SDS(Safety Data Sheet)

Product	Kixx Geartec TO-4 50		
MSDS Number	List No.	Issuing date	Last revised date
-	LB2743	2012-11-30	2026-02-09

1. IDENTIFICATION

1) Product name

Kixx Geartec TO-4 50

2) Recommended use of the chemical and restriction on use

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

3) Details of the supplier of the safety data sheet

○ **Manufacturer**

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

2. HAZARDS IDENTIFICATION

1) Classification of the product

- Not applicable

2) Label elements

○ **Hazard pictograms**

- Not applicable

○ **Signal word**

- Not applicable

○ **Hazard statements**

- Not applicable

○ **Precautionary statements**

1) Prevention

- Not applicable

2) Response

- Not applicable

3) Storage

- Not applicable

4) Disposal

- Not applicable

3) Other hazards

○ **Product NFPA Level**

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

Product name	Health	Flammable	Reaction
Kixx Geartec TO-4 50	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	81 ~ 86
Polyisobutylene	Propene, 2-methyl-, polymers	9003-27-4		8 ~ 13
Other non-hazardous ingredients				1 ~ 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	0.1 ~ 2
Distillates (petroleum), solvent-dewaxed light paraffinic	Solventdewaxed light paraffinic distillate (petroleum)	64742-56-9	265-159-2	0.1 ~ 0.8
Distillates (petroleum), solvent-refined light paraffinic	CSR160805-21386	64741-89-5	265-091-3	0.1 ~ 0.8
Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt	1-Hexanol,2-ethyl-, O,O-diester with phosphorodithioic acid, zinc salt (7CI)	4259-15-8	224-235-5	0.1 ~ 0.8
Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts	Dialkyl(C1-C14)dithiophosphoric acid, zinc salt ; DI-C1-14 ALKYL DITHIOPHOSPHORIC ACID, ZINC SALT ; Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts	68649-42-3	272-028-3	0.1 ~ 0.8
ar-Nonyl-N-(nonylphenyl)benzenamine	DINONYL DIPHENYLAMINE	36878-20-3	253-249-4	0.1 ~ 0.5
Distillates (petroleum), solvent-refined heavy paraffinic	DISTILLATES (PETROLEUM), SOLVENT REFINED, HEAVY PARAFFINIC ; DISTILLATES(PETROLEUM),SOLVENT-REFINED HEAVY PARAFFINIC ; Distillates, petroleum, solvent refined heavy paraffinic	64741-88-4	265-090-8	0.1 ~ 0.5
Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate	Propanoic acid,3-[[bis(1-methylethoxy)phosphinothioyl]thio]-, ethyl ester	71735-74-5	275-965-6	0.1 ~ 0.5
Dinonylnaphthalenesulfonic acid zinc salt	ZINC DINONYLNAPHTHALENE SULFONATE	28016-00-4	248-778-2	0 ~ 0.3

Dihydro-3-(tetrapropenyl)-2,5-furandione	2-DODECEN-1-YLSUCCINIC ANHYDRIDE	26544-38-7	247-781-6	0 ~ 0.3

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

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

4. FIRST AID MEASURES

1) Eye contact
- In case of contact with material, immediately flush eyes with running water for at least 15 minutes.
- If eye irritation persists: Get medical advice/attention.

2) Skin contact
- In case of contact with material, immediately flush skin with running water for at least 15 minutes.
- Remove and isolate contaminated clothing and shoes.
- Launder contaminated clothing and shoes before re-use.
- If skin irritation occurs: Get medical advice/attention.

3) Inhalation
- Move victim to fresh air.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician.

4) Ingestion
- If unconscious but breathing, never give anything by mouth
- If swallowed do not induce vomiting, seek medical advice immediat.
- Get immediate medical advice/attention.
- Rinse mouth.

5) Indication of any immediate medical attention and special treatment needed
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

5. FIRE FIGHTING MEASURES

1) Suitable (and unsuitable) extinguishing media
- Small fire: Dry sand, dry chemical, alcohol-resistant foam, water spray, regular foam, CO2 (Suitable extinguishing media)
- Large fire: Water spray/fog, regular foam (Suitable extinguishing media)
- High-pressure water (Unsuitable extinguishing media)

2) Special hazards arising from the substance or mixture
- May be ignited by heat, sparks or flames.
- Fire may produce irritating and/or toxic gases.
- May cause toxic effects if inhaled.

3) Special protective equipment and precautions
- Substance may be transported hot.
- Runoff may cause pollution.

for firefighters	- Contact may cause burns to skin and eyes. - Dike fire-control water for later disposal; do not scatter the material. - Move containers from fire area if you can do it without risk. - Fire involving Tanks: Cool containers with flooding quantities of water until well after fire is out. - Fire involving Tanks: Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. - Fire involving Tanks: ALWAYS stay away from tanks engulfed in fire.

6. ACCIDENTAL RELEASE MEASURES

1) Health considerations and protective equipment	- Do not touch or walk through spilled material. - ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). - Ventilate the contaminated area. - Stop leak if you can do it without risk. - Prevent dust cloud. - Please note that materials and conditions to be avoided.
2) Environmental precautions	- Prevent entry into waterways, sewers, basements or confined areas.
3) Methods and material for containment and cleaning up	- Small Spill: Flush area with flooding quantities of water. - Large Spill: Dike far ahead of liquid spill for later disposal. - With clean shovel place material into clean, dry container and cover loosely; move containers from spill area. - Cover powder spill with plastic sheet or tarp to minimize spreading and keep powder dry. - Small Spill: Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal.

7. HANDLING AND STORAGE

1) Precautions for safe handling	- Wash ... thoroughly after handling. - Please note that materials and conditions to be avoided. - Handling refer to engineering control/personal protection section. - Cuation: High temperature
2) Conditions for safe storage (including any incompatibilities)	- Store in a dry place. Store in a closed container. - Please note that materials and conditions to be avoided. - Store in a closed container.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

1) Control parameters

Chemical name	Exposure limits	ACGIH TLV	OSHA PEL	Biological limit values(BLV)
Distillates (petroleum), hydrotreated heavy paraffinic	TWA： 0.8 mg/m3	TWA 5 mg/m3, Inhalable particulate matter(Mineral oil, Pure, highly and severely refined)	Not available	Not available
Polyisobutylene	Not available	Not available	Not available	Not available
Other non-hazardous ingredients	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), 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
Distillates (petroleum), solvent-refined light paraffinic	Not available	TWA 5 mg/m3, Inhalable particulate matter(Mineral oil, Pure, highly and severely refined)	Not available	Not available
Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt	Not available	Not available	Not available	Not available
Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts	Not available	Not available	Not available	Not available
ar-Nonyl-N-(nonylphenyl)benzenamine	Not available	Not available	Not available	Not available

Distillates (petroleum), solvent-refined heavy paraffinic	Not available	TWA 5 mg/m3, Inhalable particulate matter(Mineral oil, Pure, highly and severely refined)	Not available	Not available
Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate	Not available	Not available	Not available	Not available
Dinonylnaphthalenesulfonic acid zinc salt	Not available	Not available	Not available	Not available
Dihydro-3-(tetrapropenyl)-2,5-furandione	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 disorder.
- An eye wash unit and safety shower station should be available nearby work place.
- In case of direct exposure or potential exposure to the substance, wear safety glasses for chemicals approved in the country.

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

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

9. PHYSICAL AND CHEMICAL PROPERTIES

Item	Input Value

Apperance	Liquid
Color	No Data
Smell	a specific smell of Hydrocarbon
Smell Threshold	No Data
pH (Numerical value)	No Data
Melting/Freezing Point	No Data
Boilling Point	No Data
Flash Point	260 ℃
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	0.885
Distribution Coefficient	No Data
SelfIgnition Temperature	No Data
Pyrolysis Temperature	No Data
Viscosity	192 mm2/s (at 40℃)
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)
- Polyisobutylene : Not available
- Other non-hazardous ingredients : Not available
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : rat(male/female); LD50 > 5000 ㎎/㎏ 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)
- Distillates (petroleum), solvent-refined light paraffinic : rat(male/female); LD50 > 5000 ㎎/㎏ bw, no deaths (OECD TG 401, GLP) (read across: 64742-56-9) (ECHA)
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : rat(male); LD50 = 3100 ㎎/㎏ bw (OECD TG 401) (ECHA)
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : rat; LD50 = 3100 mg/kg bw (read across: zinc bis(O,O?diisooctyl) bis(dithiophosphate) (ECHA)
- ar-Nonyl-N-(nonylphenyl)benzenamine : rat(male/female); LD50 > 5000 ㎎/㎏ bw, no deaths (OECD TG 401) (ECHA)
- Distillates (petroleum), solvent-refined heavy paraffinic : rat(male/female); LD50 > 5000 ㎎/㎏ bw, no deaths (OECD TG 401, GLP) (read across: 64742-56-9) (ECHA)
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : rat(male/female); LD50 > 5 mL/kg (ECHA)
- Dinonylnaphthalenesulfonic acid zinc salt : rat; LD50 > 2000 mg/kg bw, no deaths (equivalent or similar to guideline OECD TG 401) (ECHA)
- Dihydro-3-(tetrapropenyl)-2,5-furandione : Rat(Male); LD50 = 2900 mg/kg (equivalent or similar to guideline OECD TG 423, GLP) (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)
- Polyisobutylene : Not available
- Other non-hazardous ingredients : Not available
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : rabbit(male/female); LD50 > 5000 ㎎/㎏ 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)
- Distillates (petroleum), solvent-refined light paraffinic : rabbit(male/female); LD50 > 5000 ㎎/㎏ bw, no deaths (OECD TG 402, GLP) (read across: 64742-56-9) (ECHA)
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : rabbit(male); LD50 > 5000 ㎎/㎏ bw (OECD TG

402) (ECHA)
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : rabbit(male/female); LD50 > 3160 mg/kg bw, no deaths (ECHA)
- ar-Nonyl-N-(nonylphenyl)benzenamine : rat(male/female); LD50 > 2000 ㎎/kg bw (OECD TG 402) (ECHA)
- Distillates (petroleum), solvent-refined heavy paraffinic : rabbit(male/female); LD50 > 5000 ㎎/kg bw, no deaths (OECD TG 402, GLP) (read across: 64742-56-9) (ECHA)
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : rat(male/female); LD50 > 2000 mg/kg bw, no deaths (OECD TG 402, GLP) (ECHA)
- Dinonylnaphthalenesulfonic acid zinc salt : rabbit; LD50 > 8000 mg/kg bw, no deaths (equivalent or similar to guideline OECD TG 402) (ECHA)
- Dihydro-3-(tetrapropenyl)-2,5-furandione : Rabbit; LD100 = 6200~7500 mg/kg bw (estimated LD50 > 2000 mg/kg) (ECHA)

*** Inhalation(Gas) - Not applicable**
- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Polyisobutylene : Not applicable
- Other non-hazardous ingredients : Not available
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not applicable
- Distillates (petroleum), solvent-dewaxed light paraffinic : Not applicable
- Distillates (petroleum), solvent-refined light paraffinic : Not applicable
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : Not applicable
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Not applicable
- ar-Nonyl-N-(nonylphenyl)benzenamine : Not applicable
- Distillates (petroleum), solvent-refined heavy paraffinic : Not applicable
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : Not applicable
- Dinonylnaphthalenesulfonic acid zinc salt : Not applicable
- Dihydro-3-(tetrapropenyl)-2,5-furandione : Not applicable

*** Inhalation(Vapour) - Not classified (ATEmix > 20 mg/L)**
- Distillates (petroleum), hydrotreated heavy paraffinic : Not available
- Polyisobutylene : Not available
- Other non-hazardous ingredients : Not available
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not available
- Distillates (petroleum), solvent-dewaxed light paraffinic : Not available
- Distillates (petroleum), solvent-refined light paraffinic : Not available
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : Not available
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : rat; LC50 > 5 mg/L air, no deaths (no data for exposure time)(ECHA)
- ar-Nonyl-N-(nonylphenyl)benzenamine : Not available
- Distillates (petroleum), solvent-refined heavy paraffinic : Not available
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : Not available
- Dinonylnaphthalenesulfonic acid zinc salt : Not available
- Dihydro-3-(tetrapropenyl)-2,5-furandione : 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)
- Polyisobutylene : Not available

- Other non-hazardous ingredients : Not available
- 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), 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)
- Distillates (petroleum), solvent-refined 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)
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : Not available
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Not available
- ar-Nonyl-N-(nonylphenyl)benzenamine : Not available
- Distillates (petroleum), solvent-refined 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)
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : Not available
- Dinonylnaphthalenesulfonic acid zinc salt : rat; 1h-LC50 > 7.6 mg/L, no deaths (FHSLA, CFR, Title 21, para. 191.10) (ECHA)
- Dihydro-3-(tetrapropenyl)-2,5-furandione : rat; inhalation: aerosol; 4h-LC50 = 5.3 mg/L (read across: 25377-73-5) (ECHA)

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

- Distillates (petroleum), hydrotreated heavy paraffinic	:	Solvent dewaxed light paraffinic oil is not considered to be irritating to the skin of rabbits. (read across : 64742-56-9) (GLP) (ECHA)
- Polyisobutylene	:	Not available
- Other non-hazardous ingredients	:	Not available
- Distillates (petroleum), solvent-dewaxed heavy paraffinic	:	rabbit; not irritating (GLP) (read across: 64742-56-9) (ECHA)
- Distillates (petroleum), solvent-dewaxed light paraffinic	:	rabbit; not irritating (GLP) (ECHA)
- Distillates (petroleum), solvent-refined light paraffinic	:	rabbit; not irritating (GLP) (read across: 64742-56-9) (ECHA)
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt	:	rabbit; not irritating (OECD TG 404, GLP) (ECHA)
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts	:	rabbit; irritating (PDII = 4) (read across: Cetrimonium chloride (CAS No: 112-02-7))(ECHA)
- ar-Nonyl-N-(nonylphenyl)benzenamine	:	rabbit; slightly irritating (OECD TG 404, GLP) (read across: TK12340) (ECHA)
- Distillates (petroleum), solvent-refined heavy paraffinic	:	rabbit; not irritating (GLP) (read across: 64742-56-9) (ECHA)
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate	:	rabbit; not irritating (ECHA)

- Dinonylnaphthalenesulfonic acid zinc salt : rabbit; irritating (FHSLA, CFR Title 21, para. 191.11) (ECHA)
- Dihydro-3-(tetrapropenyl)-2,5-furandione : Rabbit; not irritating (equivalent or similar to guideline US 16 CFR 1500.41, 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)
- Polyisobutylene : Not available
- Other non-hazardous ingredients : Not available
- Distillates (petroleum), solvent-dewaxed heavy 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)
- Distillates (petroleum), solvent-refined light paraffinic : rabbit; not irritating (OECD TG 405, GLP) (read across: 64742-56-9) (ECHA)
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : rabbit; zinc salt causes persistent eye irritation through 21 days. (OECD TG 405, GLP) (ECHA)
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : rabbit; irritating (read across: Stearyltrimethylammonium chloride) (OECD TG 405)(ECHA)
- ar-Nonyl-N-(nonylphenyl)benzenamine : rabbit; not irritating (OECD TG 405, GLP) (read across: TK12340) (ECHA)
- Distillates (petroleum), solvent-refined heavy paraffinic : rabbit; not irritating (OECD TG 405, GLP) (read across: 64742-56-9) (ECHA)
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : rabbit; not irritating (ECHA)
- Dinonylnaphthalenesulfonic acid zinc salt : rabbit; irritating (OECD TG 405, GLP) (ECHA)
- Dihydro-3-(tetrapropenyl)-2,5-furandione : Rabbit; irritating (equivalent or similar to guideline 16CFR 1500.42, GLP) (ECHA)

○ **Respiratory sensitization : Not classified**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not available
- Polyisobutylene : Not available
- Other non-hazardous : Not available

ingredients

- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not available
- Distillates (petroleum), solvent-dewaxed light paraffinic : Not available
- Distillates (petroleum), solvent-refined light paraffinic : Not available
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : Not available
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Not available
- ar-Nonyl-N-(nonylphenyl)benzenamine : Not available
- Distillates (petroleum), solvent-refined heavy paraffinic : Not available
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : Not available
- Dinonylnaphthalenesulfonic acid zinc salt : Not available
- Dihydro-3-(tetrapropenyl)-2,5-furandione : 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)
- Polyisobutylene : Not available
- Other non-hazardous ingredients : Not available
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : guinea pig; not sensitising (OECD TG 406, GLP) (read across: 64742-53-6) (ECHA)
- Distillates (petroleum), solvent-dewaxed light paraffinic : guinea pig; not sensitising (OECD TG 406, GLP) (ECHA)
- Distillates (petroleum), solvent-refined light paraffinic : guinea pig; not sensitising (OECD TG 406, GLP) (read across: 64742-53-6) (ECHA)
- Phosphorodithioic acid : guinea pig; not sensitising (OECD TG 406, GLP) (ECHA)

O,O-bis(2-ethylhexyl) ester, zinc salt

- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Human(patch test); not sensitising(positive reaction index=0) (read across: Cetrimonium chloride (CAS No: 112-02-7))(ECHA)
- ar-Nonyl-N-(nonylphenyl)benzenamine : guinea pig; not sensitising (OECD TG 406, GLP) (ECHA)
- Distillates (petroleum), solvent-refined heavy paraffinic : guinea pig; not sensitising (OECD TG 406, GLP) (read across: 64742-53-6) (ECHA)
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : guinea pig; not sensitising (OECD TG 406, GLP) (ECHA)
- Dinonylnaphthalenesulfonic acid zinc salt : guinea pig; sensitising (EPA OTS 798.4100, GLP) (ECHA)
- Dihydro-3-(tetrapropenyl)-2,5-furandione : guinea pig; sensitising (Migrated information Subcategory 1A applies as 3/5 animals responded when induced with 0.01% in GPMT. Meet criteria of 30% response at ≤ 0.1% induction concentration. Criteria used for interpretation of results: EU) (read across: 19780-11-1) (equivalent or similar to guideline OECD TG 406) (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)
- Polyisobutylene : IARC, EU CLP 1272/2008, OSHA, ACGIH, US EPA IRIS, NTP : not listed
- Other non-hazardous ingredients : Not available
- 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), 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)
- Distillates (petroleum), solvent-refined 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)
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : IARC, EU CLP 1272/2008, OSHA, ACGIH, US EPA IRIS, NTP : not listed
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : IARC, EU CLP 1272/2008, OSHA, ACGIH, US EPA IRIS, NTP : not listed
- ar-Nonyl-N-(nonylphenyl)benzenamine : IARC, EU CLP 1272/2008, OSHA, ACGIH, US EPA IRIS, NTP : not listed
- Distillates (petroleum), solvent-refined heavy : 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

paraffinic | extract as measured by IP 346)

- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : IARC, EU CLP 1272/2008, OSHA, ACGIH, US EPA IRIS, NTP : not listed
- Dinonylnaphthalenesulfonic acid zinc salt : IARC, EU CLP 1272/2008, OSHA, ACGIH, US EPA IRIS, NTP : not listed
- Dihydro-3-(tetrapropenyl)-2,5-furandione : 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)
- Polyisobutylene : In vitro Cell Transformation: positive (US Dashboard)
- Other non-hazardous ingredients : Not available
- 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), solvent-dewaxed light paraffinic : in vitro; Mammalian Chromosome Aberration Test : Negative (OECD TG 473, GLP) (ECHA)
  in vitro; Mammalian Cell Gene Mutation Test : Positive (OECD TG 476) (ECHA)
  in vitro; Bacterial Reverse Mutation Assay : Positive (OECD TG 471, GLP) (ECHA)
  in vivo; Mammalian Erythrocyte Micronucleus Test : Negative (OECD TG 474) (ECHA)
- Distillates (petroleum), solvent-refined 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)
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : In vitro bacterial reverse mutation assay; negative (OECD TG 471, GLP) (ECHA)
  In vivo Mammalian Erythrocyte Micronucleus Test: negative (OECD TG 474, GLP) (ECHA)
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : In vitro - Bacterial reverse mutation test ; Negative (OECD TG 471) (read across; Cetrimonium chloride (CAS No: 112-02-7), 2',4',5',7'-tetrabromo-4,5,6,7-tetrachloro-3',6'-dihydroxy-3H-spiro[2-benzofuran-1,9'-xanthen]-3-one) (ECHA)
  In vivo: Not available
- ar-Nonyl-N-(nonylphenyl)benzenamine : In vitro Bacterial Reverse Mutation Assay : negative (OECD TG 471) (read across: TK12340) (ECHA), In Vitro Mammalian Cell Gene Mutation Test : negative (OECD

TG 476) (read across: 4,4-dioctyldiphenylamine) (ECHA)
In vivo rodent dominant lethal assay : negative (OECD TG 478) (ECHA)

- Distillates (petroleum), solvent-refined 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)
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : In vitro bacterial reverse mutation assay : negative (OECD TG 471) (ECHA),, In vitro Mammalian Cell Gene Mutation Test : negative (OECD TG 476, GLP) (ECHA)
in vivo Mammalian Erythrocyte Micronucleus Test : negative (OECD TG 474, GLP) (ECHA)
- Dinonylnaphthalenesulfonic acid zinc salt : In vitro bacterial reverse mutation assay : negative (OECD TG 471, GLP) (ECHA)
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
- Dihydro-3-(tetrapropenyl)-2,5-furandione : In vitro bacterial reverse mutation assay : negative (OECD TG 471, GLP) (ECHA)
In vivo : not available

○ **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)
- Polyisobutylene : Not available
- Other non-hazardous ingredients : Not available
- 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), 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)
- Distillates (petroleum), solvent-refined 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)

- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : rat(male/female); oral; 30, 100, 200 mg/kg/day; Reproduction / Developmental Toxicity Screening Test; NOAEL(parental and neonatal toxicity)=30 mg/kg/day (OECD TG 421, GLP) (ECHA)
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : In a developmental toxicity study, Sprague-Dawley female rats were treated with Quat-Silsesquioxane in the concentration of 0, 100, 300, or 1000 mg/kg/day orally by gavage in corn oil.No maternal mortality and clinical signs or behavioral changes were observed in treated female rats as compared to control. NOAEL(P)=300 mg/kg bw, NOAEL(F1)=1000 mg/kg bw (read across : Quaternary Silsesquioxane)(ECHA)
- ar-Nonyl-N-(nonylphenyl)benzenamine : rat; 50, 150 and 500 mg/kg bw; The substance is not teratogenic and not embryotoxic in rats. It causes maternal toxicity at a dose level of 500 mg/kg bw. (OECD TG 414, GLP) (ECHA)
- Distillates (petroleum), solvent-refined 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)
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : rat; 50, 150, 400 mg/kg bw/day; In conclusion, the no observed adverse effect level (NOAEL) for maternal toxicity is 150 mg/kg bw/d. The no observed adverse effect level (NOAEL) for prenatal developmental toxicity is 400 mg/kg bw/d. There were no toxicologically relevant adverse fetal findings evident. (OECD TG 414, GLP) (ECHA)
- Dinonylnaphthalenesulfonic acid zinc salt : rat; screening for reproductive / developmental toxicity; 95, 298, and 893 mg/kg body weight/day; Developmental toxicity (lower pup body weights) was observed at 893 mg/kg. No reproduction toxicity was observed for treatment up to 893 mg/kg body weight/day. (read across: 1474044-77-3) (OECD TG 422, GLP) (ECHA)
- Dihydro-3-(tetrapropenyl)-2,5-furandione : rat; screening for reproductive / developmental toxicity; 0, 50, 150, 250 mg/kg body weight; There was no evidence of a direct test item-related effect on male or female reproductive organs in this study. (read across : 92077-08-2) (OECD TG 421, 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)
- Polyisobutylene : Not available
- Other non-hazardous ingredients : Not available
- Distillates (petroleum), : oral; rat(male/female); No clinical signs of toxicity observed in either male or

solvent-dewaxed heavy paraffinic		female rats. LD50 > 5000 mg/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 mg/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)
- Distillates (petroleum), solvent-refined light paraffinic	:	oral; rat(male/female); No clinical signs of toxicity observed in either male or female rats. LD50 > 5000 mg/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 mg/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)
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt	:	oral; rat(male); Depresson, diarrhea, reduced food intake. LD50 = 3100 mg/kg bw (OECD TG 401) (ECHA)
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts	:	Significant effects not observed. (ECHA)
- ar-Nonyl-N-(nonylphenyl)benzenamine	:	oral; rat(male/female); No compound related gross organ changes were observed. LD50 > 5000 mg/kg bw, no deaths (OECD TG 401) (ECHA) dermal; rat(male/female); Piloerection, abnormal body positions, and dyspnea were seen, being common symptoms in acute toxicity testing. The animals recovered within 9 days. LD50 > 2000 mg/kg bw (OECD TG 402) (ECHA) inhalation: aerosol; rat(male/female); Necropsy and histopathological examination revealed no substance-related findings. LC50 > 5.1 mg/L air /4h, no deaths (OECD TG 403) (ECHA)
- Distillates (petroleum), solvent-refined heavy paraffinic	:	oral; rat(male/female); No clinical signs of toxicity observed in either male or female rats. LD50 > 5000 mg/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 mg/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)

- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : oral; rat(male/female); No overt signs of toxicity w ere observed in the surviving animals. LD50 > 5 mL/kg (ECHA)
  dermal; rat(male/female); No clinical signs were observed. LD50 > 2000 mg/kg bw, no deaths (OECD TG 402, GLP) (ECHA)
- Dinonylnaphthalenesulfonic acid zinc salt : Not available
- Dihydro-3-(tetrapropenyl)-2,5-furandione : 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)
- Polyisobutylene : Not available
- Other non-hazardous ingredients : Not available
- 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), 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)
- Distillates (petroleum), solvent-refined light paraffinic : rat(male/female); dermal; 13 weeks; No systemic or local effects were considered significant, and the NOAEL is ≥ 2000 mg/kg/day. (OECD TG 411) (ECHA)
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, : oral; rat(male/female); 10, 50, 125, 250, 500 mg/kg/day; 28 days; NOAEL(systemic toxicity)=125 mg/kg bw/day (OECD TG 407, GLP) (ECHA)

zinc salt

- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Sprague-Dawley female rats were treated with Quat-Silsesquioxane in the concentration of 0, 100, 300, or 1000 mg/kg/day orally by gavage in corn oil.No maternal mortality and clinical signs or behavioral changes were observed in treated female rats as compared to control. NOAEL(P)=300 mg/kg bw, NOAEL(F1)=1000 mg/kg bw (read across : Quaternary Silsesquioxane)(ECHA)
- ar-Nonyl-N-(nonylphenyl)benzenamine : oral; rat(male); 28 days; Based on the absence of clinical findings and effects on body weight, dose levels of 100, 300 and 1000 mg/kg bw were chosen for subchronic dosing. (ECHA)
- Distillates (petroleum), solvent-refined heavy paraffinic : rat(male/female); dermal; 13 weeks; No systemic or local effects were considered significant, and the NOAEL is ≥ 2000 mg/kg/day. (OECD TG 411) (ECHA)
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : oral; rat(male/female); 25, 125, 400 mg/kg bw/day; In conclusion, the administration of test article by gavage to male and female Wistar rats for 3 months caused test substance-related, adverse signs of systemic toxicity at a dose level of 400 mg/kg bw/d. Therefore, under the conditions of the present study the no observed adverse effect level (NOAEL) was 125 mg/kg bw/d for male and female Wistar rats. (OECD TG 408, GLP) (ECHA)
- Dinonylnaphthalenesulfonic acid zinc salt : oral; rat; 90d; 100, 300, 1000 mg/kg bw/day; no adverse effects were observed at oral doses in rats up to and including 100 mg/kg-bw/day for males and 300 mg/kg-bw/day for females daily for 90 days. (read across: 939-717-7) (OECD TG 408, GLP) (ECHA)
- Dihydro-3-(tetrapropenyl)-2,5-furandione : oral; rat; 28 days (males), 54 days (females); 50, 150 and 250 mg/kg bw/d; Critical effects observed: not specified (read across : 92077-08-2) (OECD TG 421, GLP) (ECHA)

○ **Aspiration hazard : Not classified**

- Distillates (petroleum), hydrotreated heavy paraffinic : Viscosity: 73.9 mm2/s (40°C)(ECHA) & hydrocarbons
- Polyisobutylene : Not available
- Other non-hazardous ingredients : Not available
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : 52.1 mm2/s (40°C) & hydrocarbons
- Distillates (petroleum), solvent-dewaxed light paraffinic : 8.4 mm2/s (40°C) (ECHA) & hydrocarbons
- Distillates (petroleum), solvent-refined light paraffinic : 19 cSt at 40°C & hydrocarbons (ECHA)
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : 131.6 cSt at 40°C (ECHA) & not hydrocarbons

- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Viscosity: > 9 - < 15 mm2/s (100°C; OECD TG 114)(ECHA) & not hydrocarbons
- ar-Nonyl-N-(nonylphenyl)benzenamine : 585 mPa.s at 40°C (ECHA) & not hydrocarbons
- Distillates (petroleum), solvent-refined heavy paraffinic : 19 cSt at 40°C & hydrocarbons (ECHA)
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : 5.63 mPa.s (40°C) (ECHA) & not hydrocarbons
- Dinonylnaphthalenesulfonic acid zinc salt : Not applicable
- Dihydro-3-(tetrapropenyl)-2,5-furandione : 430 mPa s (20°C) (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)
- Polyisobutylene : 96h-LC50(Rainbow Trout) > 5600 mg/L (US Dashboard)
- Other non-hazardous ingredients : Not available
- Distillates (petroleum), solvent-dewaxed heavy 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)
- Distillates (petroleum), solvent-refined light paraffinic : 96h-LL50(Pimephales promelas) > 100 mg/L (OECD TG 203, GLP) (ECHA)
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : 96h-LL50(Oncorhynchus mykiss) = 4.4 mg/L (OECD TG 203, GLP) (ECHA)
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Water solubility : not soluble (0.000000000005072 mg/L at 25° C)(ECHA)
- ar-Nonyl-N-(nonylphenyl)benzenamine : No toxic effects up to the limit of water solubility (< 5 μg/L)
- Distillates (petroleum), solvent-refined heavy paraffinic : 96h-LL50(Pimephales promelas) > 100 mg/L (OECD TG 203, GLP) (ECHA)
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : 96h-LC50(Danio rerio) = 1.73 mg/l (OECD TG 203, GLP) (ECHA)
- Dinonylnaphthalenesulfonic acid zinc salt : 96h-LC50(Cyprinus carpio) > 0.28 mg/L (OECD TG 203, GLP) (ECHA)
- Dihydro-3-(tetrapropenyl)-2,5-furandione : No toxicity effects observed within the limit of water

solubility(20 mg/L). (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)
- Polyisobutylene : Not available
- Other non-hazardous ingredients : Not available
- Distillates (petroleum), solvent-dewaxed heavy 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)
- Distillates (petroleum), solvent-refined light paraffinic : 48h-EL50(Daphnia magna) > 10000 mg/L (OECD TG 202) (ECHA)
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : 48h-EL50(Daphnia magna) = 75 mg/L (OECD TG 202, GLP) (ECHA)
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Water solubility : not soluble (0.000000000005072 mg/L at 25° C)(ECHA)
- ar-Nonyl-N-(nonylphenyl)benzenamine : No toxic effects up to the limit of water solubility (< 5 μg/L)
- Distillates (petroleum), solvent-refined heavy paraffinic : 48h-EL50(Daphnia magna) > 10000 mg/L (OECD TG 202) (ECHA)
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : 48h-EC50(Daphnia magna) = 4.01 mg/l (OECD TG 202, GLP) (ECHA)
- Dinonylnaphthalenesulfonic acid zinc salt : 48h-EC50(Daphnia magna) > 0.2 mg/L (OECD TG 202, GLP) (ECHA)
- Dihydro-3-(tetrapropenyl)-2,5-furandione : No toxicity effects observed within the limit of water solubility(20 mg/L). (ECHA)

Aquatic algae

- Distillates (petroleum), hydrotreated heavy paraffinic : Not available
- Polyisobutylene : Not available
- Other non-hazardous ingredients : Not available
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not available
- Distillates (petroleum), solvent-dewaxed light paraffinic : Not available
- Distillates (petroleum), solvent-refined light paraffinic : Not available
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : 72h-ErL50(Desmodesmus subspicatus) = 410 mg/L (OECD TG 201, GLP) (ECHA)
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Water solubility : not soluble (0.000000000005072 mg/L at 25° C)(ECHA)
- ar-Nonyl-N-(nonylphenyl)benzenamine : No toxic effects up to the limit of water solubility (< 5 μg/L)
- Distillates (petroleum), solvent-refined heavy paraffinic : Not available
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : 72h-ErC50(Pseudokirchneriella subcapitata) = 8.28 mg/L (OECD TG 201, GLP) (ECHA)
- Dinonylnaphthalenesulfonic acid zinc salt : Not available
- Dihydro-3-(tetrapropenyl)-2,5-furandione : No toxicity effects observed within the limit of water solubility(20 mg/L). (ECHA)

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

Fish

- Distillates (petroleum), hydrotreated heavy paraffinic : Not available

- Polyisobutylene : Not available
- Other non-hazardous ingredients : Not available
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not available
- Distillates (petroleum), solvent-dewaxed light paraffinic : Not available
- Distillates (petroleum), solvent-refined light paraffinic : Not available
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : Not available
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Not available
- ar-Nonyl-N-(nonylphenyl)benzenamine : Not available
- Distillates (petroleum), solvent-refined heavy paraffinic : Not available
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : Not available
- Dinonylnaphthalenesulfonic acid zinc salt : Not available
- Dihydro-3-(tetrapropenyl)-2,5-furandione : 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)
- Polyisobutylene : Not available
- Other non-hazardous ingredients : Not available
- Distillates (petroleum), solvent-dewaxed heavy 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)
- Distillates (petroleum), solvent-refined light paraffinic : 21d-NOEL(Daphnia magna) = 10 mg/L (OECD TG 211, GLP) (ECHA)
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : 28d-NOEC(Daphnia magna) = 0.4 mg/L (OECD TG 211, GLP) (ECHA)
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Not available
- ar-Nonyl-N-(nonylphenyl)benzenamine : Not available
- Distillates (petroleum), solvent-refined heavy paraffinic : 21d-NOEL(Daphnia magna) = 10 mg/L (OECD TG 211, GLP) (ECHA)
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : 21d-EC10(Daphnia magna) = 0.196 mg/l (OECD TG 211, GLP) (ECHA)
- Dinonylnaphthalenesulfonic acid zinc salt : 21d-NOELR(Daphnia magna) = 4.6 mg/L (OECD TG 211, GLP) (ECHA)
- Dihydro-3-(tetrapropenyl)-2,5-furandione : Not available

Aquatic algae

- Distillates (petroleum), hydrotreated heavy paraffinic : 72h-NOErL(Pseudokirchnerella subcapitata) >= 100 mg/L (read across: 72623-87-1) (OECD TG 201) (ECHA)
- Polyisobutylene : Not available
- Other non-hazardous ingredients : Not available
- Distillates (petroleum), solvent-dewaxed heavy 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)
- Distillates (petroleum), solvent-refined light paraffinic : 72h-NOErL(Pseudokirchneriella subcapitata) >=100 mg/L (OECD TG 201) (ECHA)
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : Not available

- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Not available
- ar-Nonyl-N-(nonylphenyl)benzenamine : Not available
- Distillates (petroleum), solvent-refined heavy paraffinic : 72h-NOErL(Pseudokirchneriella subcapitata) >=100 mg/L (OECD TG 201) (ECHA)
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : 72h-ErC10(Pseudokirchneriella subcapitata) = 3.93 mg/L (OECD TG 201, GLP) (ECHA)
- Dinonylnaphthalenesulfonic acid zinc salt : 72h-EC10(Raphidocelis subcapitata) = ca. 0.16 mg/L (OECD TG 201, GLP) (ECHA)
- Dihydro-3-(tetrapropenyl)-2,5-furandione : No toxicity effects observed within the limit of water solubility(20 mg/L). (ECHA)

2) Persistence and degradability

○ **Persistence**

- Distillates (petroleum), hydrotreated heavy paraffinic : This substance is UVCB, so it is not applicable. (ECHA)
- Polyisobutylene : Not available
- Other non-hazardous ingredients : Not available
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : log Kow = 6.13 (experimental) (EPISUITE)
- Distillates (petroleum), solvent-dewaxed light paraffinic : log Kow = 6.13 (experimental) (EPISUITE)
- Distillates (petroleum), solvent-refined light paraffinic : log Kow = 10.51 (estimated) (EPISUITE); not valid (over "-4<log Kow<8")
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : log Kow = 3.59 (22 °C, pH:ca. 5) (ECHA)
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : log Kow=14.876 (estimated)(EPISUITE); not valid (over -4<log Kow < 8)(ECHA)
- ar-Nonyl-N-(nonylphenyl)benzenamine : log Kow=12.24 (estimated) (EPISUITE); not valid (over -4<log Kow<8)
- Distillates (petroleum), solvent-refined heavy paraffinic : log Kow = 14.93 (estimated) (EPISUITE); not valid (over "-4<log Kow<8")
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : log Kow = 4.0 (23 °C; pH: 6.4) (OECD TG 117, GLP) (ECHA)
- Dinonylnaphthalenesulfonic acid zinc salt : log Kow >= 4.57 - <= 4.63 (20 °C; pH ca. 6) (ECHA)
- Dihydro-3-(tetrapropenyl)-2,5-furandione : log Kow >= 4.39 (OECD TG 107, GLP) (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)
- Polyisobutylene : Not available
- Other non-hazardous ingredients : Not available
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not available
- Distillates (petroleum), solvent-dewaxed light paraffinic : Not available
- Distillates (petroleum), solvent-refined light paraffinic : Not available
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : Not available
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Not available
- ar-Nonyl-N-(nonylphenyl)benzenamine : In contact with water no hydrolysis is expected. (ECHA)
- Distillates (petroleum), solvent-refined heavy paraffinic : Not available
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : Half-life for hydrolysis: 117 d (25 °C) (ECHA)
- Dinonylnaphthalenesulfonic acid zinc salt : The half-life time of the test substance at 25°C was: t½ pH 4: > 1

year, pH 7 > 1 year, pH 9 > 1 year (read across: 1474044-77-3) (OECD TG 211, GLP) (ECHA)

- Dihydro-3-(tetrapropenyl)-2,5-furandione : The substance undergoes rapid hydrolysis at ambient temperatures and environmental pH levels. (OECD TG 111, GLP) (ECHA)

3) Bioaccumulative potential

○ **Bioaccumulation**

- Distillates (petroleum), hydrotreated heavy paraffinic : This substance is UVCB, so it is not applicable. (ECHA)
- Polyisobutylene : Not available
- Other non-hazardous ingredients : Not available
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : BCF = 5147 (estimated) (EPISUITE)
- Distillates (petroleum), solvent-dewaxed light paraffinic : BCF = 5147 (EPISUITE)
- Distillates (petroleum), solvent-refined light paraffinic : BCF = 64.39 (estimated) (EPISUITE)
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : BCF=448.2 (estimated) (EPISUITE)
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : BCF=3.162(ECHA)
- ar-Nonyl-N-(nonylphenyl)benzenamine : BCF=35.87 (estimated) (EPISUITE)
- Distillates (petroleum), solvent-refined heavy paraffinic : BCF = 3.162 (estimated) (EPISUITE)
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : BCF = 253 (estimated) (EPISUITE)
- Dinonylnaphthalenesulfonic acid zinc salt : BAF = >= 56.2 - <= 70.8 (QSAR) (ECHA)
- Dihydro-3-(tetrapropenyl)-2,5-furandione : BCF = 335.2 (estimated) (EPISUITE)

○ **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)
- Polyisobutylene : Not available
- Other non-hazardous ingredients : Not available
- Distillates (petroleum), solvent-dewaxed heavy 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)
- Distillates (petroleum), solvent-refined light paraffinic : 31 % degradation after 28d; not readily biodegradable (OECD TG 301F, GLP) (ECHA)
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : < 5% degradation after 27 days; no biodegradation observed (OECD TG 301D) (ECHA)
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : 0% degradation after 28 days (Not biodegradable) (read across : Didecyl dimethyl ammonium chloride) (OECD TG 301C)(ECHA)
- ar-Nonyl-N-(nonylphenyl)benzenamine : 1% degradation after 28 days; under test conditions no biodegradation observed (OECD TG 301B, GLP) (read across: TK12340) (ECHA)
- Distillates (petroleum), solvent-refined heavy paraffinic : 31 % degradation after 28d; not readily biodegradable (OECD TG 301F, GLP) (ECHA)
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : 20 % degradation after 28d; not readily biodegradable (OECD TG 301B) (ECHA)
- Dinonylnaphthalenesulfonic acid zinc salt : >= 14 - <= 17 % degradation after 29d; not readily biodegradable (read across: 1474044-77-3) (OECD TG 301B, GLP) (ECHA)
- Dihydro-3-(tetrapropenyl)-2,5-furandione : 9.9% degradation after 28d; under test conditions no biodegradation observed (OECD TG 301D, GLP) (ECHA)

4) Mobility in soil

- Distillates (petroleum), hydrotreated heavy paraffinic : Not available
- Polyisobutylene : Not available
- Other non-hazardous ingredients : Not available
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Koc=208800 (EPISUITE)
- Distillates (petroleum), solvent-dewaxed light paraffinic : Koc = 208800 (EPISUITE)
- Distillates (petroleum), solvent-refined light paraffinic : Koc=1322000000 (EPISUITE)
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : Koc=495900 (EPISUITE)
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Koc=3268000000
- ar-Nonyl-N-(nonylphenyl)benzenamine : Koc=44900000 (EPISUITE)
- Distillates (petroleum), solvent-refined heavy paraffinic : Koc=9065000000000 (EPISUITE)
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : Koc = 1157 (EPISUITE)
- Dinonylnaphthalenesulfonic acid zinc salt : log Koc = ca. 5.24 (QSAR) (ECHA)
- Dihydro-3-(tetrapropenyl)-2,5-furandione : Koc = 825 (OECD TG 106, GLP) (ECHA)

5) Hazard to the ozone layer

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Polyisobutylene : Not applicable
- Other non-hazardous ingredients : Not available
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not applicable
- Distillates (petroleum), solvent-dewaxed light paraffinic : Not applicable
- Distillates (petroleum), solvent-refined light paraffinic : Not applicable
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : Not applicable
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Not applicable
- ar-Nonyl-N-(nonylphenyl)benzenamine : Not applicable
- Distillates (petroleum), solvent-refined heavy paraffinic : Not applicable
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : Not applicable
- Dinonylnaphthalenesulfonic acid zinc salt : Not applicable
- Dihydro-3-(tetrapropenyl)-2,5-furandione : Not applicable

6) Other adverse effects

- Distillates (petroleum), hydrotreated heavy paraffinic : Not available
- Polyisobutylene : Not available
- Other non-hazardous ingredients : Not available
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not available
- Distillates (petroleum), solvent-dewaxed light paraffinic : Not available
- Distillates (petroleum), solvent-refined light paraffinic : Not available
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : Not available
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Not available
- ar-Nonyl-N-(nonylphenyl)benzenamine : Not available
- Distillates (petroleum), solvent-refined heavy paraffinic : Not available
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : Not available
- Dinonylnaphthalenesulfonic acid zinc salt : Not available
- Dihydro-3-(tetrapropenyl)-2,5-furandione : 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
- Polyisobutylene : Not applicable
- Other non-hazardous ingredients : Not applicable
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : European EINECS phase-in substance
- Distillates (petroleum), solvent-dewaxed light paraffinic : European EINECS phase-in substance
- Distillates (petroleum), solvent-refined light paraffinic : European EINECS phase-in substance
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : European EINECS phase-in substance
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : European EINECS phase-in substance
- ar-Nonyl-N-(nonylphenyl)benzenamine : European EINECS phase-in substance
- Distillates (petroleum), solvent-refined heavy paraffinic : European EINECS phase-in substance
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : European EINECS phase-in substance
- Dinonylnaphthalenesulfonic acid zinc salt : European EINECS phase-in substance
- Dihydro-3-(tetrapropenyl)-2,5-furandione : European EINECS phase-in substance

EU CLP (CLASSIFICATION) - PRODUCT : Not applicable

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

- Other non-hazardous ingredients : Not applicable
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not applicable
- Distillates (petroleum), solvent-dewaxed light paraffinic : Not applicable
- Distillates (petroleum), solvent-refined light paraffinic : Not applicable
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : Not applicable
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Not applicable
- ar-Nonyl-N-(nonylphenyl)benzenamine : Not applicable
- Distillates (petroleum), solvent-refined heavy paraffinic : Not applicable
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : Not applicable
- Dinonylnaphthalenesulfonic acid zinc salt : Not applicable
- Dihydro-3-(tetrapropenyl)-2,5-furandione : Not applicable

Substances restricted under REACH

- Distillates (petroleum), hydrotreated heavy paraffinic : Substances restricted under REACH
- Polyisobutylene : Not applicable
- Other non-hazardous ingredients : Not applicable
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Substances restricted under REACH
- Distillates (petroleum), solvent-dewaxed light paraffinic : Substances restricted under REACH
- Distillates (petroleum), solvent-refined light paraffinic : Substances restricted under REACH
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : Not applicable
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Not applicable
- ar-Nonyl-N-(nonylphenyl)benzenamine : Not applicable
- Distillates (petroleum), solvent-refined heavy paraffinic : Substances restricted under REACH
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : Not applicable
- Dinonylnaphthalenesulfonic acid zinc salt : Not applicable
- Dihydro-3-(tetrapropenyl)-2,5-furandione : 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
- Polyisobutylene : Not applicable
- Other non-hazardous ingredients : 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), 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
- Distillates (petroleum), solvent-refined light paraffinic : Not applicable
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : Hazardous substance subject to control
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Hazardous substance subject to control
- ar-Nonyl-N-(nonylphenyl)benzenamine : Not applicable
- Distillates (petroleum), solvent-refined heavy paraffinic : Not applicable

- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : Not applicable
- Dinonylnaphthalenesulfonic acid zinc salt : Hazardous substance subject to control
- Dihydro-3-(tetrapropenyl)-2,5-furandione : Not applicable

○ **K-REACH**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Polyisobutylene : Not applicable
- Other non-hazardous ingredients : Not applicable
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not applicable
- Distillates (petroleum), solvent-dewaxed light paraffinic : Not applicable
- Distillates (petroleum), solvent-refined light paraffinic : Not applicable
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : Not applicable
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Not applicable
- ar-Nonyl-N-(nonylphenyl)benzenamine : Not applicable
- Distillates (petroleum), solvent-refined heavy paraffinic : Not applicable
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : Not applicable
- Dinonylnaphthalenesulfonic acid zinc salt : Not applicable
- Dihydro-3-(tetrapropenyl)-2,5-furandione : Not applicable

○ **Chemical Control Act in Korea**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Polyisobutylene : Not applicable
- Other non-hazardous ingredients : Not applicable
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not applicable
- Distillates (petroleum), solvent-dewaxed light paraffinic : Not applicable
- Distillates (petroleum), solvent-refined light paraffinic : Not applicable
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : List of substance subjected to the PRTR
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : List of substance subjected to the PRTR
- ar-Nonyl-N-(nonylphenyl)benzenamine : Not applicable
- Distillates (petroleum), solvent-refined heavy paraffinic : Not applicable
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : Not applicable
- Dinonylnaphthalenesulfonic acid zinc salt : List of substance subjected to the PRTR
- Dihydro-3-(tetrapropenyl)-2,5-furandione : Not applicable

○ **Safety Control of Dangerous Substances Act**

- Distillates (petroleum), hydrotreated heavy paraffinic : Dangerous substance
- Polyisobutylene : Not applicable
- Other non-hazardous ingredients : Not applicable
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not applicable
- Distillates (petroleum), solvent-dewaxed light paraffinic : Not applicable
- Distillates (petroleum), solvent-refined light paraffinic : Not applicable
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : Not applicable
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Not applicable
- ar-Nonyl-N-(nonylphenyl)benzenamine : Not applicable
- Distillates (petroleum), solvent-refined heavy paraffinic : Not applicable
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : Not applicable
- Dinonylnaphthalenesulfonic acid zinc salt : Not applicable
- Dihydro-3-(tetrapropenyl)-2,5-furandione : Not applicable

U.S.A

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

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Polyisobutylene : Not applicable
- Other non-hazardous ingredients : Not applicable
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not applicable
- Distillates (petroleum), solvent-dewaxed light paraffinic : Not applicable
- Distillates (petroleum), solvent-refined light paraffinic : Not applicable
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : Not applicable
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Not applicable
- ar-Nonyl-N-(nonylphenyl)benzenamine : Not applicable
- Distillates (petroleum), solvent-refined heavy paraffinic : Not applicable
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : Not applicable
- Dinonylnaphthalenesulfonic acid zinc salt : Not applicable
- Dihydro-3-(tetrapropenyl)-2,5-furandione : Not applicable

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

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Polyisobutylene : Not applicable
- Other non-hazardous ingredients : Not applicable
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not applicable
- Distillates (petroleum), solvent-dewaxed light paraffinic : Not applicable
- Distillates (petroleum), solvent-refined light paraffinic : Not applicable
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : Not applicable
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Not applicable
- ar-Nonyl-N-(nonylphenyl)benzenamine : Not applicable
- Distillates (petroleum), solvent-refined heavy paraffinic : Not applicable
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : Not applicable
- Dinonylnaphthalenesulfonic acid zinc salt : Not applicable
- Dihydro-3-(tetrapropenyl)-2,5-furandione : Not applicable

○ **CERCLA Section 302 regulation**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Polyisobutylene : Not applicable
- Other non-hazardous ingredients : Not applicable
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not applicable
- Distillates (petroleum), solvent-dewaxed light paraffinic : Not applicable
- Distillates (petroleum), solvent-refined light paraffinic : Not applicable
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : Not applicable
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Not applicable
- ar-Nonyl-N-(nonylphenyl)benzenamine : Not applicable
- Distillates (petroleum), solvent-refined heavy paraffinic : Not applicable
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : Not applicable
- Dinonylnaphthalenesulfonic acid zinc salt : Not applicable
- Dihydro-3-(tetrapropenyl)-2,5-furandione : Not applicable

○ **CERCLA Section 304 regulation**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable

- Polyisobutylene : Not applicable
- Other non-hazardous ingredients : Not applicable
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not applicable
- Distillates (petroleum), solvent-dewaxed light paraffinic : Not applicable
- Distillates (petroleum), solvent-refined light paraffinic : Not applicable
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : Not applicable
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Not applicable
- ar-Nonyl-N-(nonylphenyl)benzenamine : Not applicable
- Distillates (petroleum), solvent-refined heavy paraffinic : Not applicable
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : Not applicable
- Dinonylnaphthalenesulfonic acid zinc salt : Not applicable
- Dihydro-3-(tetrapropenyl)-2,5-furandione : Not applicable

○ **CERCLA Section 313 regulation**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Polyisobutylene : Not applicable
- Other non-hazardous ingredients : Not applicable
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not applicable
- Distillates (petroleum), solvent-dewaxed light paraffinic : Not applicable
- Distillates (petroleum), solvent-refined light paraffinic : Not applicable
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : Not applicable
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Not applicable
- ar-Nonyl-N-(nonylphenyl)benzenamine : Not applicable
- Distillates (petroleum), solvent-refined heavy paraffinic : Not applicable
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : Not applicable
- Dinonylnaphthalenesulfonic acid zinc salt : Not applicable
- Dihydro-3-(tetrapropenyl)-2,5-furandione : Not applicable

Interntional Convention on Environment

○ **Rotterdam Convention list**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Polyisobutylene : Not applicable
- Other non-hazardous ingredients : Not applicable
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not applicable
- Distillates (petroleum), solvent-dewaxed light paraffinic : Not applicable
- Distillates (petroleum), solvent-refined light paraffinic : Not applicable
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : Not applicable
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Not applicable
- ar-Nonyl-N-(nonylphenyl)benzenamine : Not applicable
- Distillates (petroleum), solvent-refined heavy paraffinic : Not applicable
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : Not applicable
- Dinonylnaphthalenesulfonic acid zinc salt : Not applicable
- Dihydro-3-(tetrapropenyl)-2,5-furandione : Not applicable

○ **Stockholm Convention list**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Polyisobutylene : Not applicable
- Other non-hazardous ingredients : Not applicable

- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not applicable
- Distillates (petroleum), solvent-dewaxed light paraffinic : Not applicable
- Distillates (petroleum), solvent-refined light paraffinic : Not applicable
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : Not applicable
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Not applicable
- ar-Nonyl-N-(nonylphenyl)benzenamine : Not applicable
- Distillates (petroleum), solvent-refined heavy paraffinic : Not applicable
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : Not applicable
- Dinonylnaphthalenesulfonic acid zinc salt : Not applicable
- Dihydro-3-(tetrapropenyl)-2,5-furandione : Not applicable

○ **Montreal Protocol list**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Polyisobutylene : Not applicable
- Other non-hazardous ingredients : Not applicable
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not applicable
- Distillates (petroleum), solvent-dewaxed light paraffinic : Not applicable
- Distillates (petroleum), solvent-refined light paraffinic : Not applicable
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : Not applicable
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Not applicable
- ar-Nonyl-N-(nonylphenyl)benzenamine : Not applicable
- Distillates (petroleum), solvent-refined heavy paraffinic : Not applicable
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : Not applicable
- Dinonylnaphthalenesulfonic acid zinc salt : Not applicable
- Dihydro-3-(tetrapropenyl)-2,5-furandione : Not applicable

National Inventory

○ **Korea**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Polyisobutylene : Not applicable
- Other non-hazardous ingredients : Not applicable
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not applicable
- Distillates (petroleum), solvent-dewaxed light paraffinic : Not applicable
- Distillates (petroleum), solvent-refined light paraffinic : Not applicable
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : Not applicable
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Not applicable
- ar-Nonyl-N-(nonylphenyl)benzenamine : Not applicable
- Distillates (petroleum), solvent-refined heavy paraffinic : Not applicable
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : Not applicable
- Dinonylnaphthalenesulfonic acid zinc salt : Not applicable
- Dihydro-3-(tetrapropenyl)-2,5-furandione : Not applicable

○ **U.S.A**

- Distillates (petroleum), hydrotreated heavy paraffinic : US TSCA phase-in substance
- Polyisobutylene : US TSCA phase-in substance
- Other non-hazardous ingredients : Not applicable
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : US TSCA phase-in substance
- Distillates (petroleum), solvent-dewaxed light paraffinic : US TSCA phase-in substance

- Distillates (petroleum), solvent-refined light paraffinic : US TSCA phase-in substance
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : US TSCA phase-in substance
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : US TSCA phase-in substance
- ar-Nonyl-N-(nonylphenyl)benzenamine : US TSCA phase-in substance
- Distillates (petroleum), solvent-refined heavy paraffinic : US TSCA phase-in substance
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : US TSCA phase-in substance
- Dinonylnaphthalenesulfonic acid zinc salt : US TSCA phase-in substance
- Dihydro-3-(tetrapropenyl)-2,5-furandione : US TSCA phase-in substance

○ **China**

- Distillates (petroleum), hydrotreated heavy paraffinic : China phase-in substance
- Polyisobutylene : China phase-in substance
- Other non-hazardous ingredients : Not applicable
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : China phase-in substance
- Distillates (petroleum), solvent-dewaxed light paraffinic : China phase-in substance
- Distillates (petroleum), solvent-refined light paraffinic : China phase-in substance
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : China phase-in substance
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : China phase-in substance
- ar-Nonyl-N-(nonylphenyl)benzenamine : China phase-in substance
- Distillates (petroleum), solvent-refined heavy paraffinic : China phase-in substance
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : China phase-in substance
- Dinonylnaphthalenesulfonic acid zinc salt : China phase-in substance
- Dihydro-3-(tetrapropenyl)-2,5-furandione : China phase-in substance

○ **Japan**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Polyisobutylene : Japan ENCS phase-in substance
- Other non-hazardous ingredients : Not applicable
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Japan ENCS phase-in substance
- Distillates (petroleum), solvent-dewaxed light paraffinic : Not applicable
- Distillates (petroleum), solvent-refined light paraffinic : Not applicable
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : Japan ENCS phase-in substance
- Phosphorodithioic acid O,O-dialkyl(C=1-14) esters zinc salts : Not applicable
- ar-Nonyl-N-(nonylphenyl)benzenamine : Japan ENCS phase-in substance
- Distillates (petroleum), solvent-refined heavy paraffinic : Not applicable
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : Japan ENCS phase-in substance
- Dinonylnaphthalenesulfonic acid zinc salt : Japan ENCS phase-in substance
- Dihydro-3-(tetrapropenyl)-2,5-furandione : Japan ENCS phase-in substance

16. OTHER INFORMATION

1) Reference

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

2) Issue Date

- 2012-11-30

3) Revision number and Last date revised

○ **Number of revised**

- 5

○ **Date of last revision**

- 2026-01-05

○ **Last Revision History**

- update

4) Other

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