SDS(Safety Data Sheet)

Product	DIC Grease EP 2		
MSDS Number	List No.	Issuing date	Last revised date
-	LB3000	2012-11-30	2026-02-20

1. IDENTIFICATION

1) Product name

DIC Grease EP 2

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 1544-5151

2. HAZARDS IDENTIFICATION

1) Classification of the product

SERIOUS EYE DAMAGE/EYE IRRITATION : Category 2

2) Label elements

○ **Hazard pictograms**



○ **Signal word**

Warning

○ **Hazard statements**

- H319 Causes serious eye irritation.

○ **Precautionary statements**

1) Prevention

- P264 Wash ... thoroughly after handling.
- P280 Wear protective gloves/protective clothing/eye protection/face protection/hearing protection.

2) Response

- P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- P337 + P313 If eye irritation persists: Get medical advice/attention.

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
DIC Grease EP 2	2	0	0

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical name	Trade names and Synonyms	CAS No.	EC No.	Contain Ratio(%)
Distillates (petroleum), hydrotreated heavy paraffinic	Emulsifiable oil	64742-54-7	265-157-1	60 ~ 65
Distillates, petroleum, solvent-refined heavy naphthenic		64741-96-4	265-097-6	17 ~ 19
Polyisobutylene	Propene, 2-methyl-, polymers	9003-27-4		7 ~ 9
12-Hydroxyoctadecanoic acid monolithium salt	lithium 12-hydroxystearate	7620-77-1	231-536-5	6 ~ 8
Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts	Zinc, dithiophosphate mixed iso-Bu and pentyl esters	68457-79-4	270-608-0	1 ~ 2
Amines, alkyl(C=10~16), reaction products with alkanol(C=5~9), phosphorus oxide(P2O5), phosphorus sulfide(P2S5) and propylene oxide				0 ~ 0.5
Mineral Oil(Mixture)				0.2 ~ 1
Dilithium tetraborate	LITHIUM TETRABORATE	12007-60-2	234-514-3	0 ~ 0.5
(Z)-N-9-octadecenylpropane-1,3-diamine	N-Oleyl-1,3-diaminopropane	7173-62-8	230-528-9	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

- Get medical attention immediately.
- In case of contact with substance, immediately flush eyes with running water for at least 20 minutes.

- IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- If eye irritation persists: Get medical advice/attention.

2) Skin contact

- In case of contact with substance, immediately flush skin with running water for at least 20 minutes.
- Immediately call a POISON CENTER or doctor/physician.

3) Inhalation

- Do not use mouth-to-mouth method if victim inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.
- Administer oxygen if breathing is difficult.
- IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.

4) Ingestion

- Do not use mouth-to-mouth method if victim ingested the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.
- IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.

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

- Use alcohol foam, carbon dioxide, or water spray when fighting fires involving this material.
- Use dry sand or earth to smother fire.
- Direct water (Unsuitable extinguishing media)

2) Special hazards arising from the substance or mixture

- Fire may produce irritating, corrosive and/or toxic gases.
- Heating may cause a fire or explosion.

3) Special protective equipment and precautions for firefighters

- Rescuers should put on appropriate protective gear.
- In case of fire: Evacuate area. Fight fire remotely due to the risk of explosion.
- Eliminate all ignition sources if safe to do so.

6. ACCIDENTAL RELEASE MEASURES

1) Health considerations and protective equipment

- Clean up spills immediately, observing precautions in Protective Equipment section.
- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- Please note that materials and conditions to be avoided.

2) Environmental precautions
- Large spill: Prevent entry into waterways, sewers, basements or confined areas.

3) Methods and material for containment and cleaning up
- Absorb spill with inert material (e.g., dry sand or earth), then place in a chemical waste container.
- Absorb the liquid and scrub the area with detergent and water.

7. HANDLING AND STORAGE

1) Precautions for safe handling
- Follow all MSDS/label precautions even after container is emptied because they may retain product residues.
- Please note that materials and conditions to be avoided.
- Handling refer to engineering control/personal protection section.
- Wash thoroughly after handling.

2) Conditions for safe storage (including any incompatibilities)
- Please note that materials and conditions to be avoided.
- Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
- Store in a well-ventilated place. Keep container tightly closed.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

1) Control parameters

Chemical name	Exposure limits	ACGIH TLV	OSHA PEL	Biological limit values(BLV)
Distillates (petroleum), hydrotreated heavy paraffinic	TWA :Not available	TWA 5 mg/m3, Inhalable particulate matter(Mineral oil, Pure, highly and severely refined)	Not available	Not available
Distillates, petroleum, solvent-refined heavy naphthenic	TWA :Not available	TWA 5 mg/m3, Inhalable particulate matter(Mineral oil, Pure, highly and severely refined)	Not available	Not available
Polyisobutylene	Not available	Not available	Not available	Not available
12-Hydroxyoctadecanoic acid monolithium salt	Not available	Not available	Not available	Not available
Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts	Not available	Not available	Not available	Not available

Amines, alkyl(C=10~16), reaction products with alkanol(C=5~9), phosphorus oxide(P2O5), phosphorus sulfide(P2S5) and propylene oxide	Not available	Not available	Not available	Not available
Mineral Oil(Mixture)	Not available	Not available	Not available	Not available
Dilithium tetraborate	Not available	Not available	Not available	Not available
(Z)-N-9-octadecenylpropane-1,3-diamine	Not available	Not available	Not available	Not available

2) Appropriate engineering controls

- Install local exhaust ventilation system.
- Check legal suitability of exposure level.

3) Personal protection equipment

○ **Respiratory protection**

- If exposure consentration of the material exceeds the permitted exposure standards, Wear European Standard EN 149 approved full or half face piece (with goggles) respireatory protective equipment.
- If exposure consentration of the material is lower than 100 ppm of the permitted exposure standards, Wear a respiratory protective device, equipped with an adequate filter by considering physicochemical properties of exposured particulate material ; such
- If exposure consentration of the paticle material is lower than 250 ppm of the permitted exposure standards, Wear a respiratory protective device, equipped with an adequate filter by considering physicochemical properties of exposured particulate material
- If exposure consentration of the particle material is lower than 500 ppm of the permitted exposure standards, Wear a respiratory protective device, equipped with an adequate filter by considering physicochemical properties of exposured particulate materia
- If exposure consentration of the particle material is lower than 10000 ppm of the permitted exposure standards, Wear a respiratory protective device, equipped with an adequate filter by considering physicochemical properties of exposured particulate mater
- If exposure consentration of the material is lower than 100000 ppm of the permitted exposure standards, Wear a respiratory protective device, equipped with an adequate filter by considering physicochemical properties of exposured particulate material ; su

○ **Eye protection**

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

○ **Hand protection**

- Wear appropriate protective gloves by considering physical and chemical properties of chemicals.

○ **Body protection**

- Wear appropriate protective clothing by considering physical and chemical properties of chemicals.

9. PHYSICAL AND CHEMICAL PROPERTIES

Item	Input Value
Apperance	Solid
Color	No Data
Smell	a specific smell of Hydrocarbon
Smell Threshold	No Data
pH (Numerical value)	No Data
Melting/Freezing Point	No Data
Boilling Point	No Data
Flash Point	No Data
Evaporating Rate	No Data
Flammability(Solid, Gas)	No Data
Explosibility Range	No Data
Steam Pressure	No Data
Solubility	No Data
Vapor Density	No Data
Specific Gravity	0.889
Distribution Coefficient	No Data
SelfIgnition Temperature	No Data
Pyrolysis Temperature	No Data
Viscosity	No Data
Molecular Weight	No Data

10. STABILITY AND REACTIVITY

1) Chemical Stability and hazardous reactivity - Can form explosive mixtures at temperatures at or above the flashpoint.
- Fire may produce irritating, corrosive and/or toxic gases.

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

3) Incompatible materials - Combustibles

4) Hazardous decomposition products - During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.

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**

- Causes serious eye irritation.
- Possible exposure through the eye

○ **Ingestion**

- No ingestion effect through mouth.

2) Health hazard information

○ **Acute toxicity**

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

- Distillates (petroleum), hydrotreated heavy paraffinic : rat(male/female), LD50 > 5,000 mg/kg bw, no deaths (read-across: 64742-56-9) (OECD TG 401, GLP) (ECHA)
- Distillates, petroleum, solvent-refined heavy naphthenic : rat(male/female); LD50 > 5000 ㎎/kg bw, no deaths (OECD TG 401, GLP) (read across: 64742-56-9) (ECHA)
- Polyisobutylene : Not available
- 12-Hydroxyoctadecanoic acid monolithium salt : rat; LD50 > 5000 ㎎/kg bw, no deaths (equivalent or similar to guideline OECD TG 401) (ECHA)
- Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts : rat(male); LD50 = 3600 ㎎/kg bw (OECD TG 401) (ECHA)
- Amines, alkyl(C=10~16), reaction products with alkanol(C=5~9), phosphorus oxide(P2O5), phosphorus sulfide(P2S5) and propylene oxide : Not available
- Mineral Oil(Mixture) : Not available
- Dilithium tetraborate : rat(female); LD50 = 500 mg/L (OECD TG 423, GLP) (ECHA)
- (Z)-N-9-octadecenylpropane-1,3-diamine : rat(female); LD50 = approx. 500 mg/kg bw (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)
- Distillates, petroleum, solvent-refined heavy naphthenic : rabbit(male/female); LD50 > 5000 ㎎/kg bw, no deaths (OECD TG 402, GLP) (read across: 64742-56-9) (ECHA)
- Polyisobutylene : Not available
- 12-Hydroxyoctadecanoic acid monolithium salt : rat; LD50 > 2000 ㎎/kg bw, no deaths (ECHA)
- Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts : rabbit(male/female); LD50 > 20000 ㎎/kg bw (OECD TG 402) (ECHA)
- Amines, alkyl(C=10~16), reaction products with alkanol(C=5~9), phosphorus oxide(P2O5), phosphorus sulfide(P2S5) and propylene oxide : Not available
- Mineral Oil(Mixture) : Not available
- Dilithium tetraborate : rat; LD50 > 2000 mg/kg bw, no deaths (OECD TG 402, GLP) (ECHA)
- (Z)-N-9-octadecenylpropane-1,3-diamine : Not available

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

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

- 12-Hydroxyoctadecanoic acid monolithium salt : Not applicable
- Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts : Not applicable
- Amines, alkyl(C=10~16), reaction products with alkanol(C=5~9), phosphorus oxide(P2O5), phosphorus sulfide(P2S5) and propylene oxide : Not available
- Mineral Oil(Mixture) : Not available
- Dilithium tetraborate : Not applicable
- (Z)-N-9-octadecenylpropane-1,3-diamine : Not applicable

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

- Distillates (petroleum), hydrotreated heavy paraffinic : Not available
- Distillates, petroleum, solvent-refined heavy naphthenic : Not available
- Polyisobutylene : Not available
- 12-Hydroxyoctadecanoic acid monolithium salt : Not available
- Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts : Not available
- Amines, alkyl(C=10~16), reaction products with alkanol(C=5~9), phosphorus oxide(P2O5), phosphorus sulfide(P2S5) and propylene oxide : Not available
- Mineral Oil(Mixture) : Not available
- Dilithium tetraborate : Not available
- (Z)-N-9-octadecenylpropane-1,3-diamine : Not available

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

- Distillates (petroleum), hydrotreated heavy paraffinic : inhalation: aerosol; rat(male/female); 4h-LC50 > 5.53 mg/L. No deaths (read-across: MRD-87-102) (OECD TG 403)(ECHA)
- Distillates, petroleum, solvent-refined heavy naphthenic : rat(male/female); inhalation: aerosol; LC50 > 5.53 mg/L air /4h, no deaths (OECD TG 403) (read across: MRD-87-102) (ECHA)
- Polyisobutylene : Not available
- 12-Hydroxyoctadecanoic acid monolithium salt : Not available
- Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts : Not available
- Amines, alkyl(C=10~16), reaction products with alkanol(C=5~9), phosphorus oxide(P2O5), phosphorus sulfide(P2S5) and propylene oxide : Not available
- Mineral Oil(Mixture) : Not available
- Dilithium tetraborate : Not available
- (Z)-N-9-octadecenylpropane-1,3-diamine : 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)
- Distillates, petroleum, solvent-refined heavy naphthenic	:	rabbit; not irritating (GLP) (read across: 64742-56-9) (ECHA)
- Polyisobutylene	:	Not available
- 12-Hydroxyoctadecanoic acid monolithium salt	:	human epidermis model; not irritating (read across: 20336-96-3) (OECD TG 439, GLP) (ECHA)
- Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts	:	rabbit; not irritating (EPA OTS 798.4470, GLP) (ECHA)
- Amines, alkyl(C=10~16),	:	Not available

reaction products with alkanol(C=5~9), phosphorus oxide(P2O5), phosphorus sulfide(P2S5) and propylene oxide

- Mineral Oil(Mixture) : Not available
- Dilithium tetraborate : human; not corrosive (OECD TG 431, GLP) (ECHA)
- (Z)-N-9-octadecenylpropane-1,3-diamine : rabbit; Corrosive properties are observed following exposures of 3 minutes and longer, with the skin destruction becoming visible after some delay. (OECD TG 404, GLP) (ECHA)

○ **Serious eye damage/irritation : Category 2 (EYE IRRITATION Cat. 2)**

- Distillates (petroleum), hydrotreated heavy paraffinic : Solvent dewaxed light paraffinic oil is not considered to be an ocular irritant. (read-aross: 64742-56-9) (equivalent or similar to guideline OECD TG 405, GLP) (ECHA)
- Distillates, petroleum, solvent-refined heavy naphthenic : rabbit; not irritating (OECD TG 405, GLP) (read across: 64742-56-9) (ECHA)
- Polyisobutylene : Not available
- 12-Hydroxyoctadecanoic acid monolithium salt : rabbit; not irritating (read across: 20466-33-5) (OECD TG 405, GLP) (ECHA)
- Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts : rabbit; Under the conditions of this study, the test material causes irreversible effects on the eye. (OECD TG 405, GLP) (ECHA)
- Amines, alkyl(C=10~16), reaction products with alkanol(C=5~9), phosphorus oxide(P2O5), phosphorus sulfide(P2S5) and propylene oxide : Not available
- Mineral Oil(Mixture) : Not available
- Dilithium tetraborate : rabbit; causes serious eye damage (OECD TG 405, GLP) (ECHA)
- (Z)-N-9-octadecenylpropane-1,3-diamine : Not available

○ **Respiratory sensitization : Not classified**

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

mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts

- Amines, alkyl(C=10~16), reaction products with alkanol(C=5~9), phosphorus oxide(P2O5), phosphorus sulfide(P2S5) and propylene oxide : Not available
- Mineral Oil(Mixture) : Not available
- Dilithium tetraborate : Not available
- (Z)-N-9-octadecenylpropane-1,3-diamine : Not available

○ **Skin sensitization : Not classified**

- Distillates (petroleum), hydrotreated heavy paraffinic : Under the conditions of the test, Solvent dewaxed light paraffinic oil is considered non-sensitizing for guinea-pigs. (read-aross: 64742-56-9) (OECD TG 406, GLP) (ECHA)
- Distillates, petroleum, solvent-refined heavy naphthenic : guinea pig; not sensitising (OECD TG 406, GLP) (read across: 64742-53-6) (ECHA)
- Polyisobutylene : Not available
- 12-Hydroxyoctadecanoic acid monolithium salt : mouse; not sensitising (read across: 502962-81-4) (OECD TG 429, GLP) (ECHA)
- Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts : guinea pig; not sensitising (OECD TG 406, GLP) (ECHA)
- Amines, alkyl(C=10~16), reaction products with alkanol(C=5~9), phosphorus oxide(P2O5), phosphorus sulfide(P2S5) and propylene oxide : Not available
- Mineral Oil(Mixture) : Not available
- Dilithium tetraborate : not sensitising (ECHA)
- (Z)-N-9-octadecenylpropane-1,3-diamine : Not available

○ **Carcinogenicity : Not classified**

- Distillates (petroleum), hydrotreated heavy paraffinic : EU CLP 1272/2008 : Carc. 1B (Note L : The classification as a carcinogen need not apply if it can be shown that the substance contains less than 3% DMSO extract as measured by IP 346)
- Distillates, petroleum, solvent-refined heavy naphthenic : EU CLP 1272/2008 : Carc. 1B (Note L : The classification as a carcinogen need not apply if it can be shown that the substance contains less than 3% DMSO extract as measured by IP 346)
- Polyisobutylene : IARC, EU CLP 1272/2008, OSHA, ACGIH, US EPA IRIS, NTP : not listed

- 12-Hydroxyoctadecanoic acid monolithium salt : IARC, EU CLP 1272/2008, OSHA, ACGIH, US EPA IRIS, NTP : not listed
- Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts : IARC, EU CLP 1272/2008, OSHA, ACGIH, US EPA IRIS, NTP : not listed
- Amines, alkyl(C=10~16), reaction products with alkanol(C=5~9), phosphorus oxide(P2O5), phosphorus sulfide(P2S5) and propylene oxide : Not available
- Mineral Oil(Mixture) : Not available
- Dilithium tetraborate : IARC, EU CLP 1272/2008, OSHA, ACGIH, US EPA IRIS, NTP : not listed
- (Z)-N-9-octadecenylpropane-1,3-diamine : 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)
- Distillates, petroleum, solvent-refined heavy naphthenic : In vitro Bacterial Reverse Mutation Assay : positive (OECD TG 471) (read across: 64741-50-0) (ECHA), In Vitro Mammalian Chromosome Aberration Test : negative (OECD TG 473) (read across: L-06 Light Hydrotreated Feedstock) (ECHA)
  In vivo Mammalian Erythrocyte Micronucleus Test : negative (OECD TG 474) (read across: solvent-extracted, dewaxed paraffin oil) (ECHA)
- Polyisobutylene : In vitro Cell Transformation: positive (US Dashboard)
- 12-Hydroxyoctadecanoic acid monolithium salt : In Vitro Bacterial Reverse Mutation Assay : negative (OECD TG 471, GLP) (ECHA)
  In Vitro Mammalian Cell Gene Mutation Test : negative (OECD TG 476, GLP) (ECHA)
  In vivo : Not available
- Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts : In vitro bacterial reverse mutation assay; negative (OECD TG 471, GLP) (ECHA), In Vitro Mammalian Cell Gene Mutation Test : negative (OECD TG 476) (ECHA)
  In vivo Mammalian Erythrocyte Micronucleus Test: negative (OECD TG 474, GLP) (ECHA)
- Amines, alkyl(C=10~16), reaction products with alkanol(C=5~9), phosphorus oxide(P2O5), phosphorus sulfide(P2S5) and propylene oxide : Not available
- Mineral Oil(Mixture) : Not available

- Dilithium tetraborate : in vitro bacterial reverse mutation assay : negative / positive (OECD TG 471) (ECHA)
  in vitro mammalian chromosome aberration test : negative (OECD TG 473, GLP) (ECHA)
- (Z)-N-9-octadecenylpropane-1,3-diamine : 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

○ **Reproductive toxicity : Not classified**

- Distillates (petroleum), hydrotreated heavy paraffinic : rat; screening for reproductive / developmental toxicity; Reproductive performance was not adversely affected at any dose level evaluated. There were no neonatal toxicity observed at any dose level. There were no differences in terms of systemic toxicity between either of the dose formulations. (read-aross : Chevron 100 Neutral) (OECD TG 421, GLP) (ECHA)
- Distillates, petroleum, solvent-refined heavy naphthenic : 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)
- Polyisobutylene : Not available
- 12-Hydroxyoctadecanoic acid monolithium salt : rat(male/female); dermal; 0; 100; 300; 1000 mg/kg bw; did not result in any adverse reproductive effects or any definitive test article-related changes in the development or survival of the offspring. (OECD TG 422, GLP) (ECHA)
- Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts : rat(male/female); 0, 10, 40, or 160 mg/kg/day; No effects observed at any dose level, NOEL(reproductive, neonatal toxicity)=160 mg/kg bw/day, NOAEL(systemic toxicity)>= 160 mg/kg bw/day (OECD TG 422, GLP) (ECHA)
- Amines, alkyl(C=10~16), reaction products with alkanol(C=5~9), phosphorus oxide(P2O5), phosphorus sulfide(P2S5) and propylene oxide : Not available
- Mineral Oil(Mixture) : Not available
- Dilithium tetraborate : rat; oral; screening for reproductive / developmental toxicity; The NOAEL (Developmental toxicity) = 50 mg/kg (bw). This is based on reduced gestation index, marked reductions in post-implantation survival, live litter size, live birth, viability and lactation indices, a high number of total litter losses, and reduced pup birth weight and postnatal growth at 150 mg/kg
  The parental NOAEL= 50 mg/kg (bw). This is based on reduced body weight gain at gestation and lactation. (OECD TG 422, GLP) (ECHA)
- (Z)-N-9-octadecenylpropane-1,3-diamine : rat; two-generation reproductive toxicity; 0, 3, 9 and 27 mg/kg bw/day; The performance of the 2 generations was very similar. Under the conditions of the study 30 mg/kg/day produced only minor parental toxicity but no reproductive

effects. At 90 mg/kg/day there was very marked parental toxicity, a possible minor effect on pup and litter weights, and 2 pups with body tremors. There were no obvious adverse effects on mating and littering performance at any of the levels tested. (read across : 2372-82-9) (OECD TG 416, GLP) (ECHA)

rat; 1.25, 5.0, 20.0 mg/kg bw; developmental toxicity; Based on the findings, the NOAEL (No observed adverse effect level) for maternal toxicity is believed to be 1.25 mg/ kg body weight based on clinical observations seen in some animals at 5 mg/kg, whereas the NOAEL for embryo-fetal toxicity is believed to be 20 mg/ kg body weight. (OECD TG 414, GLP) (ECHA)

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

- Distillates (petroleum), hydrotreated heavy paraffinic	:	Hydronephrosis of the right kidney was observed in one rat but was not considered treatment-related by the study authors. No other abnormalities were observed in any male or female rats. (read-across: 64742-56-9) (OECD TG 401, GLP)(ECHA) Dermal administration of API 78-9 at 5000 mg/kg did not result in any dermal irritation or signs of clinical toxicity. Gross necroscopy did not reveal any signs of systemic toxicity at the 5000 mg/kg dose level. (read-across: 64742-56-9) (OECD TG 402, GLP)(ECHA)
- Distillates, petroleum, solvent-refined heavy naphthenic	:	oral; rat(male/female); No clinical signs of toxicity observed in either male or female rats. LD50 > 5000 ㎎/kg bw, no deaths (OECD TG 401, GLP) (read across: 64742-56-9) (ECHA) dermal; rabbit(male/female); No visible signs of clinical toxicity were observed in male and female rabbits dosed with API 78-9 at 5000 mg/kg. LD50 > 5000 ㎎/kg bw, no deaths (OECD TG 402, GLP) (read across: 64742-56-9) (ECHA) inhalation: aerosol; rat(male/female); The test material which was deposited on the animal fur during exposure diminished by observation Day 10. No mortality in either the control or exposed group was reported. There were no statistically significant differences in mean body weight between groups. LC50 > 5.53 mg/L air /4h, no deaths (OECD TG 403) (read across: MRD-87-102) (ECHA)
- Polyisobutylene	:	Not available
- 12-Hydroxyoctadecanoic acid monolithium salt	:	dermal; rat; Clinical toxicity: No toxicologically significant signs were observed. LD50 > 2000 ㎎/kg bw, no deaths (ECHA)
- Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts	:	oral; rat(male); Lung congestion, gastrointestinal findings and staining around the mouth, nose and anus were common necropsy findings for the animals that died. All surviving animals were normal at necropsy. LD50 = 3600 ㎎/kg bw (OECD TG 401) (ECHA)
- Amines, alkyl(C=10~16), reaction products with alkanol(C=5~9), phosphorus oxide(P2O5), phosphorus sulfide(P2S5) and propylene oxide	:	Not available
- Mineral Oil(Mixture)	:	Not available
- Dilithium tetraborate	:	Not available
- (Z)-N-9-octadecenylpropane-1,3-	:	Not available

diamine

○ **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)
- Distillates, petroleum, solvent-refined heavy naphthenic : rabbit(male/female); dermal; The systemic toxicity NOAEL for this 28-day dermal toxicity study in the rabbit is 1,000 mg/kg, based on the lack of adverse systemic effects observed at this dose level. (OECD TG 410, GLP) (read across: 64742-53-6) (ECHA)
- Polyisobutylene : Not available
- 12-Hydroxyoctadecanoic acid monolithium salt : rat(male/female); dermal; 0; 100; 300; 1000 mg/kg bw; systemic effects on basis that no statistically significant adverse (treatment related) effects were observed at all test doses. (OECD TG 422, GLP) (ECHA)
- Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts : rat(male/female); 0, 10, 40, or 160 mg/kg/day; No effects observed at any dose level, NOAEL(systemic toxicity)>= 160 mg/kg bw/day (OECD TG 422, GLP) (ECHA)
- Amines, alkyl(C=10~16), reaction products with alkanol(C=5~9), phosphorus oxide(P2O5), phosphorus sulfide(P2S5) and propylene oxide : Not available
- Mineral Oil(Mixture) : Not available
- Dilithium tetraborate : rat; oral; Combined Repeated Dose Toxicity Study with the Reproduction / Developmental Toxicity Screening Test; No general systemic treatment related effects for males or females were reported in a 28 -day repeated dose toxicity study with the reproduction/developmental toxicity screening test (OECD TG 422) of dilithium tetraborate by oral gavage in rats. The NOAEL (male and female) is equal or greater than 150 mg/kg(bw). (OECD TG 422, GLP) (ECHA)
- (Z)-N-9-octadecenylpropane-1,3-diamine : oral; rat; 0.0, 0.1, 0.4, 1.5 and 6 mg/kg bw; 90d; Test item-related changes were seen in the small intestine (ileum and jejunum), mesenteric lymph node, spleen, bone marrow (sternum) and trachea of terminally sacrificed animals.. NOAEL = 0.4 mg/kg bw/day (read across : 90640-43-0) (OECD TG 408, GLP) (ECHA)

○ **Aspiration hazard : Not classified**

- Distillates (petroleum), hydrotreated heavy paraffinic : Viscosity: 73.9 mm2/s (40°C)(ECHA) & hydrocarbons
- Distillates, petroleum, solvent-refined heavy naphthenic : > 2 mm2/s (40°C) (ECHA) & hydrocarbons

- Polyisobutylene : Not available
- 12-Hydroxyoctadecanoic acid monolithium salt : Not applicable
- Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts : 264.8 cSt at 40 C (ECHA) & not hydrocarbons
- Amines, alkyl(C=10~16), reaction products with alkanol(C=5~9), phosphorus oxide(P2O5), phosphorus sulfide(P2S5) and propylene oxide : Not available
- Mineral Oil(Mixture) : Not available
- Dilithium tetraborate : Not applicable
- (Z)-N-9-octadecenylpropane-1,3-diamine : 11 mPa s (50.0°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)
- Distillates, petroleum, solvent-refined heavy naphthenic : 96h-LL50(Pimephales promelas) > 100 mg/L (OECD TG 203, GLP) (ECHA)
- Polyisobutylene : 96h-LC50(Rainbow Trout) > 5600 mg/L (US Dashboard)
- 12-Hydroxyoctadecanoic acid monolithium salt : 96h-LL50(Oncorhynchus mykiss) > 100 mg/L (read across: 20336-96-3) (OECD TG 203, GLP) (ECHA)
- Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts : 96h-LC50(Cyprinodon variegatus) = 46 mg/L (OECD TG 203, GLP) (ECHA)
- Amines, alkyl(C=10~16), reaction products with alkanol(C=5~9), phosphorus oxide(P2O5), phosphorus sulfide(P2S5) and propylene oxide : Not available
- Mineral Oil(Mixture) : Not available
- Dilithium tetraborate : 96h-LC50(Cyprinus carpio) > 100 mg/L (OECD TG 203, GLP) (ECHA)
- (Z)-N-9-octadecenylpropane-1,3-diamine : 96h-LC50(Danio rerio)= 0.148 mg/L (read across : 68603-64-5) (OECD TG 203, GLP) (ECHA)

Invertebrates

- Distillates (petroleum), hydrotreated heavy paraffinic : 48h-EL50(Daphnia magna) > 10,000 mg/L (read across : 64742-53-6 or 64741-97-5) (equivalent or similar to guideline OECD TG 202) (ECHA)
- Distillates, petroleum, solvent-refined heavy naphthenic : 48h-EL50(Daphnia magna) > 10000 mg/L (OECD TG 202) (ECHA)

- Polyisobutylene : Not available
- 12-Hydroxyoctadecanoic acid monolithium salt : 48h-EL50(Daphnia magna) > 100 mg/L (read across: 20336-96-3) (OECD TG 202, GLP) (ECHA)
- Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts : 48h-EL50(Daphnia magna) = 23 mg/L (OECD TG 202, GLP) (ECHA)
- Amines, alkyl(C=10~16), reaction products with alkanol(C=5~9), phosphorus oxide(P2O5), phosphorus sulfide(P2S5) and propylene oxide : Not available
- Mineral Oil(Mixture) : Not available
- Dilithium tetraborate : 48h-EC50(Daphnia magna) > 100 mg/L (OECD TG 202, GLP) (ECHA)
- (Z)-N-9-octadecenylpropane-1,3-diamine : 48h-EC50(Daphnia magna) > 0.013 - < 0.025 mg/L (OECD TG 202, GLP) (ECHA)

Aquatic algae

- Distillates (petroleum), hydrotreated heavy paraffinic : Not available
- Distillates, petroleum, solvent-refined heavy naphthenic : Not available
- Polyisobutylene : Not available
- 12-Hydroxyoctadecanoic acid monolithium salt : 72h-ErL50(Raphidocelis subcapitata) > 160 mg/L (read across: 20336-96-3) (OECD TG 201, GLP) (ECHA)
- Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts : 72h-ErL50(Desmodesmus subspicatus) = 24 mg/L (OECD TG 201, GLP) (ECHA)
- Amines, alkyl(C=10~16), reaction products with alkanol(C=5~9), phosphorus oxide(P2O5), phosphorus sulfide(P2S5) and propylene oxide : Not available
- Mineral Oil(Mixture) : Not available
- Dilithium tetraborate : 72h-ErC50(Pseudokirchneriella subcapitata) > 100 mg/L (OECD TG 201, GLP) (ECHA)
- (Z)-N-9-octadecenylpropane-1,3-diamine : 72h-ErC50(Desmodesmus subspicatus) = 0.507 mg/L (OECD TG 201, GLP) (ECHA)

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

Fish

- Distillates (petroleum), hydrotreated heavy paraffinic : Not available
- Distillates, petroleum, solvent-refined heavy naphthenic : Not available
- Polyisobutylene : Not available
- 12-Hydroxyoctadecanoic acid monolithium salt : Not available
- Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts : Not available
- Amines, alkyl(C=10~16), reaction products with alkanol(C=5~9), phosphorus oxide(P2O5), phosphorus sulfide(P2S5) and propylene oxide : Not available
- Mineral Oil(Mixture) : Not available
- Dilithium tetraborate : Not available
- (Z)-N-9-octadecenylpropane-1,3-diamine : Not available

Invertebrates

- Distillates (petroleum), hydrotreated heavy paraffinic : 21d-NOEL(Daphnia magna)=10 mg/L (read across: 64742-53-6) (equivalent or similar to guideline OECD TG 211, GLP) (ECHA)
- Distillates, petroleum, solvent-refined heavy naphthenic : 21d-NOEL(Daphnia magna) = 10 mg/L (OECD TG 211, GLP) (ECHA)
- Polyisobutylene : Not available
- 12-Hydroxyoctadecanoic acid monolithium salt : Not available
- Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts : 21d-NOEC(Daphnia magna) =

0.4 mg/L (OECD TG 211, GLP) (ECHA)

- Amines, alkyl(C=10~16), reaction products with alkanol(C=5~9), phosphorus oxide(P2O5), phosphorus sulfide(P2S5) and propylene oxide : Not available
- Mineral Oil(Mixture) : Not available
- Dilithium tetraborate : Not available
- (Z)-N-9-octadecenylpropane-1,3-diamine : 21d-NOEC(Daphnia magna) = 0.1 mg/L (OECD TG 211, GLP) (ECHA)

Aquatic algae

- Distillates (petroleum), hydrotreated heavy paraffinic : 72h-NOErL(Pseudokirchnerella subcapitata) >= 100 mg/L (read across: 72623-87-1) (OECD TG 201) (ECHA)
- Distillates, petroleum, solvent-refined heavy naphthenic : 72h-NOErL(Pseudokirchneriella subcapitata) >=100 mg/L (OECD TG 201) (ECHA)
- Polyisobutylene : Not available
- 12-Hydroxyoctadecanoic acid monolithium salt : 72h-NOELR(Raphidocelis subcapitata) > 160 mg/L (read across: 20336-96-3) (OECD TG 201, GLP) (ECHA)
- Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts : Not available
- Amines, alkyl(C=10~16), reaction products with alkanol(C=5~9), phosphorus oxide(P2O5), phosphorus sulfide(P2S5) and propylene oxide : Not available
- Mineral Oil(Mixture) : Not available
- Dilithium tetraborate : 72h-NOErC = 32 mg/L (OECD TG 201, GLP) (ECHA)
- (Z)-N-9-octadecenylpropane-1,3-diamine : 72h-ErC10(Desmodesmus subspicatus) = 0.188 mg/L (OECD TG 201, GLP) (ECHA)

2) Persistence and degradability

○ **Persistence**

- Distillates (petroleum), hydrotreated heavy paraffinic : This substance is UVCB, so it is not applicable. (ECHA)
- Distillates, petroleum, solvent-refined heavy naphthenic : log Kow = 6.13 (experimental) (EPISUITE)
- Polyisobutylene : Not available
- 12-Hydroxyoctadecanoic acid monolithium salt : log Kow = 2.60 (estimated) (EPISUITE)
- Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts : log Kow = 0.69 (21.8 °C; pH:ca. 5) (OECD TG 107, GLP) (ECHA)
- Amines, alkyl(C=10~16), reaction products with alkanol(C=5~9), phosphorus oxide(P2O5), phosphorus sulfide(P2S5) and propylene oxide : Not available
- Mineral Oil(Mixture) : Not available
- Dilithium tetraborate : Not available
- (Z)-N-9-octadecenylpropane-1,3-diamine : log Kow = 0.03 (OECD TG 123) (ECHA)

○ **Degradability**

- Distillates (petroleum), hydrotreated heavy paraffinic : The chemical constituents that comprise the other lubricant base oils category consist entirely of carbon and hydrogen and do not contain hydrolyzable groups. As such, they have a very low potential to hydrolyze. Therefore, this degradative process will not contribute to their removal from the environment. (ECHA)
- Distillates, petroleum, solvent-refined heavy naphthenic : Not available
- Polyisobutylene : Not available
- 12-Hydroxyoctadecanoic acid monolithium salt : Not available
- Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts : Not available
- Amines, alkyl(C=10~16), reaction products with alkanol(C=5~9), phosphorus oxide(P2O5), phosphorus

sulfide(P2S5) and propylene oxide : Not available
- Mineral Oil(Mixture) : Not available
- Dilithium tetraborate : Not available
- (Z)-N-9-octadecenylpropane-1,3-diamine : Not available

3) Bioaccumulative potential

○ **Bioaccumulation**

- Distillates (petroleum), hydrotreated heavy paraffinic : This substance is UVCB, so it is not applicable. (ECHA)
- Distillates, petroleum, solvent-refined heavy naphthenic : BCF = 5147 (estimated) (EPISUITE)
- Polyisobutylene : Not available
- 12-Hydroxyoctadecanoic acid monolithium salt : BCF=2-8 (ECHA)
- Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts : BCF=140.1 (estimated) (EPISUITE)
- Amines, alkyl(C=10~16), reaction products with alkanol(C=5~9), phosphorus oxide(P2O5), phosphorus sulfide(P2S5) and propylene oxide : Not available
- Mineral Oil(Mixture) : Not available
- Dilithium tetraborate : Not available
- (Z)-N-9-octadecenylpropane-1,3-diamine : BCF = 1977 (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)
- Distillates, petroleum, solvent-refined heavy naphthenic : 31 % degradation after 28d; not readily biodegradable (OECD TG 301F, GLP) (ECHA)
- Polyisobutylene : Not available
- 12-Hydroxyoctadecanoic acid monolithium salt : biodegraded 78% by day 28 based on BOD; readily biodegradable (OECD TG 301C, GLP) (ECHA)
- Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts : 1.5 % degradation after 28 days; not readily biodegradable (OECD TG 301B, GLP) (ECHA)
- Amines, alkyl(C=10~16), reaction products with alkanol(C=5~9), phosphorus oxide(P2O5), phosphorus sulfide(P2S5) and propylene oxide : Not available
- Mineral Oil(Mixture) : Not available
- Dilithium tetraborate : Not available
- (Z)-N-9-octadecenylpropane-1,3-diamine : 66% degradation after 28d; readily biodegradable (OECD TG 301D, GLP) (ECHA)

4) Mobility in soil

- Distillates (petroleum), hydrotreated heavy paraffinic : Not available
- Distillates, petroleum, solvent-refined heavy naphthenic : Koc=208800 (EPISUITE)
- Polyisobutylene : Not available
- 12-Hydroxyoctadecanoic acid monolithium salt : Koc=15.22 (estimated) (EPISUITE)
- Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts : Koc=1491000 (EPISUITE)
- Amines, alkyl(C=10~16), reaction products with alkanol(C=5~9), phosphorus oxide(P2O5), phosphorus sulfide(P2S5) and propylene oxide : Not available
- Mineral Oil(Mixture) : Not available
- Dilithium tetraborate : Not available
- (Z)-N-9-octadecenylpropane-1,3-diamine : Koc = 98090 (estimated) (ECHA)

5) Hazard to the ozone layer

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Distillates, petroleum, solvent-refined heavy naphthenic : Not applicable
- Polyisobutylene : Not applicable
- 12-Hydroxyoctadecanoic acid monolithium salt : Not applicable
- Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts : Not applicable
- Amines, alkyl(C=10~16), reaction products with alkanol(C=5~9), phosphorus oxide(P2O5), phosphorus sulfide(P2S5) and propylene oxide : Not available
- Mineral Oil(Mixture) : Not available
- Dilithium tetraborate : Not applicable
- (Z)-N-9-octadecenylpropane-1,3-diamine : Not applicable

6) Other adverse effects

- Distillates (petroleum), hydrotreated heavy paraffinic : Not available
- Distillates, petroleum, solvent-refined heavy naphthenic : Not available
- Polyisobutylene : Not available
- 12-Hydroxyoctadecanoic acid monolithium salt : Not available
- Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts : Not available
- Amines, alkyl(C=10~16), reaction products with alkanol(C=5~9), phosphorus oxide(P2O5), phosphorus sulfide(P2S5) and propylene oxide : Not available
- Mineral Oil(Mixture) : Not available
- Dilithium tetraborate : Not available
- (Z)-N-9-octadecenylpropane-1,3-diamine : Not available

13. DISPOSAL CONSIDERATIONS

1) Disposal methods

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

2) Special precaution for disposal

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

14. TRANSPORT INFORMATION

1) UN No.

- Not applicable

2) Proper shipping name

- Not applicable

3) Transport hazard class(es)

- Not applicable

4) Packing group

- Not applicable

5) Marine pollutant

- Not applicable

6) Special safety response for transportation or transportation measure

- Types of Emergency Measures in Case of Fire : Not applicable

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

15. REGULATORY INFORMATION

EINECS(or ELINCS)

- Distillates (petroleum), hydrotreated heavy paraffinic : European EINECS phase-in substance
- Distillates, petroleum, solvent-refined heavy naphthenic : European EINECS phase-in substance
- Polyisobutylene : Not applicable
- 12-Hydroxyoctadecanoic acid monolithium salt : European EINECS phase-in substance
- Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts : European EINECS phase-in substance
- Amines, alkyl(C=10~16), reaction products with alkanol(C=5~9), phosphorus oxide(P2O5), phosphorus sulfide(P2S5) and propylene oxide : Not applicable
- Mineral Oil(Mixture) : Not applicable
- Dilithium tetraborate : European EINECS phase-in substance
- (Z)-N-9-octadecenylpropane-1,3-diamine : European EINECS phase-in substance

EU CLP (CLASSIFICATION) - PRODUCT : Not applicable

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Distillates, petroleum, solvent-refined heavy naphthenic : Not applicable
- Polyisobutylene : Not applicable
- 12-Hydroxyoctadecanoic acid monolithium salt : Not applicable
- Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts : Not applicable
- Amines, alkyl(C=10~16), reaction products with alkanol(C=5~9), phosphorus oxide(P2O5), phosphorus sulfide(P2S5) and propylene oxide : Not applicable
- Mineral Oil(Mixture) : Not applicable
- Dilithium tetraborate : Not applicable
- (Z)-N-9-octadecenylpropane-1,3-diamine : Not applicable

Substances restricted under REACH

- Distillates (petroleum), hydrotreated heavy paraffinic : Substances restricted under REACH
- Distillates, petroleum, solvent-refined heavy naphthenic : Substances restricted under REACH
- Polyisobutylene : Not applicable
- 12-Hydroxyoctadecanoic acid monolithium salt : Not applicable
- Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts : Not applicable
- Amines, alkyl(C=10~16), reaction products with alkanol(C=5~9), phosphorus oxide(P2O5), phosphorus sulfide(P2S5) and propylene oxide : Not applicable
- Mineral Oil(Mixture) : Not applicable
- Dilithium tetraborate : Not applicable
- (Z)-N-9-octadecenylpropane-1,3-diamine : Not applicable

Substances subject to authorization under REACH

REACH SVHC List

Korea

○ **Occupational Safety and Health Act**

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

- Polyisobutylene : Not applicable
- 12-Hydroxyoctadecanoic acid monolithium salt : Not applicable
- Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts : Hazardous substance subject to control
- Amines, alkyl(C=10~16), reaction products with alkanol(C=5~9), phosphorus oxide(P2O5), phosphorus sulfide(P2S5) and propylene oxide : Not applicable
- Mineral Oil(Mixture) : Not applicable
- Dilithium tetraborate : Not applicable
- (Z)-N-9-octadecenylpropane-1,3-diamine : Not applicable

○ **K-REACH**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Distillates, petroleum, solvent-refined heavy naphthenic : Not applicable
- Polyisobutylene : Not applicable
- 12-Hydroxyoctadecanoic acid monolithium salt : Not applicable
- Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts : Not applicable
- Amines, alkyl(C=10~16), reaction products with alkanol(C=5~9), phosphorus oxide(P2O5), phosphorus sulfide(P2S5) and propylene oxide : Not applicable
- Mineral Oil(Mixture) : Not applicable
- Dilithium tetraborate : Not applicable
- (Z)-N-9-octadecenylpropane-1,3-diamine : Not applicable

○ **Chemical Control Act in Korea**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Distillates, petroleum, solvent-refined heavy naphthenic : Not applicable
- Polyisobutylene : Not applicable
- 12-Hydroxyoctadecanoic acid monolithium salt : Not applicable
- Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts : List of substance subjected to the PRTR
- Amines, alkyl(C=10~16), reaction products with alkanol(C=5~9), phosphorus oxide(P2O5), phosphorus sulfide(P2S5) and propylene oxide : Not applicable
- Mineral Oil(Mixture) : Not applicable
- Dilithium tetraborate : List of substance subjected to the PRTR
- (Z)-N-9-octadecenylpropane-1,3-diamine : Not applicable

○ **Safety Control of Dangerous Substances Act**

- Distillates (petroleum), hydrotreated heavy paraffinic : Dangerous substance
- Distillates, petroleum, solvent-refined heavy naphthenic : Not applicable
- Polyisobutylene : Not applicable
- 12-Hydroxyoctadecanoic acid monolithium salt : Not applicable
- Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts : Not applicable
- Amines, alkyl(C=10~16), reaction products with alkanol(C=5~9), phosphorus oxide(P2O5), phosphorus sulfide(P2S5) and propylene oxide : Not applicable
- Mineral Oil(Mixture) : Not applicable
- Dilithium tetraborate : Not applicable
- (Z)-N-9-octadecenylpropane-1,3-diamine : Not applicable

U.S.A

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

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Distillates, petroleum, solvent-refined heavy naphthenic : Not applicable
- Polyisobutylene : Not applicable
- 12-Hydroxyoctadecanoic acid monolithium salt : Not applicable
- Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts : Not applicable
- Amines, alkyl(C=10~16), reaction products with alkanol(C=5~9), phosphorus oxide(P2O5), phosphorus sulfide(P2S5) and propylene oxide : Not applicable
- Mineral Oil(Mixture) : Not applicable
- Dilithium tetraborate : Not applicable
- (Z)-N-9-octadecenylpropane-1,3-diamine : Not applicable

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

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Distillates, petroleum, solvent-refined heavy naphthenic : Not applicable
- Polyisobutylene : Not applicable
- 12-Hydroxyoctadecanoic acid monolithium salt : Not applicable
- Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts : Not applicable
- Amines, alkyl(C=10~16), reaction products with alkanol(C=5~9), phosphorus oxide(P2O5), phosphorus sulfide(P2S5) and propylene oxide : Not applicable
- Mineral Oil(Mixture) : Not applicable
- Dilithium tetraborate : Not applicable
- (Z)-N-9-octadecenylpropane-1,3-diamine : Not applicable

○ **CERCLA Section 302 regulation**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Distillates, petroleum, solvent-refined heavy naphthenic : Not applicable
- Polyisobutylene : Not applicable
- 12-Hydroxyoctadecanoic acid monolithium salt : Not applicable
- Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts : Not applicable
- Amines, alkyl(C=10~16), reaction products with alkanol(C=5~9), phosphorus oxide(P2O5), phosphorus sulfide(P2S5) and propylene oxide : Not applicable
- Mineral Oil(Mixture) : Not applicable
- Dilithium tetraborate : Not applicable
- (Z)-N-9-octadecenylpropane-1,3-diamine : Not applicable

○ **CERCLA Section 304 regulation**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Distillates, petroleum, solvent-refined heavy naphthenic : Not applicable
- Polyisobutylene : Not applicable
- 12-Hydroxyoctadecanoic acid monolithium salt : Not applicable
- Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts : Not applicable
- Amines, alkyl(C=10~16), reaction products with alkanol(C=5~9), phosphorus oxide(P2O5), phosphorus sulfide(P2S5) and propylene oxide : Not applicable
- Mineral Oil(Mixture) : Not applicable
- Dilithium tetraborate : Not applicable
- (Z)-N-9-octadecenylpropane-1,3-diamine : Not applicable

○ **CERCLA Section 313 regulation**

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

- Distillates, petroleum, solvent-refined heavy naphthenic : Not applicable
- Polyisobutylene : Not applicable
- 12-Hydroxyoctadecanoic acid monolithium salt : Not applicable
- Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts : Not applicable
- Amines, alkyl(C=10~16), reaction products with alkanol(C=5~9), phosphorus oxide(P2O5), phosphorus sulfide(P2S5) and propylene oxide : Not applicable
- Mineral Oil(Mixture) : Not applicable
- Dilithium tetraborate : Not applicable
- (Z)-N-9-octadecenylpropane-1,3-diamine : Not applicable

Interntional Convention on Environment

○ **Rotterdam Convention list**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Distillates, petroleum, solvent-refined heavy naphthenic : Not applicable
- Polyisobutylene : Not applicable
- 12-Hydroxyoctadecanoic acid monolithium salt : Not applicable
- Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts : Not applicable
- Amines, alkyl(C=10~16), reaction products with alkanol(C=5~9), phosphorus oxide(P2O5), phosphorus sulfide(P2S5) and propylene oxide : Not applicable
- Mineral Oil(Mixture) : Not applicable
- Dilithium tetraborate : Not applicable
- (Z)-N-9-octadecenylpropane-1,3-diamine : Not applicable

○ **Stockholm Convention list**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Distillates, petroleum, solvent-refined heavy naphthenic : Not applicable
- Polyisobutylene : Not applicable
- 12-Hydroxyoctadecanoic acid monolithium salt : Not applicable
- Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts : Not applicable
- Amines, alkyl(C=10~16), reaction products with alkanol(C=5~9), phosphorus oxide(P2O5), phosphorus sulfide(P2S5) and propylene oxide : Not applicable
- Mineral Oil(Mixture) : Not applicable
- Dilithium tetraborate : Not applicable
- (Z)-N-9-octadecenylpropane-1,3-diamine : Not applicable

○ **Montreal Protocol list**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Distillates, petroleum, solvent-refined heavy naphthenic : Not applicable
- Polyisobutylene : Not applicable
- 12-Hydroxyoctadecanoic acid monolithium salt : Not applicable
- Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts : Not applicable
- Amines, alkyl(C=10~16), reaction products with alkanol(C=5~9), phosphorus oxide(P2O5), phosphorus sulfide(P2S5) and propylene oxide : Not applicable
- Mineral Oil(Mixture) : Not applicable
- Dilithium tetraborate : Not applicable
- (Z)-N-9-octadecenylpropane-1,3-diamine : Not applicable

National Inventory

○ **Korea**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Distillates, petroleum, solvent-refined heavy naphthenic : Not applicable
- Polyisobutylene : Not applicable
- 12-Hydroxyoctadecanoic acid monolithium salt : Not applicable
- Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts : Not applicable
- Amines, alkyl(C=10~16), reaction products with alkanol(C=5~9), phosphorus oxide(P2O5), phosphorus sulfide(P2S5) and propylene oxide : Not applicable
- Mineral Oil(Mixture) : Not applicable
- Dilithium tetraborate : Not applicable
- (Z)-N-9-octadecenylpropane-1,3-diamine : Not applicable

○ **U.S.A**

- Distillates (petroleum), hydrotreated heavy paraffinic : US TSCA phase-in substance
- Distillates, petroleum, solvent-refined heavy naphthenic : US TSCA phase-in substance
- Polyisobutylene : US TSCA phase-in substance
- 12-Hydroxyoctadecanoic acid monolithium salt : US TSCA phase-in substance
- Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts : US TSCA phase-in substance
- Amines, alkyl(C=10~16), reaction products with alkanol(C=5~9), phosphorus oxide(P2O5), phosphorus sulfide(P2S5) and propylene oxide : Not applicable
- Mineral Oil(Mixture) : Not applicable
- Dilithium tetraborate : US TSCA phase-in substance
- (Z)-N-9-octadecenylpropane-1,3-diamine : US TSCA phase-in substance

○ **China**

- Distillates (petroleum), hydrotreated heavy paraffinic : China phase-in substance
- Distillates, petroleum, solvent-refined heavy naphthenic : China phase-in substance
- Polyisobutylene : China phase-in substance
- 12-Hydroxyoctadecanoic acid monolithium salt : China phase-in substance
- Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts : China phase-in substance
- Amines, alkyl(C=10~16), reaction products with alkanol(C=5~9), phosphorus oxide(P2O5), phosphorus sulfide(P2S5) and propylene oxide : Not applicable
- Mineral Oil(Mixture) : Not applicable
- Dilithium tetraborate : China phase-in substance
- (Z)-N-9-octadecenylpropane-1,3-diamine : China phase-in substance

○ **Japan**

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Distillates, petroleum, solvent-refined heavy naphthenic : Not applicable
- Polyisobutylene : Japan ENCS phase-in substance
- 12-Hydroxyoctadecanoic acid monolithium salt : Japan ENCS phase-in substance
- Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts : Japan ENCS phase-in substance
- Amines, alkyl(C=10~16), reaction products with alkanol(C=5~9), phosphorus oxide(P2O5), phosphorus sulfide(P2S5) and propylene oxide : Not applicable
- Mineral Oil(Mixture) : Not applicable
- Dilithium tetraborate : Japan ENCS phase-in substance
- (Z)-N-9-octadecenylpropane-1,3-diamine : 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**

- 8

○ **Date of last revision**

- 2026-02-20

○ **Last Revision History**

- English revision

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.