SDS(Safety Data Sheet)

Product	Kixx GX7 Diesel 5W-30		
MSDS Number	List No.	Issuing date	Last revised date
-	LB2762	2015-08-13	2026-03-04

1. IDENTIFICATION

1) Product name

Kixx GX7 Diesel 5W-30

2) Recommended use of the chemical and restriction on use

- Recommended use: Lubricants; Diesel 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
Kixx GX7 Diesel 5W-30	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	84 ~ 94
Trade secret				10 ~ 15
ar-Nonyl-N-(nonylphenyl)benzenamine	DINONYL DIPHENYLAMINE	36878-20-3	253-249-4	0.5 ~ 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	0.3 ~ 2
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	0.3 ~ 2
Phenol, tetrapropylene-, sulfurized, carbonates, calcium salts, overbased		122384-87-6		0.3 ~ 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	0.2 ~ 1
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	0.2 ~ 1

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

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

4. FIRST AID MEASURES

1) Eye contact - In case of contact with material, immediately flush eyes with running water for at least 15 minutes.

- If eye irritation persists: Get medical advice/attention.

2) Skin contact

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

3) Inhalation

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

4) Ingestion

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

5) Indication of any immediate medical attention and special treatment needed

- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

5. FIRE FIGHTING MEASURES

1) Suitable (and unsuitable) extinguishing media

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

2) Special hazards arising from the substance or mixture

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

3) Special protective equipment and precautions for firefighters

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

6. ACCIDENTAL RELEASE MEASURES

1) Health considerations and

- Do not touch or walk through spilled material.

protective equipment

- 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
Trade secret	Not available	Not available	Not available	Not available
ar-Nonyl-N-(nonylphenyl)benzenamine	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-refined heavy paraffinic	Not available	TWA 5 mg/m3, Inhalable particulate matter(Mineral oil, Pure, highly and severely refined)	Not available	Not available
Phenol, tetrapropylene-, sulfurized, carbonates, calcium 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
Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt	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	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	228 ℃
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	0.849
Distribution Coefficient	No Data
SelfIgnition Temperature	No Data
Pyrolysis Temperature	No Data
Viscosity	12.3 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
- ar-Nonyl-N-(nonylphenyl)benzenamine : rat(male/female); LD50 > 5000 ㎎/kg bw, no deaths (OECD TG 401) (ECHA)
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : rat(male/female); LD50 > 5000 ㎎/kg bw, no deaths (OECD TG 401, GLP) (read across: 64742-56-9) (ECHA)
- Distillates (petroleum), solvent-refined heavy paraffinic : rat(male/female); LD50 > 5000 ㎎/kg bw, no deaths (OECD TG 401, GLP) (read across: 64742-56-9) (ECHA)
- Phenol, tetrapropylene-, sulfurized, carbonates, calcium salts, overbased : LD50 >5000 ~ < 16000 mg/kg (OECD TG 401) (SIDS)
- 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)
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : rat(male); LD50 = 3100 ㎎/kg bw (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
- ar-Nonyl-N-(nonylphenyl)benzenamine : rat(male/female); LD50 > 2000 ㎎/kg bw (OECD TG 402) (ECHA)
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : rabbit(male/female); LD50 > 5000 ㎎/kg bw, no deaths (OECD TG 402, GLP) (read across: 64742-56-9) (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)
- Phenol, tetrapropylene-, sulfurized, carbonates, calcium salts, overbased : LD50 > 2000 mg/kg, no deaths (OECD TG 402) (SIDS)
- 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)
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : rabbit(male); LD50 > 5000 ㎎/kg bw (OECD TG 402) (ECHA)

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

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Trade secret : Not available
- ar-Nonyl-N-(nonylphenyl)benzenamine : Not applicable
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not applicable
- Distillates (petroleum), solvent-refined heavy paraffinic : Not applicable
- Phenol, tetrapropylene-, sulfurized, carbonates, calcium salts, overbased : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not applicable
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : Not applicable

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

- Distillates (petroleum), hydrotreated heavy paraffinic : Not available
- Trade secret : Not available
- ar-Nonyl-N-(nonylphenyl)benzenamine : Not available
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not available
- Distillates (petroleum), solvent-refined heavy paraffinic : Not available
- Phenol, tetrapropylene-, sulfurized, carbonates, calcium salts, overbased : LC50 >1.67 mg/L (OECD TG 403) (SIDS)
- 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)
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : 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
- ar-Nonyl-N-(nonylphenyl)benzenamine : 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-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)
- Phenol, tetrapropylene-, sulfurized, carbonates, calcium salts, overbased : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not available
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : 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
- ar-Nonyl-N-(nonylphenyl)benzenamine	:	rabbit; slightly irritating (OECD TG 404, GLP) (read across: TK12340) (ECHA)
- Distillates (petroleum), solvent-dewaxed heavy paraffinic	:	rabbit; not irritating (GLP) (read across: 64742-56-9) (ECHA)
- Distillates (petroleum), solvent-refined heavy paraffinic	:	rabbit; not irritating (GLP) (read across: 64742-56-9) (ECHA)

- Phenol, tetrapropylene-, sulfurized, carbonates, calcium salts, overbased : Cause slight irritation to skin. (SIDS)
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : rabbit; irritant (OECD TG 404, GLP) (ECHA)
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : rabbit; not irritating (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
- ar-Nonyl-N-(nonylphenyl)benzenamine : rabbit; not irritating (OECD TG 405, GLP) (read across: TK12340) (ECHA)
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : rabbit; not irritating (OECD TG 405, GLP) (read across: 64742-56-9) (ECHA)
- Distillates (petroleum), solvent-refined heavy paraffinic : rabbit; not irritating (OECD TG 405, GLP) (read across: 64742-56-9) (ECHA)
- Phenol, tetrapropylene-, sulfurized, carbonates, calcium salts, overbased : Cause slight irritation to the eye. (SIDS)
- 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)
- 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)

○ **Respiratory sensitization : Not classified**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not available
- Trade secret : Not available
- ar-Nonyl-N-(nonylphenyl)benzenamine : Not available
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not available
- Distillates (petroleum), solvent-refined heavy : Not available

paraffinic

- Phenol, tetrapropylene-, sulfurized, carbonates, calcium salts, overbased : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not available
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : 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
- ar-Nonyl-N-(nonylphenyl)benzenamine : guinea pig; not sensitising (OECD TG 406, GLP) (ECHA)
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : guinea pig; not sensitising (OECD TG 406, GLP) (read across: 64742-53-6) (ECHA)
- Distillates (petroleum), solvent-refined heavy paraffinic : guinea pig; not sensitising (OECD TG 406, GLP) (read across: 64742-53-6) (ECHA)
- Phenol, tetrapropylene-, sulfurized, carbonates, calcium salts, overbased : It is not considered to be sensitisers in humans. (SIDS)
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : guinea pig; not sensitising (OECD TG 406, GLP) (ECHA)
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : guinea pig; not sensitising (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
- ar-Nonyl-N-(nonylphenyl)benzenamine : 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), : EU CLP 1272/2008 : Carc. 1B (Note L : The classification as a carcinogen need

solvent-refined heavy paraffinic		not apply if it can be shown that the substance contains less than 3% DMSO extract as measured by IP 346)
- Phenol, tetrapropylene-, sulfurized, carbonates, calcium salts, overbased	:	There is no information on the carcinogenic potential. (SIDS)
- 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
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt	:	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
- 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-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-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)
- Phenol, tetrapropylene-, sulfurized, carbonates, calcium salts, overbased	:	In vitro- Negative (Bacterial Reverse Mutation Assay; OECD TG 471), In vitro - Negative (Mutation test; OECD TG 476) In vivo - Negative (Mouse micronucleus assay; OECD TG 474) (SIDS)
- 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) In vivo Mammalian Erythrocyte Micronucleus Test: negative (OECD TG 474, GLP) (ECHA)
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester,	:	In vitro bacterial reverse mutation assay; negative (OECD TG 471, GLP) (ECHA) In vivo Mammalian Erythrocyte Micronucleus Test: negative (OECD TG 474, GLP)

zinc salt (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
- 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-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-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)
- Phenol, tetrapropylene-, sulfurized, carbonates, calcium salts, overbased : They are of low concern for developmental toxicity. Alkyl phenate sulfides cause a reduction in fertility in rats(M/F), a reduction in mean live litter size, and a reduction in the size of M/F reproductive organs. (NOAEL(developmental)=300mg/kg bw/day) (SIDS)
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : EC 283-392-8 has not been tested for reproduction toxicity, however 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)
- 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)

○ **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

- ar-Nonyl-N-(nonylphenyl)benzenamine : oral; rat(male/female); No compound related gross organ changes were observed. LD50 > 5000 ㎎/㎏ 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 ㎎/㎏ 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-dewaxed heavy paraffinic : oral; rat(male/female); No clinical signs of toxicity observed in either male or female rats. LD50 > 5000 ㎎/㎏ 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 ㎎/㎏ 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 heavy paraffinic : oral; rat(male/female); No clinical signs of toxicity observed in either male or female rats. LD50 > 5000 ㎎/㎏ 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 ㎎/㎏ 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)

- Phenol, tetrapropylene-, sulfurized, carbonates, calcium salts, overbased : Not available

- 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)

- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : oral; rat(male); Depresson, diarrhea, reduced food intake. LD50 = 3100 ㎎/㎏ bw (OECD TG 401) (ECHA)

○ **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
- 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-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-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)
- Phenol, tetrapropylene-, sulfurized, carbonates, calcium salts, overbased : 2 human repeated-insult patch tests, no evidence of skin irritation was observed. In the two oral developmental toxicity studies in rats, no deaths or signs of toxicity attributable to the test substance were observed in the screening study, and treatment-related signs of toxicity observed in the definitive study were limited to clear, red, yellow and/or tan staining/matting/material around the nose and mouth in the high-dose group. The systemic NOAEL=250 mg/kg bw/day. (SIDS)
- 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)
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : 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)

○ **Aspiration hazard : Not classified**

- Distillates (petroleum), hydrotreated heavy paraffinic : Viscosity: 73.9 mm2/s (40°C)(ECHA) & hydrocarbons
- Trade secret : Not available
- ar-Nonyl-N-(nonylphenyl)benzenamine : 585 mPa.s at 40°C (ECHA) & not hydrocarbons
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : 52.1 mm2/s (40°C) & hydrocarbons
- Distillates (petroleum), solvent-refined heavy paraffinic : 19 cSt at 40°C & hydrocarbons (ECHA)
- Phenol, tetrapropylene-, sulfurized, carbonates, calcium salts, overbased : Not available

- 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
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : 131.6 cSt at 40°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)
- Trade secret : Not available
- ar-Nonyl-N-(nonylphenyl)benzenamine : No toxic effects up to the limit of water solubility (< 5 μg/L)
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : 96h-LL50(Pimephales promelas) > 100 mg/L (OECD TG 203, GLP) (ECHA)
- Distillates (petroleum), solvent-refined heavy paraffinic : 96h-LL50(Pimephales promelas) > 100 mg/L (OECD TG 203, GLP) (ECHA)
- Phenol, tetrapropylene-, sulfurized, carbonates, calcium salts, overbased : 96h-LL50(Oncorhynchus mykiss) > 1000 mg/l (read-across: 122384-85-4) (OECD TG 203) (SIDS)
- 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)
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : 96h-LL50(Oncorhynchus mykiss) = 4.4 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
- ar-Nonyl-N-(nonylphenyl)benzenamine : No toxic effects up to the limit of water solubility (< 5 μg/L)
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : 48h-EL50(Daphnia magna) > 10000 mg/L (OECD TG 202) (ECHA)
- Distillates (petroleum), solvent-refined heavy paraffinic : 48h-EL50(Daphnia magna) > 10000 mg/L (OECD TG 202) (ECHA)
- Phenol, tetrapropylene-, sulfurized, carbonates, calcium salts, overbased : 48h-LL50(Daphnia magna) > 1000 mg/l (read-across: 122384-85-4) (OECD TG 202) (SIDS)
- 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)
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : 48h-EL50(Daphnia magna) = 75 mg/L (OECD TG 202, GLP) (ECHA)

Aquatic algae

- Distillates (petroleum), hydrotreated heavy paraffinic : Not available
- Trade secret : Not available
- ar-Nonyl-N-(nonylphenyl)benzenamine : No toxic effects up to the limit of water solubility (< 5 μg/L)
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not available
- Distillates (petroleum), solvent-refined heavy paraffinic : Not available
- Phenol, tetrapropylene-, sulfurized, carbonates, calcium salts, overbased : 96h-LL50(Pseudokirchneriella subcapitata) > 1000 mg/l(read-across: 122384-85-4) (OECD TG 201) (SIDS)
- 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)
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : 72h-ErL50(Desmodesmus subspicatus) = 410 mg/L (OECD TG 201, GLP) (ECHA)

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

Fish

- Distillates (petroleum), hydrotreated heavy paraffinic : Not available
- Trade secret : Not available
- ar-Nonyl-N-(nonylphenyl)benzenamine : Not available
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not available
- Distillates (petroleum), solvent-refined heavy paraffinic : Not available
- Phenol, tetrapropylene-, sulfurized, carbonates, calcium salts, overbased : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not available
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : 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
- ar-Nonyl-N-(nonylphenyl)benzenamine : Not available
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : 21d-NOEL(Daphnia magna) = 10 mg/L (OECD TG 211, GLP) (ECHA)
- Distillates (petroleum), solvent-refined heavy paraffinic : 21d-NOEL(Daphnia magna) = 10 mg/L (OECD TG 211, GLP) (ECHA)
- Phenol, tetrapropylene-, sulfurized, carbonates, calcium 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)
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : 28d-NOEC(Daphnia magna) = 0.4 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
- ar-Nonyl-N-(nonylphenyl)benzenamine : Not available
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : 72h-NOErL(Pseudokirchneriella subcapitata) >=100 mg/L (OECD TG 201) (ECHA)
- Distillates (petroleum), solvent-refined heavy paraffinic : 72h-NOErL(Pseudokirchneriella subcapitata) >=100 mg/L (OECD TG 201) (ECHA)
- Phenol, tetrapropylene-, sulfurized, carbonates, calcium salts, overbased : Not available

- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not available
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : Not available

2) Persistence and degradability

○ **Persistence**

- Distillates (petroleum), hydrotreated heavy paraffinic : This substance is UVCB, so it is not applicable. (ECHA)
- Trade secret : Not available
- ar-Nonyl-N-(nonylphenyl)benzenamine : log Kow=12.24 (estimated) (EPISUITE); not valid (over -4<log Kow<8)
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : log Kow = 6.13 (experimental) (EPISUITE)
- Distillates (petroleum), solvent-refined heavy paraffinic : log Kow = 14.93 (estimated) (EPISUITE); not valid (over "-4<log Kow<8")
- Phenol, tetrapropylene-, sulfurized, carbonates, calcium salts, overbased : log Kow=8.5-14 (calculated) (SIDS)
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : log Kow = 0.56(ECHA)
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : log Kow = 3.59 (22 °C, pH:ca. 5) (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
- ar-Nonyl-N-(nonylphenyl)benzenamine : In contact with water no hydrolysis is expected. (ECHA)
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not available
- Distillates (petroleum), solvent-refined heavy paraffinic : Not available
- Phenol, tetrapropylene-, sulfurized, carbonates, calcium salts, overbased : Not undergo hydrolysis. Atmospheric half-lives : 1.41~3 hours (calculated) (SIDS)
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not available
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : Not available

3) Bioaccumulative potential

○ **Bioaccumulation**

- Distillates (petroleum), hydrotreated heavy paraffinic : This substance is UVCB, so it is not applicable. (ECHA)
- Trade secret : Not available
- ar-Nonyl-N-(nonylphenyl)benzenamine : BCF=35.87 (estimated) (EPISUITE)
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : BCF = 5147 (estimated) (EPISUITE)
- Distillates (petroleum), solvent-refined heavy paraffinic : BCF = 3.162 (estimated) (EPISUITE)
- Phenol, tetrapropylene-, sulfurized, carbonates, calcium salts, overbased : estimated BCF range 3.2 ? 656 (low bioaccumulation potential) (SIDS)
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not available
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : BCF=448.2 (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)
- Trade secret : Not available
- 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-dewaxed heavy paraffinic : 31 % degradation after 28d; not readily biodegradable (OECD TG 301F, GLP) (ECHA)
- Distillates (petroleum), solvent-refined heavy paraffinic : 31 % degradation after 28d; not readily biodegradable (OECD TG 301F, GLP) (ECHA)
- Phenol, tetrapropylene-, sulfurized, carbonates, calcium salts, overbased : Do not readily biodegrade. 4.7%~13.4% biodegradation after 28 days (OECD TG 301B) (read across : 122384-85-4) (SIDS)
- 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)
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : < 5% degradation after 27 days; no biodegradation observed (OECD TG 301D) (ECHA)

4) Mobility in soil

- Distillates (petroleum), hydrotreated heavy paraffinic : Not available
- Trade secret : Not available
- ar-Nonyl-N-(nonylphenyl)benzenamine : Koc=44900000 (EPISUITE)
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Koc=208800 (EPISUITE)
- Distillates (petroleum), solvent-refined heavy paraffinic : Koc=9065000000000 (EPISUITE)
- Phenol, tetrapropylene-, sulfurized, carbonates, calcium salts, overbased : Koc=1218000000000 (EPISUITE)
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Koc=1017000
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : Koc=495900 (EPISUITE)

5) Hazard to the ozone layer

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Trade secret : Not available
- ar-Nonyl-N-(nonylphenyl)benzenamine : Not applicable
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not applicable
- Distillates (petroleum), solvent-refined heavy paraffinic : Not applicable
- Phenol, tetrapropylene-, sulfurized, carbonates, calcium salts, overbased : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not applicable
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : Not applicable

6) Other adverse effects

- Distillates (petroleum), hydrotreated heavy paraffinic : Not available
- Trade secret : Not available
- ar-Nonyl-N-(nonylphenyl)benzenamine : Not available
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not available
- Distillates (petroleum), solvent-refined heavy paraffinic : Not available
- Phenol, tetrapropylene-, sulfurized, carbonates, calcium salts, overbased : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not available
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : 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
- ar-Nonyl-N-(nonylphenyl)benzenamine : European EINECS phase-in substance
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : European EINECS phase-in substance
- Distillates (petroleum), solvent-refined heavy paraffinic : European EINECS phase-in substance
- Phenol, tetrapropylene-, sulfurized, carbonates, calcium salts, overbased : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : European EINECS phase-in substance
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : European EINECS phase-in substance

EU CLP (CLASSIFICATION) - PRODUCT : Not applicable

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Trade secret : Not applicable
- ar-Nonyl-N-(nonylphenyl)benzenamine : Not applicable
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not applicable
- Distillates (petroleum), solvent-refined heavy paraffinic : Not applicable
- Phenol, tetrapropylene-, sulfurized, carbonates, calcium salts, overbased : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not applicable
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : Not applicable

Substances restricted under REACH

- Distillates (petroleum), hydrotreated heavy paraffinic : Substances restricted under REACH
- Trade secret : Not applicable
- ar-Nonyl-N-(nonylphenyl)benzenamine : Not applicable

- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Substances restricted under REACH
- Distillates (petroleum), solvent-refined heavy paraffinic : Substances restricted under REACH
- Phenol, tetrapropylene-, sulfurized, carbonates, calcium salts, overbased : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not applicable
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : 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
- ar-Nonyl-N-(nonylphenyl)benzenamine : 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-refined heavy paraffinic : Not applicable
- Phenol, tetrapropylene-, sulfurized, carbonates, calcium salts, overbased : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Hazardous substance subject to control
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : Hazardous substance subject to control

○ **K-REACH**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Trade secret : Not applicable
- ar-Nonyl-N-(nonylphenyl)benzenamine : Not applicable
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not applicable
- Distillates (petroleum), solvent-refined heavy paraffinic : Not applicable
- Phenol, tetrapropylene-, sulfurized, carbonates, calcium salts, overbased : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not applicable
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : Not applicable

○ **Chemical Control Act in Korea**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Trade secret : Not applicable
- ar-Nonyl-N-(nonylphenyl)benzenamine : Not applicable
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not applicable
- Distillates (petroleum), solvent-refined heavy paraffinic : Not applicable
- Phenol, tetrapropylene-, sulfurized, carbonates, calcium 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
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : List of substance subjected to the PRTR

○ **Safety Control of Dangerous Substances Act**

- Distillates (petroleum), hydrotreated heavy paraffinic : Dangerous substance
- Trade secret : Not applicable
- ar-Nonyl-N-(nonylphenyl)benzenamine : Not applicable

- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not applicable
- Distillates (petroleum), solvent-refined heavy paraffinic : Not applicable
- Phenol, tetrapropylene-, sulfurized, carbonates, calcium salts, overbased : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not applicable
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : 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
- ar-Nonyl-N-(nonylphenyl)benzenamine : Not applicable
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not applicable
- Distillates (petroleum), solvent-refined heavy paraffinic : Not applicable
- Phenol, tetrapropylene-, sulfurized, carbonates, calcium salts, overbased : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not applicable
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : Not applicable

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

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Trade secret : Not applicable
- ar-Nonyl-N-(nonylphenyl)benzenamine : Not applicable
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not applicable
- Distillates (petroleum), solvent-refined heavy paraffinic : Not applicable
- Phenol, tetrapropylene-, sulfurized, carbonates, calcium salts, overbased : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not applicable
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : Not applicable

○ **CERCLA Section 302 regulation**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Trade secret : Not applicable
- ar-Nonyl-N-(nonylphenyl)benzenamine : Not applicable
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not applicable
- Distillates (petroleum), solvent-refined heavy paraffinic : Not applicable
- Phenol, tetrapropylene-, sulfurized, carbonates, calcium salts, overbased : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not applicable
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : Not applicable

○ **CERCLA Section 304 regulation**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Trade secret : Not applicable
- ar-Nonyl-N-(nonylphenyl)benzenamine : Not applicable
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not applicable
- Distillates (petroleum), solvent-refined heavy paraffinic : Not applicable
- Phenol, tetrapropylene-, sulfurized, carbonates, calcium salts, overbased : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not applicable
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : Not applicable

○ **CERCLA Section 313 regulation**

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

- ar-Nonyl-N-(nonylphenyl)benzenamine : Not applicable
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not applicable
- Distillates (petroleum), solvent-refined heavy paraffinic : Not applicable
- Phenol, tetrapropylene-, sulfurized, carbonates, calcium salts, overbased : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not applicable
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : Not applicable

Interntional Convention on Environment

○ **Rotterdam Convention list**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Trade secret : Not applicable
- ar-Nonyl-N-(nonylphenyl)benzenamine : Not applicable
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not applicable
- Distillates (petroleum), solvent-refined heavy paraffinic : Not applicable
- Phenol, tetrapropylene-, sulfurized, carbonates, calcium salts, overbased : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not applicable
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : Not applicable

○ **Stockholm Convention list**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Trade secret : Not applicable
- ar-Nonyl-N-(nonylphenyl)benzenamine : Not applicable
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not applicable
- Distillates (petroleum), solvent-refined heavy paraffinic : Not applicable
- Phenol, tetrapropylene-, sulfurized, carbonates, calcium salts, overbased : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not applicable
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : Not applicable

○ **Montreal Protocol list**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Trade secret : Not applicable
- ar-Nonyl-N-(nonylphenyl)benzenamine : Not applicable
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not applicable
- Distillates (petroleum), solvent-refined heavy paraffinic : Not applicable
- Phenol, tetrapropylene-, sulfurized, carbonates, calcium salts, overbased : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not applicable
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : Not applicable

National Inventory

○ **Korea**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Trade secret : Not applicable
- ar-Nonyl-N-(nonylphenyl)benzenamine : Not applicable
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Not applicable
- Distillates (petroleum), solvent-refined heavy paraffinic : Not applicable
- Phenol, tetrapropylene-, sulfurized, carbonates, calcium salts, overbased : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not applicable
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : Not applicable

○ **U.S.A**

- Distillates (petroleum), hydrotreated heavy paraffinic : US TSCA phase-in substance
- Trade secret : Not applicable
- ar-Nonyl-N-(nonylphenyl)benzenamine : US TSCA phase-in substance
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : US TSCA phase-in substance
- Distillates (petroleum), solvent-refined heavy paraffinic : US TSCA phase-in substance
- Phenol, tetrapropylene-, sulfurized, carbonates, calcium salts, overbased : US TSCA phase-in substance
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : US TSCA phase-in substance
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : US TSCA phase-in substance

○ **China**

- Distillates (petroleum), hydrotreated heavy paraffinic : China phase-in substance
- Trade secret : Not applicable
- ar-Nonyl-N-(nonylphenyl)benzenamine : China phase-in substance
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : China phase-in substance
- Distillates (petroleum), solvent-refined heavy paraffinic : China phase-in substance
- Phenol, tetrapropylene-, sulfurized, carbonates, calcium salts, overbased : China phase-in substance
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : China phase-in substance
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : China phase-in substance

○ **Japan**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Trade secret : Not applicable
- ar-Nonyl-N-(nonylphenyl)benzenamine : Japan ENCS phase-in substance
- Distillates (petroleum), solvent-dewaxed heavy paraffinic : Japan ENCS phase-in substance
- Distillates (petroleum), solvent-refined heavy paraffinic : Not applicable
- Phenol, tetrapropylene-, sulfurized, carbonates, calcium salts, overbased : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not applicable
- Phosphorodithioic acid O,O-bis(2-ethylhexyl) ester, zinc salt : 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

- 2015-08-13

3) Revision number and Last date revised

○ **Number of revised**

- 4

○ **Date of last revision**

- 2025-12-08

○ **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.