixed with vegetable oils, sulfurized : Not applicable
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Not applicable
- Tributyl borate : Not applicable
- Octadecanoic acid : Not applicable
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : Not applicable
- (Z)-N-Methyl-N-(1-oxo-9-octadecenyl)glycine : Not applicable
- Paraffin oils (petroleum), catalytic dewaxed heavy : Not applicable

6) Other adverse effects

- Distillates (petroleum), hydrotreated heavy paraffinic : Not available
- Distillates, petroleum, solvent-refined heavy naphthenic : Not available
- Polyisobutylene : Not available
- 12-Hydroxyoctadecanoic acid monolithium salt : Not available
- Oils, animal, mixed with vegetable oils, sulfurized : Not available
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Not available
- Tributyl borate : Not available
- Octadecanoic acid : Not available
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : Not available
- (Z)-N-Methyl-N-(1-oxo-9-octadecenyl)glycine : Not available

- Paraffin oils (petroleum), catalytic dewaxed heavy : Not available

13. DISPOSAL CONSIDERATIONS

1) Disposal methods

- Waste must be disposed of in accordance with federal, state and local environmental control regulation.

2) Special precaution for disposal

- Consider the required attentions in accordance with waste treatment management regulation.

14. TRANSPORT INFORMATION

1) UN No.

- Not applicable

2) Proper shipping name

- Not applicable

3) Transport hazard class(es)

- Not applicable

4) Packing group

- Not applicable

5) Marine pollutant

- Not applicable

6) Special safety response for transportation or transportation measure

- Types of Emergency Measures in Case of Fire : Not applicable
- Types of Emergency Measures in Leakage : Not applicable
- Transport regulations according to ADR/RID, AND, IMDG and ICAO/IATA : Not applicable

15. REGULATORY INFORMATION

EINECS(or ELINCS)

- Distillates (petroleum), hydrotreated heavy paraffinic : European EINECS phase-in substance
- Distillates, petroleum, solvent-refined heavy naphthenic : European EINECS phase-in substance
- Polyisobutylene : Not applicable
- 12-Hydroxyoctadecanoic acid monolithium salt : European EINECS phase-in substance
- Oils, animal, mixed with vegetable oils, sulfurized : European EINECS phase-in substance
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : European EINECS phase-in substance
- Tributyl borate : European EINECS phase-in substance
- Octadecanoic acid : European EINECS phase-in substance
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : European EINECS phase-in substance
- (Z)-N-Methyl-N-(1-oxo-9-octadecenyl)glycine : European EINECS phase-in substance
- Paraffin oils (petroleum), catalytic dewaxed heavy : European EINECS phase-in substance

EU CLP (CLASSIFICATION) - PRODUCT : Not applicable

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Distillates, petroleum, solvent-refined heavy naphthenic : Not applicable
- Polyisobutylene : Not applicable

- 12-Hydroxyoctadecanoic acid monolithium salt : Not applicable
- Oils, animal, mixed with vegetable oils, sulfurized : Not applicable
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Not applicable
- Tributyl borate : Not applicable
- Octadecanoic acid : Not applicable
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : Not applicable
- (Z)-N-Methyl-N-(1-oxo-9-octadecenyl)glycine : Not applicable
- Paraffin oils (petroleum), catalytic dewaxed heavy : Not applicable

Substances restricted under REACH

- Distillates (petroleum), hydrotreated heavy paraffinic : Substances restricted under REACH
- Distillates, petroleum, solvent-refined heavy naphthenic : Substances restricted under REACH
- Polyisobutylene : Not applicable
- 12-Hydroxyoctadecanoic acid monolithium salt : Not applicable
- Oils, animal, mixed with vegetable oils, sulfurized : Not applicable
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Not applicable
- Tributyl borate : Not applicable
- Octadecanoic acid : Not applicable
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : Not applicable
- (Z)-N-Methyl-N-(1-oxo-9-octadecenyl)glycine : Not applicable
- Paraffin oils (petroleum), catalytic dewaxed heavy : Substances restricted under REACH

Substances subject to authorization under REACH

REACH SVHC List

Korea

○ **Occupational Safety and Health Act**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Distillates, petroleum, solvent-refined heavy naphthenic : Not applicable
- Polyisobutylene : Not applicable
- 12-Hydroxyoctadecanoic acid monolithium salt : Not applicable
- Oils, animal, mixed with vegetable oils, sulfurized : Not applicable
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Hazardous substance subject to control
- Tributyl borate : Not applicable
- Octadecanoic acid : Not applicable
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : Not applicable
- (Z)-N-Methyl-N-(1-oxo-9-octadecenyl)glycine : Not applicable
- Paraffin oils (petroleum), catalytic dewaxed heavy : Not applicable

○ **K-REACH**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Distillates, petroleum, solvent-refined heavy naphthenic : Not applicable
- Polyisobutylene : Not applicable
- 12-Hydroxyoctadecanoic acid monolithium salt : Not applicable
- Oils, animal, mixed with vegetable oils, sulfurized : Not applicable
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Not applicable
- Tributyl borate : Not applicable
- Octadecanoic acid : Not applicable

- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : Not applicable
- (Z)-N-Methyl-N-(1-oxo-9-octadecenyl)glycine : Not applicable
- Paraffin oils (petroleum), catalytic dewaxed heavy : Not applicable

○ **Chemical Control Act in Korea**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Distillates, petroleum, solvent-refined heavy naphthenic : Not applicable
- Polyisobutylene : Not applicable
- 12-Hydroxyoctadecanoic acid monolithium salt : Not applicable
- Oils, animal, mixed with vegetable oils, sulfurized : Not applicable
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : List of substance subjected to the PRTR
- Tributyl borate : List of substance subjected to the PRTR
- Octadecanoic acid : Not applicable
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : Not applicable
- (Z)-N-Methyl-N-(1-oxo-9-octadecenyl)glycine : Not applicable
- Paraffin oils (petroleum), catalytic dewaxed heavy : Not applicable

○ **Safety Control of Dangerous Substances Act**

- Distillates (petroleum), hydrotreated heavy paraffinic : Dangerous substance
- Distillates, petroleum, solvent-refined heavy naphthenic : Not applicable
- Polyisobutylene : Not applicable
- 12-Hydroxyoctadecanoic acid monolithium salt : Not applicable
- Oils, animal, mixed with vegetable oils, sulfurized : Not applicable
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Not applicable
- Tributyl borate : Not applicable
- Octadecanoic acid : Not applicable
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : Not applicable
- (Z)-N-Methyl-N-(1-oxo-9-octadecenyl)glycine : Not applicable
- Paraffin oils (petroleum), catalytic dewaxed heavy : Not applicable

U.S.A

○ **US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Distillates, petroleum, solvent-refined heavy naphthenic : Not applicable
- Polyisobutylene : Not applicable
- 12-Hydroxyoctadecanoic acid monolithium salt : Not applicable
- Oils, animal, mixed with vegetable oils, sulfurized : Not applicable
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Not applicable
- Tributyl borate : Not applicable
- Octadecanoic acid : Not applicable
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : Not applicable
- (Z)-N-Methyl-N-(1-oxo-9-octadecenyl)glycine : Not applicable
- Paraffin oils (petroleum), catalytic dewaxed heavy : Not applicable

○ **CERCLA Designation of hazardous substances (40 CFR 302.4)**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Distillates, petroleum, solvent-refined heavy naphthenic : Not applicable
- Polyisobutylene : Not applicable
- 12-Hydroxyoctadecanoic acid monolithium salt : Not applicable

- Oils, animal, mixed with vegetable oils, sulfurized : Not applicable
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Not applicable
- Tributyl borate : Not applicable
- Octadecanoic acid : Not applicable
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : Not applicable
- (Z)-N-Methyl-N-(1-oxo-9-octadecenyl)glycine : Not applicable
- Paraffin oils (petroleum), catalytic dewaxed heavy : Not applicable

○ **CERCLA Section 302 regulation**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Distillates, petroleum, solvent-refined heavy naphthenic : Not applicable
- Polyisobutylene : Not applicable
- 12-Hydroxyoctadecanoic acid monolithium salt : Not applicable
- Oils, animal, mixed with vegetable oils, sulfurized : Not applicable
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Not applicable
- Tributyl borate : Not applicable
- Octadecanoic acid : Not applicable
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : Not applicable
- (Z)-N-Methyl-N-(1-oxo-9-octadecenyl)glycine : Not applicable
- Paraffin oils (petroleum), catalytic dewaxed heavy : Not applicable

○ **CERCLA Section 304 regulation**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Distillates, petroleum, solvent-refined heavy naphthenic : Not applicable
- Polyisobutylene : Not applicable
- 12-Hydroxyoctadecanoic acid monolithium salt : Not applicable
- Oils, animal, mixed with vegetable oils, sulfurized : Not applicable
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Not applicable
- Tributyl borate : Not applicable
- Octadecanoic acid : Not applicable
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : Not applicable
- (Z)-N-Methyl-N-(1-oxo-9-octadecenyl)glycine : Not applicable
- Paraffin oils (petroleum), catalytic dewaxed heavy : Not applicable

○ **CERCLA Section 313 regulation**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Distillates, petroleum, solvent-refined heavy naphthenic : Not applicable
- Polyisobutylene : Not applicable
- 12-Hydroxyoctadecanoic acid monolithium salt : Not applicable
- Oils, animal, mixed with vegetable oils, sulfurized : Not applicable
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Not applicable
- Tributyl borate : Not applicable
- Octadecanoic acid : Not applicable
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : Not applicable
- (Z)-N-Methyl-N-(1-oxo-9-octadecenyl)glycine : Not applicable
- Paraffin oils (petroleum), catalytic dewaxed heavy : Not applicable

Interntional Convention on Environment

○ **Rotterdam Convention list**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Distillates, petroleum, solvent-refined heavy naphthenic : Not applicable
- Polyisobutylene : Not applicable
- 12-Hydroxyoctadecanoic acid monolithium salt : Not applicable
- Oils, animal, mixed with vegetable oils, sulfurized : Not applicable
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Not applicable
- Tributyl borate : Not applicable
- Octadecanoic acid : Not applicable
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : Not applicable
- (Z)-N-Methyl-N-(1-oxo-9-octadecenyl)glycine : Not applicable
- Paraffin oils (petroleum), catalytic dewaxed heavy : Not applicable

○ **Stockholm Convention list**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Distillates, petroleum, solvent-refined heavy naphthenic : Not applicable
- Polyisobutylene : Not applicable
- 12-Hydroxyoctadecanoic acid monolithium salt : Not applicable
- Oils, animal, mixed with vegetable oils, sulfurized : Not applicable
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Not applicable
- Tributyl borate : Not applicable
- Octadecanoic acid : Not applicable
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : Not applicable
- (Z)-N-Methyl-N-(1-oxo-9-octadecenyl)glycine : Not applicable
- Paraffin oils (petroleum), catalytic dewaxed heavy : Not applicable

○ **Montreal Protocol list**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Distillates, petroleum, solvent-refined heavy naphthenic : Not applicable
- Polyisobutylene : Not applicable
- 12-Hydroxyoctadecanoic acid monolithium salt : Not applicable
- Oils, animal, mixed with vegetable oils, sulfurized : Not applicable
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Not applicable
- Tributyl borate : Not applicable
- Octadecanoic acid : Not applicable
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : Not applicable
- (Z)-N-Methyl-N-(1-oxo-9-octadecenyl)glycine : Not applicable
- Paraffin oils (petroleum), catalytic dewaxed heavy : Not applicable

National Inventory

○ **Korea**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Distillates, petroleum, solvent-refined heavy naphthenic : Not applicable
- Polyisobutylene : Not applicable
- 12-Hydroxyoctadecanoic acid monolithium salt : Not applicable
- Oils, animal, mixed with vegetable oils, sulfurized : Not applicable
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Not applicable
- Tributyl borate : Not applicable
- Octadecanoic acid : Not applicable

- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : Not applicable
- (Z)-N-Methyl-N-(1-oxo-9-octadecenyl)glycine : Not applicable
- Paraffin oils (petroleum), catalytic dewaxed heavy : Not applicable

○ **U.S.A**

- Distillates (petroleum), hydrotreated heavy paraffinic : US TSCA phase-in substance
- Distillates, petroleum, solvent-refined heavy naphthenic : US TSCA phase-in substance
- Polyisobutylene : US TSCA phase-in substance
- 12-Hydroxyoctadecanoic acid monolithium salt : US TSCA phase-in substance
- Oils, animal, mixed with vegetable oils, sulfurized : US TSCA phase-in substance
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : US TSCA phase-in substance
- Tributyl borate : US TSCA phase-in substance
- Octadecanoic acid : US TSCA phase-in substance
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : US TSCA phase-in substance
- (Z)-N-Methyl-N-(1-oxo-9-octadecenyl)glycine : US TSCA phase-in substance
- Paraffin oils (petroleum), catalytic dewaxed heavy : US TSCA phase-in substance

○ **China**

- Distillates (petroleum), hydrotreated heavy paraffinic : China phase-in substance
- Distillates, petroleum, solvent-refined heavy naphthenic : China phase-in substance
- Polyisobutylene : China phase-in substance
- 12-Hydroxyoctadecanoic acid monolithium salt : China phase-in substance
- Oils, animal, mixed with vegetable oils, sulfurized : China phase-in substance
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : China phase-in substance
- Tributyl borate : China phase-in substance
- Octadecanoic acid : China phase-in substance
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : China phase-in substance
- (Z)-N-Methyl-N-(1-oxo-9-octadecenyl)glycine : China phase-in substance
- Paraffin oils (petroleum), catalytic dewaxed heavy : China phase-in substance

○ **Japan**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Distillates, petroleum, solvent-refined heavy naphthenic : Not applicable
- Polyisobutylene : Japan ENCS phase-in substance
- 12-Hydroxyoctadecanoic acid monolithium salt : Japan ENCS phase-in substance
- Oils, animal, mixed with vegetable oils, sulfurized : Japan ENCS phase-in substance
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Not applicable
- Tributyl borate : Japan ENCS phase-in substance
- Octadecanoic acid : Japan ENCS phase-in substance
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : Not applicable
- (Z)-N-Methyl-N-(1-oxo-9-octadecenyl)glycine : Japan ENCS phase-in substance
- Paraffin oils (petroleum), catalytic dewaxed heavy : Not applicable

16. OTHER INFORMATION

1) Reference

- Sources of information used in preparing this SDS included one or more of the following: Internal technical data, data from OECD eChemPortal, ECHA, NITE, TOXNET, IPCS and KOSHA search results.

2) Issue Date

- 2012-11-30

3) Revision number and Last date revised

○ **Number of revised**

- 4

○ **Date of last revision**

- 2026-01-30

○ **Last Revision History**

- update

4) Other

- The information contained in the Safety Data Sheet is at the date of its issuance to the best of our knowledge correct according to the data available to us. The information is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and shall not be considered a warranty or quality specification of any type. The information provided relates only to the specific material identified at the top of this SDS and may not be valid when the SDS material is used in combination with any other materials or in any process, unless specified in the text. Material users should review the information and recommendations in the specific context of their intended manner of handling, use, processing and storage, including an assessment of the appropriateness of the SDS material in the user's end product, if applicable.