# SDS(Safety Data Sheet)

| Product | HMC C2 SN 0W-20 | | |
|---|---|---|---|
| MSDS Number | List No. | Issuing date | Last revised date |
| - | LB2877 | 2015-11-27 | 2026-02-23 |

## 1. IDENTIFICATION

**1) Product name**

HMC C2 SN 0W-20

**2) Recommended use of the chemical and restriction on use**

- Recommended use: Lubricants
  Gasoline engine oil
- 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: +82-1899-5145

## 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 |
|---|---|---|---|
| HMC C2 SN 0W-20 | 0 | 1 | 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 | 80 ~ 90 |
| Trade secret | | | | 5 ~ 15 |
| Diisononyl adipate | BIS(7-METHYLOCTYL) ADIPATE | 33703-08-1 | 251-646-7 | 0.7 ~ 3 |
| Distillates (petroleum), solvent-dewaxed heavy paraffinic | Adriatic spindle oil; Mineral oil, petroleum distillates, solvent dewaxed heavy paraffinic (severe solvent-refining and/or hydrotreatment) ; Solvent dewaxed heavy paraffinic distillate | 64742-65-0 | 265-169-7 | 0.4 ~ 2 |
| Distillates (petroleum), hydrotreated light paraffinic | Mineral oil, petroleum distillates, hydrotreated (severe) light paraffinic | 64742-55-8 | 265-158-7 | 0.3 ~ 2 |
| Distillates (petroleum), solvent-dewaxed light paraffinic | Solventdewaxed light paraffinic distillate (petroleum) | 64742-56-9 | 265-159-2 | 0.3 ~ 2 |
| Alkylenecarbomonocyclic alcohol, sulfurized, carbonates, alkaline earth metal salts, overbased | | | | 0.1 ~ 1.2 |
| Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts | Phosphorodithioic acid, O,O-bis(1,3-dimethylbutyl and isopropyl)esters, zinc salts | 84605-29-8 | 283-392-8 | 0.1 ~ 1 |
| Zinc bis(1,3-dimethylbutyl) dithiophosphate | zinc O,O,O',O'-tetrakis(1,3-dimethylbutyl) bis(phosphorodithioate) | 2215-35-2 | 218-679-9 | 0.1 ~ 1 |
| Lubricating oils (petroleum), (C=15-30), hydrotreated neutral oil-based | Factory Supply Lubricating oils (petroleum), C15-30, hydrotreated neutral oil-based | 72623-86-0 | 276-737-9 | 0.1 ~ 1 |
| 1-Tridecanamine, N-tridecyl-, branched, reaction products with carbon disulfide 2-ethyl-N-(2-ethylhexyl)- 1-hexanamine and molybdenum oxide (MoO3) | | 799241-27-3 | | 0.1 ~ 0.5 |
| Bis(ditridecylcarbamodithioato-κS,κS']dioxodi-μ-thioxodimolybdenum, branched | | 253873-84-6 | | 0.1 ~ 0.5 |

| | | | | |
|---|---|---|---|---|
| Molybdenum, [N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S'](N,N-ditridecylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi-, branched | | 253873-83-5 | | 0.1 ~ 0.5 |
| Molybdenum, bis[N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']dioxodi-.mu.-thioxodi- | | 90901-24-9 | | 0.1 ~ 0.5 |
| 2,6-di-tert-butylphenol | Isonox 103 | 128-39-2 | 204-884-0 | 0.1 ~ 0.2 |
| Dodecylphenol, branched | Phenol, dodecyl-, branched | 121158-58-5 | 310-154-3 | 0.1 ~ 0.2 |

※ 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**

- May be ignited by heat, sparks or flames.
- Fire may produce irritating and/or toxic gases.

| | |
|---|---|
| **mixture** | - May cause toxic effects if inhaled. |
| **3) Special protective equipment and precautions for firefighters** | - Substance may be transported hot.<br>- Runoff may cause pollution.<br>- Contact may cause burns to skin and eyes.<br>- Dike fire-control water for later disposal; do not scatter the material.<br>- Move containers from fire area if you can do it without risk.<br>- Fire involving Tanks: Cool containers with flooding quantities of water until well after fire is out.<br>- Fire involving Tanks: Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.<br>- 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.<br>- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).<br>- Ventilate the contaminated area.<br>- Stop leak if you can do it without risk.<br>- Prevent dust cloud.<br>- 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.<br>- Large Spill: Dike far ahead of liquid spill for later disposal.<br>- With clean shovel place material into clean, dry container and cover loosely; move containers from spill area.<br>- Cover powder spill with plastic sheet or tarp to minimize spreading and keep powder dry.<br>- 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.<br>- Please note that materials and conditions to be avoided.<br>- Handling refer to engineering control/personal protection section.<br>- Cuation: High temperature |
| **2) Conditions for safe storage (including any incompatibilities)** | - Store in a dry place. Store in a closed container.<br>- Please note that materials and conditions to be avoided.<br>- 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 : 0.8 mg/m3 | TWA 5 mg/m3, Inhalable particulate matter(Mineral oil, Pure, highly and severely refined) | Not available | Not available |
| Trade secret | Not available | Not available | Not available | Not available |
| Diisononyl adipate | Not available | Not available | Not available | Not available |
| Distillates (petroleum), solvent-dewaxed heavy paraffinic | TWA : 0.8 mg/m3 | TWA 5 mg/m3, Inhalable particulate matter(Mineral oil, Pure, highly and severely refined) | Not available | Not available |
| Distillates (petroleum), hydrotreated light paraffinic | TWA : 0.8 mg/m3 | TWA 5 mg/m3, Inhalable particulate matter(Mineral oil, Pure, highly and severely refined) | Not available | Not available |
| Distillates (petroleum), solvent-dewaxed light paraffinic | TWA : 0.8 mg/m3 | TWA 5 mg/m3, Inhalable particulate matter(Mineral oil, Pure, highly and severely refined) | Not available | Not available |
| Alkylenecarbomonocyclic alcohol, sulfurized, carbonates, alkaline earth metal salts, overbased | Not available | Not available | Not available | Not available |
| Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts | Not available | Not available | Not available | Not available |

| | | | | |
|---|---|---|---|---|
| Zinc bis(1,3-dimethylbutyl) dithiophosphate | Not available | Not available | Not available | Not available |
| Lubricating oils (petroleum), (C=15-30), hydrotreated neutral oil-based | Not available | TWA 5 mg/m3, Inhalable particulate matter(Mineral oil, Pure, highly and severely refined) | Not available | Not available |
| 1-Tridecanamine, N-tridecyl-, branched, reaction products with carbon disulfide 2-ethyl-N-(2-ethylhexyl)- 1-hexanamine and molybdenum oxide (MoO3) | Not available | Not available | Not available | Not available |
| Bis(ditridecylcarbamodithioato-κS,κS']dioxodi-μ-thioxodimolybdenum, branched | TWA : 0.5 mg/m3 | Not available | PEL: 5 mg/m3 (Soluble compounds), 15 mg/m3 (Insoluble compounds - Total dust) mg/m3 | Not available |
| Molybdenum, [N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S'](N,N-ditridecylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi-, branched | Not available | Not available | Not available | Not available |
| Molybdenum, bis[N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']dioxodi-.mu.-thioxodi- | Not available | Not available | Not available | Not available |
| 2,6-di-tert-butylphenol | Not available | Not available | Not available | Not available |
| Dodecylphenol, branched | Not available | Not available | 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 disord
- 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 fo chemicals approved in the country.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

| Item | Input Value |
|---|---|
| Apperance | Liquid |
| Color | Light yellow |
| 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 | 220 °C |
| 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 | 0.847 |
| Distribution Coefficient | No Data |
| SelfIgnition Temperature | No Data |
| Pyrolysis Temperature | No Data |
| Viscosity | 8.5 mm2/s (at 100℃) |
| 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)
- Trade secret : Not available
- Diisononyl adipate : rat(male/female); LD50 > 5000 mg/kg bw, no deaths (equivalent or similar to guideline OECD TG 401) (ECHA)
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : rat(male/female); LD50 > 5000 mg/kg bw, no deaths (OECD TG 401, GLP) (read across: 64742-56-9) (ECHA)
- Distillates (petroleum), hydrotreated light paraffinic : rat(male/female); LD50 > 5000 mg/kg bw, no deaths (OECD TG 401, GLP) (read across: 64742-56-9) (ECHA)
- Distillates (petroleum), solvent-dewaxed light paraffinic : rat; LD50 > 5000 mg/kg bw, no deaths (OECD TG 401, GLP) (ECHA)
- Alkylenecarbomonocyclic alcohol, sulfurized, carbonates, alkaline earth metal salts, overbased : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : rat(male/female), LD50 = 4468 mg/kg bw (OECD TG 401) (ECHA)
- Zinc bis(1,3-dimethylbutyl) dithiophosphate : rat; LD50 = 2230 mg/kg bw (equivalent or similar to guideline OECD TG 401) (ECHA)
- Lubricating oils (petroleum), (C=15-30), hydrotreated neutral oil-based : rat(male/female); no deaths; LD50 > 5000 mg/kg bw; (read-across: CAS No. 64742-56-9) (OECD TG 401, GLP) (ECHA)
- 1-Tridecanamine, N-tridecyl-, branched, reaction products with carbon disulfide 2-ethyl-N-(2-ethylhexyl)- 1-hexanamine and molybdenum oxide (MoO3) : Not available
- Bis(ditridecylcarbamodithioato-κS,κS']dioxodi-μ-thioxodimolybdenum, branched : Not available
- Molybdenum, [N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S'](N,N-ditridecylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi-, branched : Not available
- Molybdenum, bis[N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']dioxodi-.mu.-thioxodi- : Not

available

- 2,6-di-tert-butylphenol : rat(male/female); LD50 > 5000 mg/kg bw, no deaths (OECD TG 401, GLP) (ECHA)
- Dodecylphenol, branched : LD50=2100 mg/kg bw(rat, female/male), For the doses of 1260, 1580, 2000, 2510, 3160 and 3980 mg/kg, the number of deaths were 1, 2, 2, 4, 4 and 4, respectively, out of 5 animals per group.(OECD TG 401)(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)
- Trade secret : Not available
- Diisononyl adipate : Not available
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : rabbit(male/female); LD50 > 5000 mg/kg bw, no deaths (OECD TG 402, GLP) (read across: 64742-56-9) (ECHA)
- Distillates (petroleum), hydrotreated light paraffinic : rabbit(male/female); LD50 > 5000 mg/kg bw, no deaths (OECD TG 402, GLP) (read across: 64742-56-9) (ECHA)
- Distillates (petroleum), solvent-dewaxed light paraffinic : rabbit; LD50 > 5000 mg/kg bw, no deaths (OECD TG 402, GLP) (ECHA)
- Alkylenecarbomonocyclic alcohol, sulfurized, carbonates, alkaline earth metal salts, overbased : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : rat(male/female), LD50 > 2002 mg/kg bw (OECD TG 402) (ECHA)
- Zinc bis(1,3-dimethylbutyl) dithiophosphate : rabbit; LD50 > 25000 mg/kg bw (equivalent or similar to guideline OECD TG 402, GLP) (ECHA)
- Lubricating oils (petroleum), (C=15-30), hydrotreated neutral oil-based : rabbit; no deaths; LD50 > 2000 mg/kg bw (read-across: CAS No. 64742-53-6) (OECD TG 402, GLP) (ECHA)
- 1-Tridecanamine, N-tridecyl-, branched, reaction products with carbon disulfide 2-ethyl-N-(2-ethylhexyl)- 1-hexanamine and molybdenum oxide (MoO3) : Not available
- Bis(ditridecylcarbamodithioato-κS,κS']dioxodi-μ-thioxodimolybdenum, branched : Not available
- Molybdenum, [N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S'](N,N-ditridecylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi-, branched : Not available
- Molybdenum, bis[N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']dioxodi-.mu.-thioxodi- : Not available
- 2,6-di-tert-butylphenol : Not available
- Dodecylphenol, branched : rabbit(male); LD50=ca. 15000 mg/kg bw; No deaths (OECD TG 402) (ECHA)

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

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Trade secret : Not available
- Diisononyl adipate : Not applicable
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not applicable
- Distillates (petroleum), hydrotreated light paraffinic : Not applicable
- Distillates (petroleum), solvent-dewaxed light paraffinic : Not applicable
- Alkylenecarbomonocyclic alcohol, sulfurized, carbonates, alkaline earth metal salts, overbased : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not applicable
- Zinc bis(1,3-dimethylbutyl) dithiophosphate : Not applicable
- Lubricating oils (petroleum), (C=15-30), hydrotreated neutral oil-based : Not applicable
- 1-Tridecanamine, N-tridecyl-, branched, reaction products with carbon disulfide 2-ethyl-N-(2-ethylhexyl)- 1-hexanamine and molybdenum oxide (MoO3) : Not applicable
- Bis(ditridecylcarbamodithioato-κS,κS']dioxodi-μ-thioxodimolybdenum, branched : Not applicable
- Molybdenum, [N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S'](N,N-ditridecylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi-, branched : Not applicable

- Molybdenum, bis[N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']dioxodi-.mu.-thioxodi- : Not applicable
- 2,6-di-tert-butylphenol : Not applicable
- Dodecylphenol, branched : Not applicable

*** Inhalation(Vapour) - Not classified (ATEmix > 20 mg/L)**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not available
- Trade secret : Not available
- Diisononyl adipate : Not available
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not available
- Distillates (petroleum), hydrotreated light paraffinic : Not available
- Distillates (petroleum), solvent-dewaxed light paraffinic : Not available
- Alkylenecarbomonocyclic alcohol, sulfurized, carbonates, alkaline earth metal salts, overbased : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : rat(male/female), inhalation: vapour, LC50 > 2.3 mg/L 4 hr, no death (OECD TG 403) (ECHA)
- Zinc bis(1,3-dimethylbutyl) dithiophosphate : Not available
- Lubricating oils (petroleum), (C=15-30), hydrotreated neutral oil-based : Not available
- 1-Tridecanamine, N-tridecyl-, branched, reaction products with carbon disulfide 2-ethyl-N-(2-ethylhexyl)- 1-hexanamine and molybdenum oxide (MoO3) : Not available
- Bis(ditridecylcarbamodithioato-κS,κS']dioxodi-μ-thioxodimolybdenum, branched : Not available
- Molybdenum, [N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S'](N,N-ditridecylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi-, branched : Not available
- Molybdenum, bis[N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']dioxodi-.mu.-thioxodi- : Not available
- 2,6-di-tert-butylphenol : Not available
- Dodecylphenol, branched : 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)
- Trade secret : Not available
- Diisononyl adipate : rat(male/female); inhalation: aerosol; 4h-LC50 > 5.7 mg/L, no deaths (read across: 103-23-1) (OECD TG 403, GLP) (ECHA)
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : rat(male/female); inhalation: aerosol; LC50 > 5.53 mg/L air /4h, no deaths (OECD TG 403) (read across: MRD-87-102) (ECHA)
- Distillates (petroleum), hydrotreated light paraffinic : rat(male/female); inhalation: aerosol; LC50 > 5.53 mg/L air /4h, no deaths (OECD TG 403) (read across: MRD-87-102) (ECHA)
- Distillates (petroleum), solvent-dewaxed light paraffinic : rat; inhalation: aerosol; LC50 > 5.53 mg/L air/4h, no deaths (OECD TG 403) (read across : MRD-87-102) (ECHA)
- Alkylenecarbomonocyclic alcohol, sulfurized, carbonates, alkaline earth metal salts, overbased : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not available
- Zinc bis(1,3-dimethylbutyl) dithiophosphate : rat(male); inhalation: aerosol; 1h-LC50 > 2 mg/L (4-hour exposure conversion value : 0.5 mg/L), no deaths (read across : 68909-93-3) (equivalent or similar to guideline OECD TG 403) (ECHA)
- Lubricating oils (petroleum), (C=15-30), hydrotreated neutral oil-based : rat; inhalation: aerosol; no deaths; LC50 > 5.53 mg/L air 4hrs (read-across: CAS No. 64741-88-4) (OECD TG 403) (ECHA)
- 1-Tridecanamine, N-tridecyl-, branched, reaction products with carbon disulfide 2-ethyl-N-(2-ethylhexyl)- 1-hexanamine and molybdenum oxide (MoO3) : Not available
- Bis(ditridecylcarbamodithioato-κS,κS']dioxodi-μ-thioxodimolybdenum, branched : Not available

- Molybdenum, [N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']($N,N$-ditridecylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi-, branched : Not available
- Molybdenum, bis[N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']dioxodi-.mu.-thioxodi- : Not available
- 2,6-di-tert-butylphenol : Not available
- Dodecylphenol, branched : Not available

○ **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) |
| - Trade secret | : | Not available |
| - Diisononyl adipate | : | rabbit; not irritating (OECD TG 404) (ECHA) |
| - Distillates (petroleum), solvent-dewaxed heavy paraffinic | : | rabbit; not irritating (GLP) (read across: 64742-56-9) (ECHA) |
| - Distillates (petroleum), hydrotreated light paraffinic | : | rabbit; not irritating (GLP) (read across: 64742-56-9) (ECHA) |
| - Distillates (petroleum), solvent-dewaxed light paraffinic | : | rabbit; not irritating (GLP) (ECHA) |
| - Alkylenecarbomonocyclic alcohol, sulfurized, carbonates, alkaline earth metal salts, overbased | : | Not available |
| - Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts | : | rabbit; irritant (OECD TG 404, GLP) (ECHA) |
| - Zinc bis(1,3-dimethylbutyl) dithiophosphate | : | rabbit; irritating (OECD TG 404, GLP) (ECHA) |
| - Lubricating oils (petroleum), (C=15-30), hydrotreated neutral oil-based | : | rabbit; not irritating (read-across: CAS No. 64742-53-6) (OECD TG 404, GLP) (ECHA) |
| - 1-Tridecanamine, N-tridecyl-, branched, reaction products with carbon disulfide 2-ethyl-N-(2-ethylhexyl)- 1-hexanamine and molybdenum oxide (MoO3) | : | Not available |
| - Bis(ditridecylcarbamodithioato-κS,κS']dioxodi-μ-thioxodimolybdenum, branched | : | Not available |
| - Molybdenum, [N,N-bis(2- | : | Not available |

ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']](N,N-ditridecylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi-, branched

- Molybdenum, bis[N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']dioxodi-.mu.-thioxodi- : Not available
- 2,6-di-tert-butylphenol : rabbit; irritating (OECD TG 404, GLP) (ECHA)
- Dodecylphenol, branched : Rabbit; Severe skin irritant (PDII=6.2), erythema and edema formation for 24, 48 and 72 hours was calculated to be 3.5 (OECD TG 404, GLP)(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)
- Trade secret : Not available
- Diisononyl adipate : rabbit; not irritating (OECD TG 405) (ECHA)
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : rabbit; not irritating (OECD TG 405, GLP) (read across: 64742-56-9) (ECHA)
- Distillates (petroleum), hydrotreated light paraffinic : rabbit; not irritating (OECD TG 405, GLP) (read across: 64742-56-9) (ECHA)
- Distillates (petroleum), solvent-dewaxed light paraffinic : rabbit; not irritating (GLP) (ECHA)
- Alkylenecarbomonocyclic alcohol, sulfurized, carbonates, alkaline earth metal salts, overbased : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : rabbit; Under the conditions of this study, the test material caused ocular irritation that persisted through Day 21. ; irreversible effects on the eye (ECHA)
- Zinc bis(1,3-dimethylbutyl) dithiophosphate : rabbit; irreversible effects on the eye (equivalent or similar to guideline 16CFR 1500.42) (ECHA)
- Lubricating oils (petroleum), (C=15-30), hydrotreated neutral oil-based : rabbit; not irritaing (read-across: CAS No. 64742-56-9) (OECD TG 405, GLP) (ECHA)
- 1-Tridecanamine, N-tridecyl-, branched, reaction products with carbon disulfide 2-ethyl-N-(2-ethylhexyl)- 1-hexanamine and molybdenum oxide (MoO3) : Not available
- Bis(ditridecylcarbamodithioato- : Not available

κS,κS']dioxodi-μ-thioxodimolybdenum, branched

- Molybdenum, [N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S'](N,N-ditridecylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi-, branched : Not available
- Molybdenum, bis[N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']dioxodi-.mu.-thioxodi- : Not available
- 2,6-di-tert-butylphenol : rabbit; not irritating (OECD TG 405, GLP) (ECHA)
- Dodecylphenol, branched : Rabbit; not irritating (OECD TG 405, GLP)(ECHA)

○ **Respiratory sensitization : Not classified**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not available
- Trade secret : Not available
- Diisononyl adipate : Not available
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not available
- Distillates (petroleum), hydrotreated light paraffinic : Not available
- Distillates (petroleum), solvent-dewaxed light paraffinic : Not available
- Alkylenecarbomonocyclic alcohol, sulfurized, carbonates, alkaline earth metal salts, overbased : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not available
- Zinc bis(1,3-dimethylbutyl) dithiophosphate : Not available
- Lubricating oils (petroleum), (C=15-30), hydrotreated neutral oil-based : Not available
- 1-Tridecanamine, N-tridecyl-, branched, reaction products with carbon disulfide 2-ethyl-N-(2-ethylhexyl)- 1-hexanamine and molybdenum oxide : Not available

(MoO3)

- Bis(ditridecylcarbamodithioato-κS,κS']dioxodi-μ-thioxodimolybdenum, branched : Not available
- Molybdenum, [N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S'](N,N-ditridecylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi-, branched : Not available
- Molybdenum, bis[N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']dioxodi-.mu.-thioxodi- : Not available
- 2,6-di-tert-butylphenol : Not available
- Dodecylphenol, branched : 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)
- Trade secret : Not available
- Diisononyl adipate : guinea pig; Draize test; not sensitising (read across: 103-23-1) (ECHA)
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : guinea pig; not sensitising (OECD TG 406, GLP) (read across: 64742-53-6) (ECHA)
- Distillates (petroleum), hydrotreated light paraffinic : guinea pig; not sensitising (OECD TG 406, GLP) (ECHA)
- Distillates (petroleum), solvent-dewaxed light paraffinic : guinea pig; not sensitising (OECD TG 406, GLP) (ECHA)
- Alkylenecarbomonocyclic alcohol, sulfurized, carbonates, alkaline earth metal salts, overbased : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : guinea pig; not sensitising (OECD TG 406, GLP) (ECHA)
- Zinc bis(1,3-dimethylbutyl) dithiophosphate : guinea pig; not sensitising (equivalent or similar to guideline OECD TG 406, GLP) (ECHA)
- Lubricating oils (petroleum), (C=15-30), hydrotreated neutral oil-based : guinea pig; not sensitising (read-across: CAS No. 64742-53-6) (OECD TG 406, GLP) (ECHA)
- 1-Tridecanamine, N-tridecyl-, branched, reaction products with carbon disulfide 2-ethyl-N- : Not available

(2-ethylhexyl)- 1-hexanamine and molybdenum oxide (MoO3)

- Bis(ditridecylcarbamodithioato-κS,κS']dioxodi-μ-thioxodimolybdenum, branched : Not available
- Molybdenum, [N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S'](N,N-ditridecylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi-, branched : Not available
- Molybdenum, bis[N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']dioxodi-.mu.-thioxodi- : Not available
- 2,6-di-tert-butylphenol : guinea pig; not sensitising (OECD TG 406, GLP) (ECHA)
- Dodecylphenol, branched : Not sensitising (Guinea Pig)(OECD TG 406, GLP)(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)
- Trade secret : Not available
- Diisononyl adipate : IARC, EU CLP 1272/2008, OSHA, ACGIH, US EPA IRIS, NTP : not listed
- Distillates (petroleum), solvent-dewaxed 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), hydrotreated light 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-dewaxed light 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)
- Alkylenecarbomonocyclic alcohol, sulfurized, carbonates, alkaline earth metal salts, overbased : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : IARC, EU CLP 1272/2008, OSHA, ACGIH, US EPA IRIS, NTP : not listed
- Zinc bis(1,3-dimethylbutyl) dithiophosphate : IARC, NTP; UES EPA IRIS, ACGIH, EU CLP 1272/2008 : not listed
- Lubricating oils (petroleum), (C=15-30), hydrotreated neutral oil-based : 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)
- 1-Tridecanamine, N- : IARC, EU CLP 1272/2008, OSHA, ACGIH, US EPA IRIS, NTP : not listed

tridecyl-, branched, reaction products with carbon disulfide 2-ethyl-N-(2-ethylhexyl)- 1-hexanamine and molybdenum oxide (MoO3)

- Bis(ditridecylcarbamodithioato-κS,κS']dioxodi-μ-thioxodimolybdenum, branched : IARC, EU CLP 1272/2008, OSHA, ACGIH, US EPA IRIS, NTP : not listed
- Molybdenum, [N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S'](N,N-ditridecylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi-, branched : IARC, EU CLP 1272/2008, OSHA, ACGIH, US EPA IRIS, NTP : not listed
- Molybdenum, bis[N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']dioxodi-.mu.-thioxodi- : IARC, EU CLP 1272/2008, OSHA, ACGIH, US EPA IRIS, NTP : not listed
- 2,6-di-tert-butylphenol : IARC, EU CLP 1272/2008, OSHA, ACGIH, US EPA IRIS, NTP : not listed
- Dodecylphenol, branched : IARC, EU CLP 1272/2008, OSHA, ACGIH, US EPA IRIS, NTP : not listed

○ **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)
- Trade secret : Not available
- Diisononyl adipate : In vitro Bacterial Reverse Mutation Assay : negative (equivalent or similar to guideline OECD TG 471) (ECHA)
  In vitro Mammalian Cell Gene Mutation Test : negative (equivalent or similar to guideline OECD TG 476) (ECHA)
  in vitro mammalian cell micronucleus test: negative (OECD TG 487) (ECHA)
  In vivo Mammalian Erythrocyte Micronucleus Test : negative (read across: 103-23-1) (equivalent or similar to guideline OECD TG 474) (ECHA)
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : 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)
- Distillates (petroleum), hydrotreated light paraffinic : 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)

| | | |
|---|---|---|
| - Distillates (petroleum), solvent-dewaxed light paraffinic | : | in vitro; Mammalian Chromosome Aberration Test : Negative (OECD TG 473, GLP) (ECHA)<br>in vitro; Mammalian Cell Gene Mutation Test : Positive (OECD TG 476) (ECHA)<br>in vitro; Bacterial Reverse Mutation Assay : Positive (OECD TG 471, GLP) (ECHA)<br>in vivo; Mammalian Erythrocyte Micronucleus Test : Negative (OECD TG 474) (ECHA) |
| - Alkylenecarbomonocyclic alcohol, sulfurized, carbonates, alkaline earth metal salts, overbased | : | Not available |
| - Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts | : | In vitro Bacterial reverse mutation test: negative(OECD TG 471) (ECHA)<br>In vivo Mammalian Erythrocyte Micronucleus Test: negative (OECD TG 474, GLP) (ECHA) |
| - Zinc bis(1,3-dimethylbutyl) dithiophosphate | : | In vitro bacterial reverse mutation assay : negative (equivalent or similar to guideline OECD TG 471) (ECHA)<br>In vitro Mammalian Cell Gene Mutation Test : positive (equivalent or similar to guideline OECD TG 476) (ECHA)<br>In vivo micronucleus assay : negative (equivalent or similar to guideline OECD TG 474, GLP) (ECHA) |
| - Lubricating oils (petroleum), (C=15-30), hydrotreated neutral oil-based | : | in vitro mammalian chromosome aberration test: negative (read-across: CAS No. 64741-52-2) (OECD TG 473) (ECHA)<br>in vitro bacterial reverse mutation assay: negative (read-across: CAS No. 64742-54-7 and 64742-52-5) (OECD TG 471) (ECHA)<br>in vitro mammalian cell gene mutation assay: negative (read-across: CAS No. 64742-52-5) (OECD TG 476, GLP) (ECHA)<br>in vivo mammalian erythrocyte micronucleus assay: negative (read-across: solvent-extracted, dewaxed paraffin oils, sufficiently refined, IP 346 < 3%) (OECD TG 474) (ECHA) |
| - 1-Tridecanamine, N-tridecyl-, branched, reaction products with carbon disulfide 2-ethyl-N-(2-ethylhexyl)- 1-hexanamine and molybdenum oxide (MoO3) | : | Not available |
| - Bis(ditridecylcarbamodithioato-κS,κS']dioxodi-μ-thioxodimolybdenum, branched | : | Not available |
| - Molybdenum, [N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S'](N,N-ditridecylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi-, branched | : | Not available |
| - Molybdenum, bis[N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']dioxodi-.mu.-thioxodi- | : | Not available |

- 2,6-di-tert-butylphenol : In vitro bacterial reverse mutation assay : negative (GLP) (ECHA), In vitro In Vitro Mammalian Chromosome Aberration Test : negative (OECD TG 473, GLP) (ECHA), In Vitro Mammalian Cell Gene Mutation Test : negative (OECD TG 476, GLP) (ECHA)
  in vivo : Not available
- Dodecylphenol, branched : In vitro; negative (Bacterial Reverse Mutation Assay; OECD TG 471, GLP)(ECHA), In vitro; negative (Mammalian Cell Gene Mutation Test; OECD TG 476)(ECHA)
  In vivo; negative (Mammalian Erythrocyte Micronucleus Test; OECD TG 474) (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)
- Trade secret : Not available
- Diisononyl adipate : rat(male/female); oral; 300, 1800, 12000 ppm; One-Generation Reproduction Toxicity Study; There was no effect on the fertility of male or female animals even at the highest dose. (read across: 103-23-1) (equivalent or similar to guideline OECD TG 415, GLP) (ECHA)
  rat; oral; Prenatal Developmental Toxicity Study; 28, 170, and 1080 mg/kg; NOAEL= ca. 170 mg/kg bw/day (Based on effects at 12000 ppm (1080 mg/kg): The reduced ossification are not considered adverse, but as the result of minimal foetotoxicity.) (read across: 103-23-1) (equivalent or similar to guideline OECD TG 414, GLP) (ECHA)
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : 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)
- Distillates (petroleum), hydrotreated light paraffinic : 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)
  rat; Dermal administration of the base oil did not adversely affect maternal reproductive performance, nor did it affect offspring survival or development. (OECD TG 414) (read across: 100 SUS solvent refined base oil) (ECHA)
- Distillates (petroleum), solvent-dewaxed light paraffinic : rat; Does not adversely affect reproductive function (OECD TG 421, GLP)
  rat; Not toxic to offspring and parents (OECD TG 414) (ECHA)
- Alkylenecarbomonocyclic alcohol, sulfurized, carbonates, alkaline earth metal salts, overbased : Not available
- Phosphorodithioic acid : EC 283-392-8 has not been tested for reproduction toxicity, however

| | | |
|---|---|---|
| mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts | | experimental data on structurally related substances EC 270-608-0 was available and suitable for read-across. Based on this study, NOAEL(reproductive fertility, neonatal toxicity)=160mg/kg/day. (read-across: 68457-79-4) (OECD TG 422) (ECHA) |
| - Zinc bis(1,3-dimethylbutyl) dithiophosphate | : | rat; screening for reproductive / developmental toxicity; 0, 10, 40, or 160 mg/kg/day; Under the conditions of this screening study, no test material-related effects on reproductive performance, gestation length, parturition, reproductive organs, or neurobehavioral parameters were noted at any dosage level. Based on these results, a dosage level of 160 mg/kg/day was considered to be the no-observed-effect level (NOEL) for reproductive toxicity. NOEL(neonatal toxicity) = 160 mg/kg/day (no effects observed) (read across : phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts) (OECD TG 422, GLP) (ECHA) |
| - Lubricating oils (petroleum), (C=15-30), hydrotreated neutral oil-based | : | 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-across: CAS No. 64742-54-7) (OECD TG 421, GLP) (ECHA)<br>rat; developmental toxicity; There was no evidence of teratogenicity. There were no treatment-related changes observed during the external, skeletal, or visceral evaluations (read-across: CAS No. 64741-88-4) (OECD TG 414) (ECHA) |
| - 1-Tridecanamine, N-tridecyl-, branched, reaction products with carbon disulfide 2-ethyl-N-(2-ethylhexyl)- 1-hexanamine and molybdenum oxide (MoO3) | : | Not available |
| - Bis(ditridecylcarbamodithioato-κS,κS']dioxodi-μ-thioxodimolybdenum, branched | : | Not available |
| - Molybdenum, [N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S'](N,N-ditridecylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi-, branched | : | Not available |
| - Molybdenum, bis[N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']dioxodi-.mu.-thioxodi- | : | Not available |
| - 2,6-di-tert-butylphenol | : | rat(male/female); 30, 150, 750 mg/kg bw/day (P m & f); With respect to the reproduction parameters, no effects were noted up to and including 750 mg/kg body weight/day. No teratogenic effect was observed at external examination and necropsy of the pups in any group. (OECD Preliminary Reproduction Toxicity Screening Test, GLP) (ECHA) |
| - Dodecylphenol, branched | : | EU CLP 1272/2008 : Repr. 1B<br>As a result of oral toxicity study with dosing of 0, 1.5, 15, 75 mg/kg/day in rats(F/M), reduced implantation site, increased estrus cycle length and decreased mean epididymal sperm concentration were |

observed.NOAEL(Reproduction toxicity)=15mg/kg bw/day (OECD TG 416, GLP) (ECHA)

100 mg/kg/day was considered to be the NOEL for maternal toxicity, embryotoxicity, fetotoxicity and teratogenicity. At 300 mg/kg/day the test material was maternally toxic, embryotoxic and fetotoxic. An increase in malformation rate was seen at the high dose level however, it is not clear if this was a direct effect or secondary to maternal toxicity. (OECD TG 414, GLP)(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)
- Trade secret : Not available
- Diisononyl adipate : inhalation: aerosol; rat(male/female); No macroscopic pathological findings were noted in animals examined at the end of the study. 4h-LC50 > 5.7 mg/L, no deaths (read across: 103-23-1) (OECD TG 403, GLP) (ECHA)
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : 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)
- Distillates (petroleum), hydrotreated light paraffinic : 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)
- Distillates (petroleum), solvent-dewaxed light paraffinic : oral; rat; No clinical signs of toxicity observed in either male or female rats. LD50 > 5000 mg/kg bw, no deaths (OECD TG 401, GLP) (ECHA)

  dermal; rabbit; No visible signs of clinical toxicity were observed. LD50 > 5000 mg/kg bw, no deaths (OECD TG 402, GLP) (ECHA)
- Alkylenecarbomonocyclic alcohol, sulfurized, : Not available

carbonates, alkaline earth metal salts, overbased

- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Dermal; rat(male/female), LD50 > 2002 mg/kg bw; Prostration in one animal. No other behavioral anomalies. (OECD TG 402) (ECHA)
- Zinc bis(1,3-dimethylbutyl) dithiophosphate : inhalation; rat; All animals were sniffing and grooming throughout exposure period. Eyes appeared irritated, bodies were oily with hair stuck together and head and face were swollen. Lethargy, ptosis and chromodacryorrhea were noted in all animals. Isolated instances. 1h-LC50 > 2 mg/L (4-hour exposure conversion value : 0.5 mg/L), no deaths (read across : 68909-93-3) (equivalent or similar to guideline OECD TG 403) (ECHA)
- Lubricating oils (petroleum), (C=15-30), hydrotreated neutral oil-based : oral; rat; No clinical signs of toxicity observed in either male or female rats. LD50 > 5000 mg/kg bw, no deaths (read-across: CAS No. 64742-56-9) (OECD TG 401, GLP) (ECHA)
  dermal; rat; Skin irritation and the occurrence of soft stool occurred in some animals, but this latter effect was transient. LD50 > 2000 mg/kg bw, no deaths (read-across: CAS No. 64742-53-6) (OECD TG 402, GLP) (ECHA)
  inhalation: aerosol; rat; After removal from the chamber all of the animals had an extreme amount of test material on their fur. Post exposure the number of animals with material on their fur diminished and was absent by Day 10. LC50 > 5.53 mg/L air 4hrs, no deaths (read-across: CAS No. 64741-88-4) (OECD TG 403) (ECHA)
- 1-Tridecanamine, N-tridecyl-, branched, reaction products with carbon disulfide 2-ethyl-N-(2-ethylhexyl)- 1-hexanamine and molybdenum oxide (MoO3) : Not available
- Bis(ditridecylcarbamodithioato-κS,κS']dioxodi-μ-thioxodimolybdenum, branched : Not available
- Molybdenum, [N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S'](N,N-ditridecylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi-, branched : Not available
- Molybdenum, bis[N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']dioxodi-.mu.-thioxodi- : Not available
- 2,6-di-tert-butylphenol : oral; rat(male/female); No abnormalities were noted at necropsy of animals killed at the end of the study (day 14). LD50 > 5000 mg/kg bw, no deaths (OECD TG 401, GLP) (ECHA)
  dermal; rat(male/female); No treatment-related macroscopic findings were observed. LD50 > 2000 mg/kg bw, no deaths (OECD TG 402, GLP) (ECHA)
- Dodecylphenol, branched : Not available

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

- Distillates (petroleum), hydrotreated heavy paraffinic : 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. (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)
- Trade secret : Not available
- Diisononyl adipate : oral; rat(male/female); 103 weeks; 12000, 25000 ppm; NOAEL = 12000 ppm (body weight and weight gain) (read across: 103-23-1) (equivalent or similar to guideline OECD TG 451) (ECHA)
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : 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)
- Distillates (petroleum), hydrotreated light paraffinic : 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) (ECHA)
- Distillates (petroleum), solvent-dewaxed light paraffinic : 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)
- Alkylenecarbomonocyclic alcohol, sulfurized, carbonates, alkaline earth metal salts, overbased : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : rat(male/female); oral; 0, 10, 40, or 160 mg/kg/day; The oral repeat dose toxicity of an analog substance was evaluated with rats at doses as high as 160 mg/kg/day for up to 52 days. Substance-related toxicity was limited to morbundity, adverse clinical signs, and epithelial hyperplasia, hyperkeratosis, and inflammation of the stomach. NOAEL(systemic toxicity)=160 mg/kg/day (read across: EC 270-608-0) (OECD TG 422, GLP) (ECHA)
- Zinc bis(1,3-dimethylbutyl) dithiophosphate : oral; rat; Combined Repeated Dose Toxicity Study with the Reproduction / Developmental Toxicity Screening Test; 0, 10, 40, or 160 mg/kg/day; NOAEL(systemic toxicity) = 160 mg/kg bw/day (No effects observed at any dose level.) (read across : 68457-79-4) (OECD TG 422, GLP) (ECHA)
- Lubricating oils (petroleum), (C=15-30), hydrotreated neutral oil- : oral; rat; All animals in the 125 mg/kg/day survived to date of sacrifice. No details on clinical signs were provided. A NOAEL could not be identified and is less than 125 mg/kg/day when administered orally (OECD TG 408) (ECHA)

based

dermal; rabbit; 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 (read-across: CAS No. 64742-53-6) (OECD TG 410, GLP) (ECHA)

inhalation; rat; No systemic effects were observed. As no systemic toxicity was observed, the overall NOAEL for systemic effects was > 980 mg/m3 (read-across: CAS No. 64742-70-7) (OECD TG 412) (ECHA)

- 1-Tridecanamine, N-tridecyl-, branched, reaction products with carbon disulfide 2-ethyl-N-(2-ethylhexyl)- 1-hexanamine and molybdenum oxide (MoO3) : Not available
- Bis(ditridecylcarbamodithioato-κS,κS']dioxodi-μ-thioxodimolybdenum, branched : Not available
- Molybdenum, [N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S'](N,N-ditridecylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi-, branched : Not available
- Molybdenum, bis[N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']dioxodi-.mu.-thioxodi- : Not available
- 2,6-di-tert-butylphenol : oral; rat(male/female); 91 days; Based on these findings the no observed adverse effect level (NOAEL) was considered to be 4000 ppm for both males and females equating to 270 mg 2,6-di-tert-butylphenol/k/day in males and 298 mg 2,6-di-tert-butylphenol/kg/day for females. (OECD TG 408, GLP) (ECHA)
- Dodecylphenol, branched : Rat(F/M); oral; 90 days; 0, 50, 100, 150, 200 mg/kg/day; NOAEL=100 mg/kg bw/day(based on histological effects) (OECD TG 408, GLP)(ECHA)

○ **Aspiration hazard : Not classified**

- Distillates (petroleum), hydrotreated heavy paraffinic : Viscosity: 73.9 mm2/s (40°C)(ECHA) & hydrocarbons
- Trade secret : Not available
- Diisononyl adipate : dynamic viscosity : 9.6 mPa s (40°C) & not hydrocarbons
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : 52.1 mm2/s (40°C) & hydrocarbons
- Distillates (petroleum), hydrotreated light paraffinic : 17.0 mm2/s (40 °C) (ECHA) & hydrocarbons
- Distillates (petroleum), solvent-dewaxed light paraffinic : 8.4 mm2/s (40°C) (ECHA) & hydrocarbons
- Alkylenecarbomonocyclic : Not available

alcohol, sulfurized, carbonates, alkaline earth metal salts, overbased

- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Viscosity: 407.6 cSt(40 °C; ASTM D445-97; 2009)(ECHA) & not hydrocarbons
- Zinc bis(1,3-dimethylbutyl) dithiophosphate : 270.4 cSt (40°C) (ASTM D445-97) (ECHA) & not hydrocarbons
- Lubricating oils (petroleum), (C=15-30), hydrotreated neutral oil-based : kinematic viscosity > 2 mm2/s (40ºC) (CONCAWE, 2010a; CONCAWE, 1984; CONCAWE, 1997) (ECHA) & hydrocarbons
- 1-Tridecanamine, N-tridecyl-, branched, reaction products with carbon disulfide 2-ethyl-N-(2-ethylhexyl)- 1-hexanamine and molybdenum oxide (MoO3) : Not available
- Bis(ditridecylcarbamodithioato-κS,κS']dioxodi-μ-thioxodimolybdenum, branched : Not available
- Molybdenum, [N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S'](N,N-ditridecylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi-, branched : Not available
- Molybdenum, bis[N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']dioxodi-.mu.-thioxodi- : Not applicable
- 2,6-di-tert-butylphenol : Not applicable
- Dodecylphenol, branched : Viscosity : 450cSt(40 °C; ASTM D 445)(ECHA) & not 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)
- Trade secret : Not available
- Diisononyl adipate : No toxicity effects observed within the limit of water solubility(0.0032 mg/L). (ECHA)
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : 96h-LL50(Pimephales promelas) > 100 mg/L

(OECD TG 203, GLP) (ECHA)

- Distillates (petroleum), hydrotreated light paraffinic : 96h-LL50(Pimephales promelas) > 100 mg/L (OECD TG 203, GLP) (ECHA)
- Distillates (petroleum), solvent-dewaxed light paraffinic : 96h-LL50(Pimephales promelas) > 100 mg/L (OECD TG 203, GLP) (ECHA)
- Alkylenecarbomonocyclic alcohol, sulfurized, carbonates, alkaline earth metal salts, overbased : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : 96h-LL50(Oncorhynchus mykiss)=4.5 mg/L (OECD TG 203) (ECHA)
- Zinc bis(1,3-dimethylbutyl) dithiophosphate : 96h-LL50(Oncorhynchus mykiss) = 4.5 mg/L (read across : 84605-29-8) (OECD TG 203, GLP) (ECHA)
- Lubricating oils (petroleum), (C=15-30), hydrotreated neutral oil-based : 96h-LL50(Pimephales promelas) > 100 mg/L (OECD TG 203, GLP) (ECHA)
- 1-Tridecanamine, N-tridecyl-, branched, reaction products with carbon disulfide 2-ethyl-N-(2-ethylhexyl)- 1-hexanamine and molybdenum oxide (MoO3) : Not available
- Bis(ditridecylcarbamodithioato-κS,κS']dioxodi-μ-thioxodimolybdenum, branched : Not available
- Molybdenum, [N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S'](N,N-ditridecylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi-, branched : Not available
- Molybdenum, bis[N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']dioxodi-.mu.-thioxodi- : Not available
- 2,6-di-tert-butylphenol : 96h-LC50(Pimephales promelas) = 1.4 mg/l (OECD TG 204, GLP) (ECHA)
- Dodecylphenol, branched : 96h-LC50(Pimephales promelas)=40 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)
- Trade secret : Not available
- Diisononyl adipate : No toxicity effects observed within the limit of water solubility(0.0032 mg/L). (ECHA)
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : 48h-EL50(Daphnia magna) > 10000 mg/L (OECD TG 202) (ECHA)
- Distillates (petroleum), hydrotreated light paraffinic : 48h-EL50(Daphnia magna) > 10000 mg/L (OECD TG 202) (ECHA)
- Distillates (petroleum), solvent-dewaxed light paraffinic : 48h-EL50(Daphnia magna) > 10000 mg/L (OECD TG 202) (ECHA)
- Alkylenecarbomonocyclic alcohol, sulfurized, carbonates, alkaline earth metal salts, overbased : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : 48h-EC50(Daphnia magna)=23 mg/L (OECD TG 202) (ECHA)
- Zinc bis(1,3-dimethylbutyl) dithiophosphate : 48h-EL50(Daphnia magna) = 23 mg/L (read across : 84605-29-8) (OECD TG 202, GLP) (ECHA)
- Lubricating oils (petroleum), (C=15-30), hydrotreated neutral oil-based : 48h-EL50(Daphnia magna) > 10000 mg/L (OECD TG 202) (ECHA)
- 1-Tridecanamine, N-tridecyl-, branched, reaction products with carbon disulfide 2-ethyl-N-(2-ethylhexyl)- 1-hexanamine and molybdenum oxide (MoO3) : Not available
- Bis(ditridecylcarbamodithioato-κS,κS']dioxodi-μ-thioxodimolybdenum, branched : Not available
- Molybdenum, [N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S'](N,N-ditridecylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi-, branched : Not available
- Molybdenum, bis[N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']dioxodi-.mu.-thioxodi- : Not available
- 2,6-di-tert-butylphenol : 48h-EC50(Daphnia magna) = 0.45 mg/l (US EPA TSCA, GLP) (ECHA)
- Dodecylphenol, branched : 48h-EC50(Daphnia magna)=0.037 mg/L(OECD TG 202, GLP) (ECHA)

**Aquatic algae**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not available
- Trade secret : Not available
- Diisononyl adipate : No toxicity effects observed within the limit of water solubility(0.0032 mg/L). (ECHA)
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not available
- Distillates (petroleum), hydrotreated light paraffinic : Not available
- Distillates (petroleum), solvent-dewaxed light paraffinic : Not available
- Alkylenecarbomonocyclic alcohol, sulfurized, carbonates, alkaline earth metal salts, overbased : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : 72h-ErL50(Desmodesmus subspicatus)=24 mg/L (OECD TG 201, GLP) (ECHA)
- Zinc bis(1,3-dimethylbutyl) dithiophosphate : 72h-ErL50(Desmodesmus subspicatus) = 24 mg/L (read across : 84605-29-8) (OECD TG 201, GLP) (ECHA)
- Lubricating oils (petroleum), (C=15-30), hydrotreated neutral oil-based : Not available
- 1-Tridecanamine, N-tridecyl-, branched, reaction products with carbon disulfide 2-ethyl-N-(2-ethylhexyl)- 1-hexanamine and molybdenum oxide (MoO3) : Not available
- Bis(ditridecylcarbamodithioato-κS,κS']dioxodi-μ-thioxodimolybdenum, branched : Not available
- Molybdenum, [N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S'](N,N-ditridecylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi-, branched : Not available
- Molybdenum, bis[N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']dioxodi-.mu.-thioxodi- : Not available
- 2,6-di-tert-butylphenol : Not available
- Dodecylphenol, branched : 72h-ErC50(Desmodesmus subspicatus)=0.36 mg/L(OECD TG 201, GLP)(ECHA)

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

**Fish**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not available
- Trade secret : Not available
- Diisononyl adipate : Not available
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not available
- Distillates (petroleum), hydrotreated light paraffinic : Not available
- Distillates (petroleum), solvent-dewaxed light paraffinic : Not available
- Alkylenecarbomonocyclic alcohol, sulfurized, carbonates, alkaline earth metal salts, overbased : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not available
- Zinc bis(1,3-dimethylbutyl) dithiophosphate : Not available
- Lubricating oils (petroleum), (C=15-30), hydrotreated neutral oil-based : 14d-NOELR(Oncorhynchus mykiss) >= 1000 mg/L (estimated) (ECHA)
- 1-Tridecanamine, N-tridecyl-, branched, reaction products with carbon disulfide 2-ethyl-N-(2-ethylhexyl)- 1-hexanamine and molybdenum oxide (MoO3) : Not available
- Bis(ditridecylcarbamodithioato-κS,κS']dioxodi-μ-thioxodimolybdenum, branched : Not available
- Molybdenum, [N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S'](N,N-ditridecylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi-, branched : Not available
- Molybdenum, bis[N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']dioxodi-.mu.-thioxodi- : Not available
- 2,6-di-tert-butylphenol : Not available
- Dodecylphenol, branched : 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)

- Trade secret : Not available
- Diisononyl adipate : No toxicity effects observed within the limit of water solubility(0.0032 mg/L). (ECHA)
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : 21d-NOEL(Daphnia magna) = 10 mg/L (OECD TG 211, GLP) (ECHA)
- Distillates (petroleum), hydrotreated light paraffinic : 21d-NOEL(Daphnia magna) = 10 mg/L (OECD TG 211, GLP) (ECHA)
- Distillates (petroleum), solvent-dewaxed light paraffinic : 21d-NOEL(Daphnia magna) = 10 mg/L (OECD TG 211, GLP) (ECHA)
- Alkylenecarbomonocyclic alcohol, sulfurized, carbonates, alkaline earth metal salts, overbased : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : 21d-NOEC(Daphnia magna)=0.4 mg/L (OECD TG 211, GLP)(ECHA)
- Zinc bis(1,3-dimethylbutyl) dithiophosphate : 21d-NOECreproduction(Daphnia magna) = 0.4 mg/L (read across : 84605-29-8) (OECD TG 211, GLP) (ECHA)
- Lubricating oils (petroleum), (C=15-30), hydrotreated neutral oil-based : 21d-NOEL(Daphnia magna) = 10 mg/L (OECD TG 211, GLP) (ECHA)
- 1-Tridecanamine, N-tridecyl-, branched, reaction products with carbon disulfide 2-ethyl-N-(2-ethylhexyl)- 1-hexanamine and molybdenum oxide (MoO3) : Not available
- Bis(ditridecylcarbamodithioato-κS,κS']dioxodi-μ-thioxodimolybdenum, branched : Not available
- Molybdenum, [N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S'](N,N-ditridecylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi-, branched : Not available
- Molybdenum, bis[N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']dioxodi-.mu.-thioxodi- : Not available
- 2,6-di-tert-butylphenol : 21d-NOEC(Daphnia magna) = 0.035 mg/L (OECD TG 211, GLP) (ECHA)
- Dodecylphenol, branched : 21d-NOEC(Daphnia magna)=0.004 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)
- Trade secret : Not available
- Diisononyl adipate : No toxicity effects observed within the limit of water solubility(0.0032 mg/L). (ECHA)
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : 72h-NOErL(Pseudokirchneriella subcapitata) >=100 mg/L (OECD TG 201) (ECHA)
- Distillates (petroleum), hydrotreated light paraffinic : 72h-NOErL(Pseudokirchneriella subcapitata) >=100 mg/L (OECD TG 201) (ECHA)
- Distillates (petroleum), solvent-dewaxed light paraffinic : 72h-NOErL(Pseudokirchneriella subcapitata) >=100 mg/L (OECD TG 201) (ECHA)
- Alkylenecarbomonocyclic alcohol, sulfurized, carbonates, alkaline earth metal salts, overbased : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not available
- Zinc bis(1,3-dimethylbutyl) dithiophosphate : Not available
- Lubricating oils (petroleum), (C=15-30), hydrotreated neutral oil-based : 72h-NOEL(Pseudokirchneriella subcapitata) >= 100 mg/L (OECD TG 201) (ECHA)
- 1-Tridecanamine, N-tridecyl-, branched, reaction products with carbon disulfide 2-ethyl-N-(2-ethylhexyl)- 1-hexanamine and molybdenum oxide (MoO3) : Not available
- Bis(ditridecylcarbamodithioato-κS,κS']dioxodi-μ-thioxodimolybdenum, branched : Not available
- Molybdenum, [N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S'](N,N-ditridecylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi-, branched : Not available
- Molybdenum, bis[N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']dioxodi-.mu.-thioxodi- : Not available
- 2,6-di-tert-butylphenol : Not available

- Dodecylphenol, branched : 72h-NOEC(Desmodesmus subspicatus)=0.07 mg/L(OECD TG 201, GLP)(ECHA)

**2) Persistence and degradability**

○ **Persistence**

- Distillates (petroleum), hydrotreated heavy paraffinic : This substance is UVCB, so it is not applicable. (ECHA)
- Trade secret : Not available
- Diisononyl adipate : log Kow = >= 9.56 - <= 10.4 (25 °C) (OECD TG 117) (ECHA)
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : log Kow = 6.13 (experimental) (EPISUITE)
- Distillates (petroleum), hydrotreated light paraffinic : Not available
- Distillates (petroleum), solvent-dewaxed light paraffinic : log Kow = 6.13 (experimental) (EPISUITE)
- Alkylenecarbomonocyclic alcohol, sulfurized, carbonates, alkaline earth metal salts, overbased : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : log Kow = 0.56(ECHA)
- Zinc bis(1,3-dimethylbutyl) dithiophosphate : log Kow = 2.21 (20 °C; pH: 5-6) (OECD TG 107, GLP) (ECHA)
- Lubricating oils (petroleum), (C=15-30), hydrotreated neutral oil-based : log Kow = 6.43 (estimated) (EPISUITE)
- 1-Tridecanamine, N-tridecyl-, branched, reaction products with carbon disulfide 2-ethyl-N-(2-ethylhexyl)- 1-hexanamine and molybdenum oxide (MoO3) : Not available
- Bis(ditridecylcarbamodithioato-κS,κS']dioxodi-μ-thioxodimolybdenum, branched : Not available
- Molybdenum, [N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S'](N,N-ditridecylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi-, branched : Not available
- Molybdenum, bis[N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']dioxodi-.mu.-thioxodi- : Not available
- 2,6-di-tert-butylphenol : log Kow = 4.5 (24 °C) (OECD TG 117, GLP) (ECHA)
- Dodecylphenol, branched : log Kow = 7.14 (OECD TG 123)(ECHA)

○ **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)
- Trade secret : Not available
- Diisononyl adipate : After evaporation or exposure to the air, diisononyl adipate will be rapidly degraded by photochemical processes. (ECHA) Hydrolysis is not expected to be a relevant degradation pathway since the substance is readily biodegradable. (ECHA)
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not available
- Distillates (petroleum), hydrotreated light paraffinic : Not available
- Distillates (petroleum), solvent-dewaxed light paraffinic : Not available
- Alkylenecarbomonocyclic alcohol, sulfurized, carbonates, alkaline earth metal salts, overbased : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not available
- Zinc bis(1,3-dimethylbutyl) dithiophosphate : Not available
- Lubricating oils (petroleum), (C=15-30), hydrotreated neutral oil-based : They have a very low potential to hydrolyze (ECHA)
- 1-Tridecanamine, N-tridecyl-, branched, reaction products with carbon disulfide 2-ethyl-N-(2-ethylhexyl)- 1-hexanamine and molybdenum oxide (MoO3) : Not available
- Bis(ditridecylcarbamodithioato-κS,κS']dioxodi-μ-thioxodimolybdenum, branched : Not available
- Molybdenum, [N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S'](N,N-ditridecylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi-, branched : Not available
- Molybdenum, bis[N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']dioxodi-.mu.-thioxodi- : Not available
- 2,6-di-tert-butylphenol : Air - DT50: 0.22 d

- Dodecylphenol, branched : An atmospheric half-life of 2.294 hours can be calculated based on hydroxyl radical interaction, but the low vapour pressure of this substance and its Henry's Law Constant indicate that partitioning into atmosphere will not be a significant pathway.(SIDS)

**3) Bioaccumulative potential**

○ **Bioaccumulation**

- Distillates (petroleum), hydrotreated heavy paraffinic : This substance is UVCB, so it is not applicable. (ECHA)
- Trade secret : Not available
- Diisononyl adipate : BCF = 267.7 (estimated) (EPISUITE)
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : BCF = 5147 (estimated) (EPISUITE)
- Distillates (petroleum), hydrotreated light paraffinic : Not available
- Distillates (petroleum), solvent-dewaxed light paraffinic : BCF = 5147 (EPISUITE)
- Alkylenecarbomonocyclic alcohol, sulfurized, carbonates, alkaline earth metal salts, overbased : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not available
- Zinc bis(1,3-dimethylbutyl) dithiophosphate : BCF = 11810 (estimated) (EPISUITE)
- Lubricating oils (petroleum), (C=15-30), hydrotreated neutral oil-based : BCF = 8137 (estimated) (EPISUITE)
- 1-Tridecanamine, N-tridecyl-, branched, reaction products with carbon disulfide 2-ethyl-N-(2-ethylhexyl)- 1-hexanamine and molybdenum oxide (MoO3) : Not available
- Bis(ditridecylcarbamodithioato-κS,κS']dioxodi-μ-thioxodimolybdenum, branched : Not available
- Molybdenum, [N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S'](N,N-ditridecylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi-, branched : Not available
- Molybdenum, bis[N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']dioxodi-.mu.-thioxodi- : Not available
- 2,6-di-tert-butylphenol : BCF=ca. 660 L/kg (ECHA)
- Dodecylphenol, branched : BCF=823 (OECD TG 305); TPP has a moderate potential to bioaccumulate.(SIDS)

○ **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)
- Trade secret : Not available
- Diisononyl adipate : > 90 % degradation after 28d; readily biodegradation (equivalent or similar to guideline OECD TG 301F, GLP) (ECHA)
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : 31 % degradation after 28d; not readily biodegradable (OECD TG 301F, GLP) (ECHA)
- Distillates (petroleum), hydrotreated light paraffinic : 31 % degradation after 28d; not readily biodegradable (OECD TG 301F, GLP) (ECHA)
- Distillates (petroleum), solvent-dewaxed light paraffinic : 31% degradation after 28 days; not readily biodegradable (OECD TG 301F, GLP) (ECHA)
- Alkylenecarbomonocyclic alcohol, sulfurized, carbonates, alkaline earth metal salts, overbased : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : 1.5% degradation after 28 days; not readily biodegradable (OECD TG 301 B, GLP) (ECHA)
- Zinc bis(1,3-dimethylbutyl) dithiophosphate : 1.5% degradation ($CO_2$ evolution) after 28d; Not readily biodegradable under test conditions (read across : 84605-29-8) (OECD TG 301B, GLP) (ECHA)
- Lubricating oils (petroleum), (C=15-30), hydrotreated neutral oil-based : 31% degradation after 28 days (OECD TG 301F, GLP) (ECHA)
- 1-Tridecanamine, N-tridecyl-, branched, reaction products with carbon disulfide 2-ethyl-N-(2-ethylhexyl)- 1-hexanamine and molybdenum oxide (MoO3) : Not available

- Bis(ditridecylcarbamodithioato-κS,κS']dioxodi-μ-thioxodimolybdenum, branched : Not available
- Molybdenum, [N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S'](N,N-ditridecylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi-, branched : Not available
- Molybdenum, bis[N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']dioxodi-.mu.-thioxodi- : Not available
- 2,6-di-tert-butylphenol : >= 12 - <= 24 % degradation after 28d; not inherently biodegradable (OECD TG 302C, GLP) (ECHA)
- Dodecylphenol, branched : 10% biodegradation after 56 days (OECD TG 302 D, GLP); cannot be considered to be inherently biodegradable(ECHA)

**4) Mobility in soil**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not available
- Trade secret : Not available
- Diisononyl adipate : Koc=803200 (estimated) (EPISUITE)
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Koc=208800 (EPISUITE)
- Distillates (petroleum), hydrotreated light paraffinic : Not available
- Distillates (petroleum), solvent-dewaxed light paraffinic : Koc = 208800 (EPISUITE)
- Alkylenecarbomonocyclic alcohol, sulfurized, carbonates, alkaline earth metal salts, overbased : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Koc=1017000
- Zinc bis(1,3-dimethylbutyl) dithiophosphate : Koc = 33750 (estimated) (EPISUITE)
- Lubricating oils (petroleum), (C=15-30), hydrotreated neutral oil-based : Koc = 380400 (estimated) (EPISUITE)
- 1-Tridecanamine, N-tridecyl-, branched, reaction products with carbon disulfide 2-ethyl-N-(2-ethylhexyl)- 1-hexanamine and molybdenum oxide (MoO3) : Not available
- Bis(ditridecylcarbamodithioato-κS,κS']dioxodi-μ-thioxodimolybdenum, branched : Not available
- Molybdenum, [N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S'](N,N-ditridecylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi-, branched : Not available
- Molybdenum, bis[N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']dioxodi-.mu.-thioxodi- : Not available
- 2,6-di-tert-butylphenol : Koc = 6506 (EPISUITE)
- Dodecylphenol, branched : Not available

**5) Hazard to the ozone layer**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Trade secret : Not available
- Diisononyl adipate : Not applicable
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not applicable
- Distillates (petroleum), hydrotreated light paraffinic : Not applicable
- Distillates (petroleum), solvent-dewaxed light paraffinic : Not applicable
- Alkylenecarbomonocyclic alcohol, sulfurized, carbonates, alkaline earth metal salts, overbased : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not applicable
- Zinc bis(1,3-dimethylbutyl) dithiophosphate : Not applicable
- Lubricating oils (petroleum), (C=15-30), hydrotreated neutral oil-based : Not applicable
- 1-Tridecanamine, N-tridecyl-, branched, reaction products with carbon disulfide 2-ethyl-N-(2-ethylhexyl)- 1-hexanamine and molybdenum oxide (MoO3) : Not applicable
- Bis(ditridecylcarbamodithioato-κS,κS']dioxodi-μ-thioxodimolybdenum, branched : Not applicable
- Molybdenum, [N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S'](N,N-ditridecylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi-, branched : Not applicable
- Molybdenum, bis[N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']dioxodi-.mu.-thioxodi- : Not applicable

- 2,6-di-tert-butylphenol : Not applicable
- Dodecylphenol, branched : Not applicable

**6) Other adverse effects**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not available
- Trade secret : Not available
- Diisononyl adipate : Not available
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not available
- Distillates (petroleum), hydrotreated light paraffinic : Not available
- Distillates (petroleum), solvent-dewaxed light paraffinic : Not available
- Alkylenecarbomonocyclic alcohol, sulfurized, carbonates, alkaline earth metal salts, overbased : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not available
- Zinc bis(1,3-dimethylbutyl) dithiophosphate : Not available
- Lubricating oils (petroleum), (C=15-30), hydrotreated neutral oil-based : Not available
- 1-Tridecanamine, N-tridecyl-, branched, reaction products with carbon disulfide 2-ethyl-N-(2-ethylhexyl)- 1-hexanamine and molybdenum oxide (MoO3) : Not available
- Bis(ditridecylcarbamodithioato-κS,κS']dioxodi-μ-thioxodimolybdenum, branched : Not available
- Molybdenum, [N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S'](N,N-ditridecylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi-, branched : Not available
- Molybdenum, bis[N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']dioxodi-.mu.-thioxodi- : Not available
- 2,6-di-tert-butylphenol : Not available
- Dodecylphenol, branched : Not available

## 13. DISPOSAL CONSIDERATIONS

**1) Disposal methods**

- Not available

**2) Special precaution for disposal**

- The user of this product must disposal by oneself or entrust to waste disposer or person who other's waste recycle and dispose, person who establish and operate waste disposal facilities.
- Dispose of waste in accordance with all applicable laws and regulations.

## 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
- Trade secret : Not applicable
- Diisononyl adipate : European EINECS phase-in substance
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : European EINECS phase-in substance
- Distillates (petroleum), hydrotreated light paraffinic : European EINECS phase-in substance
- Distillates (petroleum), solvent-dewaxed light paraffinic : European EINECS phase-in substance
- Alkylenecarbomonocyclic alcohol, sulfurized, carbonates, alkaline earth metal salts, overbased : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : European EINECS phase-in substance
- Zinc bis(1,3-dimethylbutyl) dithiophosphate : European EINECS phase-in substance
- Lubricating oils (petroleum), (C=15-30), hydrotreated neutral oil-based : European EINECS phase-in substance
- 1-Tridecanamine, N-tridecyl-, branched, reaction products with carbon disulfide 2-ethyl-N-(2-ethylhexyl)- 1-hexanamine and molybdenum oxide (MoO3) : Not applicable
- Bis(ditridecylcarbamodithioato-κS,κS']dioxodi-μ-thioxodimolybdenum, branched : Not applicable
- Molybdenum, [N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S'](N,N-ditridecylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi-, branched : Not applicable
- Molybdenum, bis[N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']dioxodi-.mu.-thioxodi- : Not applicable
- 2,6-di-tert-butylphenol : European EINECS phase-in substance
- Dodecylphenol, branched : European EINECS phase-in substance

**EU CLP (CLASSIFICATION) - PRODUCT : Not applicable**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Trade secret : Not applicable
- Diisononyl adipate : Not applicable
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not applicable
- Distillates (petroleum), hydrotreated light paraffinic : Not applicable
- Distillates (petroleum), solvent-dewaxed light paraffinic : Not applicable
- Alkylenecarbomonocyclic alcohol, sulfurized, carbonates, alkaline earth metal salts, overbased : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not applicable
- Zinc bis(1,3-dimethylbutyl) dithiophosphate : Not applicable
- Lubricating oils (petroleum), (C=15-30), hydrotreated neutral oil-based : Not applicable
- 1-Tridecanamine, N-tridecyl-, branched, reaction products with carbon disulfide 2-ethyl-N-(2-ethylhexyl)- 1-hexanamine and molybdenum oxide (MoO3) : Not applicable
- Bis(ditridecylcarbamodithioato-κS,κS']dioxodi-μ-thioxodimolybdenum, branched : Not applicable
- Molybdenum, [N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S'](N,N-ditridecylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi-, branched : Not applicable
- Molybdenum, bis[N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']dioxodi-.mu.-thioxodi- : Not applicable
- 2,6-di-tert-butylphenol : Not applicable
- Dodecylphenol, branched : Not applicable

**Substances restricted under REACH**

- Distillates (petroleum), hydrotreated heavy paraffinic : Substances restricted under REACH
- Trade secret : Not applicable
- Diisononyl adipate : Not applicable
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Substances restricted under REACH
- Distillates (petroleum), hydrotreated light paraffinic : Substances restricted under REACH
- Distillates (petroleum), solvent-dewaxed light paraffinic : Substances restricted under REACH
- Alkylenecarbomonocyclic alcohol, sulfurized, carbonates, alkaline earth metal salts, overbased : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not applicable
- Zinc bis(1,3-dimethylbutyl) dithiophosphate : Not applicable
- Lubricating oils (petroleum), (C=15-30), hydrotreated neutral oil-based : Substances restricted under REACH
- 1-Tridecanamine, N-tridecyl-, branched, reaction products with carbon disulfide 2-ethyl-N-(2-ethylhexyl)- 1-hexanamine and molybdenum oxide (MoO3) : Not applicable
- Bis(ditridecylcarbamodithioato-κS,κS']dioxodi-μ-thioxodimolybdenum, branched : Not applicable
- Molybdenum, [N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S'](N,N-ditridecylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi-, branched : Not applicable
- Molybdenum, bis[N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']dioxodi-.mu.-thioxodi- : Not applicable
- 2,6-di-tert-butylphenol : Not applicable
- Dodecylphenol, branched : Not applicable

**Substances subject to authorization under REACH**

**REACH SVHC List**

**Korea**

○ **Occupational Safety and Health Act**

- Distillates (petroleum), hydrotreated heavy paraffinic : Substance subject to occupational exposure limits, Harmful agents subject to work environment monitoring, Harmful agents subject to workers requiring health examination
- Trade secret : Not applicable
- Diisononyl adipate : Not applicable
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Substance subject to occupational exposure limits, Harmful agents subject to work environment monitoring, Harmful agents subject to workers requiring health examination
- Distillates (petroleum), hydrotreated light paraffinic : Substance subject to occupational exposure limits, Harmful agents subject to work environment monitoring, Harmful agents subject to workers requiring health examination
- Distillates (petroleum), solvent-dewaxed light paraffinic : Substance subject to occupational exposure limits, Harmful agents subject to work environment monitoring, Harmful agents subject to workers requiring health examination
- Alkylenecarbomonocyclic alcohol, sulfurized, carbonates, alkaline earth metal salts, overbased : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Hazardous substance subject to control
- Zinc bis(1,3-dimethylbutyl) dithiophosphate : Hazardous substance subject to control
- Lubricating oils (petroleum), (C=15-30), hydrotreated neutral oil-based : Not applicable
- 1-Tridecanamine, N-tridecyl-, branched, reaction products with carbon disulfide 2-ethyl-N-(2-ethylhexyl)- 1-hexanamine and molybdenum oxide (MoO3) : Not applicable
- Bis(ditridecylcarbamodithioato-κS,κS']dioxodi-μ-thioxodimolybdenum, branched : Substance subject to occupational exposure limits
- Molybdenum, [N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S'](N,N-

ditridecylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi-, branched : Not applicable
- Molybdenum, bis[N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']dioxodi-.mu.-thioxodi- : Not applicable
- 2,6-di-tert-butylphenol : Not applicable
- Dodecylphenol, branched : Not applicable

○ **K-REACH**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Trade secret : Not applicable
- Diisononyl adipate : Not applicable
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not applicable
- Distillates (petroleum), hydrotreated light paraffinic : Not applicable
- Distillates (petroleum), solvent-dewaxed light paraffinic : Not applicable
- Alkylenecarbomonocyclic alcohol, sulfurized, carbonates, alkaline earth metal salts, overbased : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not applicable
- Zinc bis(1,3-dimethylbutyl) dithiophosphate : Not applicable
- Lubricating oils (petroleum), (C=15-30), hydrotreated neutral oil-based : Not applicable
- 1-Tridecanamine, N-tridecyl-, branched, reaction products with carbon disulfide 2-ethyl-N-(2-ethylhexyl)- 1-hexanamine and molybdenum oxide (MoO3) : Not applicable
- Bis(ditridecylcarbamodithioato-κS,κS']dioxodi-μ-thioxodimolybdenum, branched : Not applicable
- Molybdenum, [N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S'](N,N-ditridecylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi-, branched : Not applicable
- Molybdenum, bis[N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']dioxodi-.mu.-thioxodi- : Not applicable
- 2,6-di-tert-butylphenol : Not applicable
- Dodecylphenol, branched : Not applicable

○ **Chemical Control Act in Korea**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Trade secret : Not applicable
- Diisononyl adipate : Not applicable
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not applicable
- Distillates (petroleum), hydrotreated light paraffinic : Not applicable
- Distillates (petroleum), solvent-dewaxed light paraffinic : Not applicable
- Alkylenecarbomonocyclic alcohol, sulfurized, carbonates, alkaline earth metal salts, overbased : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : List of substance subjected to the PRTR
- Zinc bis(1,3-dimethylbutyl) dithiophosphate : List of substance subjected to the PRTR
- Lubricating oils (petroleum), (C=15-30), hydrotreated neutral oil-based : Not applicable
- 1-Tridecanamine, N-tridecyl-, branched, reaction products with carbon disulfide 2-ethyl-N-(2-ethylhexyl)- 1-hexanamine and molybdenum oxide (MoO3) : Not applicable
- Bis(ditridecylcarbamodithioato-κS,κS']dioxodi-μ-thioxodimolybdenum, branched : Not applicable
- Molybdenum, [N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S'](N,N-ditridecylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi-, branched : Not applicable
- Molybdenum, bis[N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']dioxodi-.mu.-thioxodi- : Not applicable
- 2,6-di-tert-butylphenol : Ecologically hazardous substances
- Dodecylphenol, branched : Not applicable

○ **Safety Control of Dangerous Substances Act**

- Distillates (petroleum), hydrotreated heavy paraffinic : Dangerous substance
- Trade secret : Not applicable
- Diisononyl adipate : Dangerous substance
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not applicable
- Distillates (petroleum), hydrotreated light paraffinic : Dangerous substance
- Distillates (petroleum), solvent-dewaxed light paraffinic : Not applicable
- Alkylenecarbomonocyclic alcohol, sulfurized, carbonates, alkaline earth metal salts, overbased : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not applicable
- Zinc bis(1,3-dimethylbutyl) dithiophosphate : Not applicable
- Lubricating oils (petroleum), (C=15-30), hydrotreated neutral oil-based : Not applicable
- 1-Tridecanamine, N-tridecyl-, branched, reaction products with carbon disulfide 2-ethyl-N-(2-ethylhexyl)- 1-hexanamine and molybdenum oxide (MoO3) : Not applicable
- Bis(ditridecylcarbamodithioato-κS,κS']dioxodi-μ-thioxodimolybdenum, branched : Not applicable
- Molybdenum, [N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S'](N,N-ditridecylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi-, branched : Not applicable
- Molybdenum, bis[N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']dioxodi-.mu.-thioxodi- : Not applicable
- 2,6-di-tert-butylphenol : Not applicable
- Dodecylphenol, branched : Not applicable

**U.S.A**

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

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Trade secret : Not applicable
- Diisononyl adipate : Not applicable
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not applicable
- Distillates (petroleum), hydrotreated light paraffinic : Not applicable
- Distillates (petroleum), solvent-dewaxed light paraffinic : Not applicable
- Alkylenecarbomonocyclic alcohol, sulfurized, carbonates, alkaline earth metal salts, overbased : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not applicable
- Zinc bis(1,3-dimethylbutyl) dithiophosphate : Not applicable
- Lubricating oils (petroleum), (C=15-30), hydrotreated neutral oil-based : Not applicable
- 1-Tridecanamine, N-tridecyl-, branched, reaction products with carbon disulfide 2-ethyl-N-(2-ethylhexyl)- 1-hexanamine and molybdenum oxide (MoO3) : Not applicable
- Bis(ditridecylcarbamodithioato-κS,κS']dioxodi-μ-thioxodimolybdenum, branched : Not applicable
- Molybdenum, [N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S'](N,N-ditridecylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi-, branched : Not applicable
- Molybdenum, bis[N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']dioxodi-.mu.-thioxodi- : Not applicable
- 2,6-di-tert-butylphenol : Not applicable
- Dodecylphenol, branched : Not applicable

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

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Trade secret : Not applicable
- Diisononyl adipate : Not applicable
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not applicable
- Distillates (petroleum), hydrotreated light paraffinic : Not applicable
- Distillates (petroleum), solvent-dewaxed light paraffinic : Not applicable

- Alkylenecarbomonocyclic alcohol, sulfurized, carbonates, alkaline earth metal salts, overbased : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not applicable
- Zinc bis(1,3-dimethylbutyl) dithiophosphate : Not applicable
- Lubricating oils (petroleum), (C=15-30), hydrotreated neutral oil-based : Not applicable
- 1-Tridecanamine, N-tridecyl-, branched, reaction products with carbon disulfide 2-ethyl-N-(2-ethylhexyl)- 1-hexanamine and molybdenum oxide (MoO3) : Not applicable
- Bis(ditridecylcarbamodithioato-κS,κS']dioxodi-μ-thioxodimolybdenum, branched : Not applicable
- Molybdenum, [N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S'](N,N-ditridecylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi-, branched : Not applicable
- Molybdenum, bis[N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']dioxodi-.mu.-thioxodi- : Not applicable
- 2,6-di-tert-butylphenol : Not applicable
- Dodecylphenol, branched : Not applicable

○ **CERCLA Section 302 regulation**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Trade secret : Not applicable
- Diisononyl adipate : Not applicable
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not applicable
- Distillates (petroleum), hydrotreated light paraffinic : Not applicable
- Distillates (petroleum), solvent-dewaxed light paraffinic : Not applicable
- Alkylenecarbomonocyclic alcohol, sulfurized, carbonates, alkaline earth metal salts, overbased : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not applicable
- Zinc bis(1,3-dimethylbutyl) dithiophosphate : Not applicable
- Lubricating oils (petroleum), (C=15-30), hydrotreated neutral oil-based : Not applicable
- 1-Tridecanamine, N-tridecyl-, branched, reaction products with carbon disulfide 2-ethyl-N-(2-ethylhexyl)- 1-hexanamine and molybdenum oxide (MoO3) : Not applicable
- Bis(ditridecylcarbamodithioato-κS,κS']dioxodi-μ-thioxodimolybdenum, branched : Not applicable
- Molybdenum, [N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S'](N,N-ditridecylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi-, branched : Not applicable
- Molybdenum, bis[N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']dioxodi-.mu.-thioxodi- : Not applicable
- 2,6-di-tert-butylphenol : Not applicable
- Dodecylphenol, branched : Not applicable

○ **CERCLA Section 304 regulation**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Trade secret : Not applicable
- Diisononyl adipate : Not applicable
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not applicable
- Distillates (petroleum), hydrotreated light paraffinic : Not applicable
- Distillates (petroleum), solvent-dewaxed light paraffinic : Not applicable
- Alkylenecarbomonocyclic alcohol, sulfurized, carbonates, alkaline earth metal salts, overbased : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not applicable
- Zinc bis(1,3-dimethylbutyl) dithiophosphate : Not applicable
- Lubricating oils (petroleum), (C=15-30), hydrotreated neutral oil-based : Not applicable
- 1-Tridecanamine, N-tridecyl-, branched, reaction products with carbon disulfide 2-ethyl-N-(2-ethylhexyl)- 1-hexanamine and molybdenum oxide (MoO3) : Not applicable
- Bis(ditridecylcarbamodithioato-κS,κS']dioxodi-μ-thioxodimolybdenum, branched : Not applicable

- Molybdenum, [N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']( N,N-ditridecylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi-, branched : Not applicable
- Molybdenum, bis[N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']dioxodi-.mu.-thioxodi- : Not applicable
- 2,6-di-tert-butylphenol : Not applicable
- Dodecylphenol, branched : Not applicable

○ **CERCLA Section 313 regulation**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Trade secret : Not applicable
- Diisononyl adipate : Not applicable
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not applicable
- Distillates (petroleum), hydrotreated light paraffinic : Not applicable
- Distillates (petroleum), solvent-dewaxed light paraffinic : Not applicable
- Alkylenecarbomonocyclic alcohol, sulfurized, carbonates, alkaline earth metal salts, overbased : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not applicable
- Zinc bis(1,3-dimethylbutyl) dithiophosphate : Not applicable
- Lubricating oils (petroleum), (C=15-30), hydrotreated neutral oil-based : Not applicable
- 1-Tridecanamine, N-tridecyl-, branched, reaction products with carbon disulfide 2-ethyl-N-(2-ethylhexyl)- 1-hexanamine and molybdenum oxide (MoO3) : Not applicable
- Bis(ditridecylcarbamodithioato-κS,κS']dioxodi-μ-thioxodimolybdenum, branched : Not applicable
- Molybdenum, [N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']( N,N-ditridecylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi-, branched : Not applicable
- Molybdenum, bis[N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']dioxodi-.mu.-thioxodi- : Not applicable
- 2,6-di-tert-butylphenol : Not applicable
- Dodecylphenol, branched : Not applicable

**Interntional Convention on Environment**

○ **Rotterdam Convention list**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Trade secret : Not applicable
- Diisononyl adipate : Not applicable
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not applicable
- Distillates (petroleum), hydrotreated light paraffinic : Not applicable
- Distillates (petroleum), solvent-dewaxed light paraffinic : Not applicable
- Alkylenecarbomonocyclic alcohol, sulfurized, carbonates, alkaline earth metal salts, overbased : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not applicable
- Zinc bis(1,3-dimethylbutyl) dithiophosphate : Not applicable
- Lubricating oils (petroleum), (C=15-30), hydrotreated neutral oil-based : Not applicable
- 1-Tridecanamine, N-tridecyl-, branched, reaction products with carbon disulfide 2-ethyl-N-(2-ethylhexyl)- 1-hexanamine and molybdenum oxide (MoO3) : Not applicable
- Bis(ditridecylcarbamodithioato-κS,κS']dioxodi-μ-thioxodimolybdenum, branched : Not applicable
- Molybdenum, [N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']( N,N-ditridecylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi-, branched : Not applicable
- Molybdenum, bis[N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']dioxodi-.mu.-thioxodi- : Not applicable
- 2,6-di-tert-butylphenol : Not applicable
- Dodecylphenol, branched : Not applicable

○ **Stockholm Convention list**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Trade secret : Not applicable
- Diisononyl adipate : Not applicable
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not applicable
- Distillates (petroleum), hydrotreated light paraffinic : Not applicable
- Distillates (petroleum), solvent-dewaxed light paraffinic : Not applicable
- Alkylenecarbomonocyclic alcohol, sulfurized, carbonates, alkaline earth metal salts, overbased : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not applicable
- Zinc bis(1,3-dimethylbutyl) dithiophosphate : Not applicable
- Lubricating oils (petroleum), (C=15-30), hydrotreated neutral oil-based : Not applicable
- 1-Tridecanamine, N-tridecyl-, branched, reaction products with carbon disulfide 2-ethyl-N-(2-ethylhexyl)- 1-hexanamine and molybdenum oxide (MoO3) : Not applicable
- Bis(ditridecylcarbamodithioato-κS,κS']dioxodi-μ-thioxodimolybdenum, branched : Not applicable
- Molybdenum, [N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S'](N,N-ditridecylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi-, branched : Not applicable
- Molybdenum, bis[N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']dioxodi-.mu.-thioxodi- : Not applicable
- 2,6-di-tert-butylphenol : Not applicable
- Dodecylphenol, branched : Not applicable

○ **Montreal Protocol list**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Trade secret : Not applicable
- Diisononyl adipate : Not applicable
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not applicable
- Distillates (petroleum), hydrotreated light paraffinic : Not applicable
- Distillates (petroleum), solvent-dewaxed light paraffinic : Not applicable
- Alkylenecarbomonocyclic alcohol, sulfurized, carbonates, alkaline earth metal salts, overbased : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not applicable
- Zinc bis(1,3-dimethylbutyl) dithiophosphate : Not applicable
- Lubricating oils (petroleum), (C=15-30), hydrotreated neutral oil-based : Not applicable
- 1-Tridecanamine, N-tridecyl-, branched, reaction products with carbon disulfide 2-ethyl-N-(2-ethylhexyl)- 1-hexanamine and molybdenum oxide (MoO3) : Not applicable
- Bis(ditridecylcarbamodithioato-κS,κS']dioxodi-μ-thioxodimolybdenum, branched : Not applicable
- Molybdenum, [N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S'](N,N-ditridecylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi-, branched : Not applicable
- Molybdenum, bis[N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']dioxodi-.mu.-thioxodi- : Not applicable
- 2,6-di-tert-butylphenol : Not applicable
- Dodecylphenol, branched : Not applicable

**National Inventory**

○ **Korea**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Trade secret : Not applicable
- Diisononyl adipate : Not applicable
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not applicable
- Distillates (petroleum), hydrotreated light paraffinic : Not applicable

- Distillates (petroleum), solvent-dewaxed light paraffinic : Not applicable
- Alkylenecarbomonocyclic alcohol, sulfurized, carbonates, alkaline earth metal salts, overbased : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not applicable
- Zinc bis(1,3-dimethylbutyl) dithiophosphate : Not applicable
- Lubricating oils (petroleum), (C=15-30), hydrotreated neutral oil-based : Not applicable
- 1-Tridecanamine, N-tridecyl-, branched, reaction products with carbon disulfide 2-ethyl-N-(2-ethylhexyl)- 1-hexanamine and molybdenum oxide (MoO3) : Not applicable
- Bis(ditridecylcarbamodithioato-κS,κS']dioxodi-μ-thioxodimolybdenum, branched : Not applicable
- Molybdenum, [N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S'](N,N-ditridecylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi-, branched : Not applicable
- Molybdenum, bis[N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']dioxodi-.mu.-thioxodi- : Not applicable
- 2,6-di-tert-butylphenol : Not applicable
- Dodecylphenol, branched : Not applicable

○ **U.S.A**

- Distillates (petroleum), hydrotreated heavy paraffinic : US TSCA phase-in substance
- Trade secret : Not applicable
- Diisononyl adipate : US TSCA phase-in substance
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : US TSCA phase-in substance
- Distillates (petroleum), hydrotreated light paraffinic : US TSCA phase-in substance
- Distillates (petroleum), solvent-dewaxed light paraffinic : US TSCA phase-in substance
- Alkylenecarbomonocyclic alcohol, sulfurized, carbonates, alkaline earth metal salts, overbased : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : US TSCA phase-in substance
- Zinc bis(1,3-dimethylbutyl) dithiophosphate : US TSCA phase-in substance
- Lubricating oils (petroleum), (C=15-30), hydrotreated neutral oil-based : US TSCA phase-in substance
- 1-Tridecanamine, N-tridecyl-, branched, reaction products with carbon disulfide 2-ethyl-N-(2-ethylhexyl)- 1-hexanamine and molybdenum oxide (MoO3) : Not applicable
- Bis(ditridecylcarbamodithioato-κS,κS']dioxodi-μ-thioxodimolybdenum, branched : US TSCA phase-in substance
- Molybdenum, [N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S'](N,N-ditridecylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi-, branched : US TSCA phase-in substance
- Molybdenum, bis[N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']dioxodi-.mu.-thioxodi- : US TSCA phase-in substance
- 2,6-di-tert-butylphenol : US TSCA phase-in substance
- Dodecylphenol, branched : Not applicable

○ **China**

- Distillates (petroleum), hydrotreated heavy paraffinic : China phase-in substance
- Trade secret : Not applicable
- Diisononyl adipate : China phase-in substance
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : China phase-in substance
- Distillates (petroleum), hydrotreated light paraffinic : China phase-in substance
- Distillates (petroleum), solvent-dewaxed light paraffinic : China phase-in substance
- Alkylenecarbomonocyclic alcohol, sulfurized, carbonates, alkaline earth metal salts, overbased : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : China phase-in substance
- Zinc bis(1,3-dimethylbutyl) dithiophosphate : China phase-in substance
- Lubricating oils (petroleum), (C=15-30), hydrotreated neutral oil-based : China phase-in substance
- 1-Tridecanamine, N-tridecyl-, branched, reaction products with carbon disulfide 2-ethyl-N-(2-ethylhexyl)- 1-

hexanamine and molybdenum oxide (MoO3) : Not applicable
- Bis(ditridecylcarbamodithioato-κS,κS']dioxodi-μ-thioxodimolybdenum, branched : Not applicable
- Molybdenum, [N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S'](N,N-ditridecylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi-, branched : Not applicable
- Molybdenum, bis[N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']dioxodi-.mu.-thioxodi- : Not applicable
- 2,6-di-tert-butylphenol : China phase-in substance
- Dodecylphenol, branched : China phase-in substance

○ **Japan**
- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Trade secret : Not applicable
- Diisononyl adipate : Japan ENCS phase-in substance
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Japan ENCS phase-in substance
- Distillates (petroleum), hydrotreated light paraffinic : Not applicable
- Distillates (petroleum), solvent-dewaxed light paraffinic : Not applicable
- Alkylenecarbomonocyclic alcohol, sulfurized, carbonates, alkaline earth metal salts, overbased : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not applicable
- Zinc bis(1,3-dimethylbutyl) dithiophosphate : Japan ENCS phase-in substance
- Lubricating oils (petroleum), (C=15-30), hydrotreated neutral oil-based : Not applicable
- 1-Tridecanamine, N-tridecyl-, branched, reaction products with carbon disulfide 2-ethyl-N-(2-ethylhexyl)- 1-hexanamine and molybdenum oxide (MoO3) : Japan ENCS phase-in substance
- Bis(ditridecylcarbamodithioato-κS,κS']dioxodi-μ-thioxodimolybdenum, branched : Not applicable
- Molybdenum, [N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S'](N,N-ditridecylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi-, branched : Not applicable
- Molybdenum, bis[N,N-bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']dioxodi-.mu.-thioxodi- : Not applicable
- 2,6-di-tert-butylphenol : Japan ENCS phase-in substance
- Dodecylphenol, branched : 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**
- 2015-11-27

**3) Revision number and Last date revised**

○ **Number of revised**
- 3

○ **Date of last revision**
- 2026-01-05

○ **Last Revision History**
- Revision of chemical composition and company information

**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.