To Our Customers:

The attached Safety Data Sheet (SDS) was prepared by the vendor of the product you purchased through one of our divisions. We used the manufacturer's electronic document directly or scanned a paper copy and generated a file for our automated SDS delivery system.

All statements, technical information, and recommendations contained therein are solely that of the manufacturer of the product. We at Zep Inc. did not verify the accuracy and completeness of the statements and do not warrantee or guarantee the information. We provide vendor SDSs to assist our customers in their compliance efforts. The attached document is in compliance with one of the respective country regulatory requirements noted below:

The OSHA Hazard Communication Standard (in the United States)
The Hazardous Products Regulations (in Canada)

We made every effort to deliver all of the information prepared by the manufacturer. We cannot anticipate all conditions under which this information will be used. If you have any questions about the statements on the SDS, please contact the company shown on the document.

Zep Inc. assumes no liability or responsibility for loss or damage resulting from the improper use or handling of this product, from incompatible product combinations, or from the failure to follow instructions, warnings, and advisories in the manufacturer's product label and Safety Data Sheet.

Sincerely,

Product Stewardship Team
Zep Inc.

SDS(Safety Data Sheet)

Product	GS MTF HD 70W		
MSDS Number	List No.	Issuing date	Last revised date
-	LB2697	2013-07-30	2021-09-06

1. IDENTIFICATION

1) Product name

GS MTF HD 70W

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 +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
GS MTF HD 70W	0	1	0

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical name	Trade names and Synonyms	CAS No.	EC No.	Contain Ratio(%)
1-Decene, homopolymer, hydrogenated		68037-01-4		78 ~ 88
Alkyl ester polymer				3 ~ 12
Distillates (petroleum), hydrotreated heavy paraffinic	Emulsifiable oil	64742-54-7	265-157-1	2 ~ 10
Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts		84605-29-8	283-392-8	1 ~ 5

4. FIRST AID MEASURES

1) Eye contact

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

2) Skin contact

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

3) Inhalation

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

4) Ingestion

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

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

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

5. FIRE FIGHTING MEASURES

1) Suitable (and unsuitable) extinguishing media

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

2) Special hazards arising from the substance or mixture

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

3) Special protective equipment and precautions for firefighters

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

6. ACCIDENTAL RELEASE MEASURES

1) Health considerations and protective equipment

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

2) Environmental precautions

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

3) Methods and material for containment and cleaning up

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

7. HANDLING AND STORAGE

1) Precautions for safe

- Wash ... thoroughly after handling.

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)
1-Decene, homopolymer, hydrogenated	Not available	Not available	Not available	Not available
Alkyl ester polymer	Not available	Not available	Not available	Not available
Distillates (petroleum), hydrotreated heavy paraffinic	Not available	TWA 5 mg/m3, Inhalable particulate matter(Mineral oil, Pure, highly and severely refined)	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

2) Appropriate engineering controls

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

3) Personal protection equipment

○ **Respiratory protection**

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

○ **Eye protection**

- Wear breathable safety goggles to protect from material causing eye irritation or other disorder.
- An eye wash unit and safety shower station should be available nearby work place.
- In case of direct exposure or potential exposure to the substance, wear safety glasses for chemicals approved in the country.

○ **Hand protection**

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

○ **Body protection**

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

9. PHYSICAL AND CHEMICAL PROPERTIES

Item	Input Value
Apperance	Liquid
Color	No Data
Smell	petrochemical odor
Smell Threshold	No Data
pH (Numerical value)	No Data
Melting/Freezing Point	No Data
Boilling Point	No Data
Flash Point	220 ℃
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	0.84
Distribution Coefficient	No Data
SelfIgnition Temperature	No Data
Pyrolysis Temperature	No Data
Viscosity	26 mm2/s (at 40℃)
Molecular Weight	No Data

10. STABILITY AND REACTIVITY

1) Chemical Stability and hazardous reactivity

- Stable under normal temperatures and pressures.
- Containers may explode when heated.

- Some may burn but none ignite readily.

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

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

4) Hazardous decomposition products - Not available

11. TOXICOLOGICAL INFORMATION

1) Information on the likely routes of exposures

○ **Inhalation**

- No inhalation effects through respiratory system.

○ **Skin contact**

- No effect on skin contact.

○ **Eye contact**

- No effect on eye contact.

○ **Ingestion**

- No ingestion effect through mouth.

2) Health hazard information

○ **Acute toxicity**

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

- 1-Decene, homopolymer, hydrogenated : rat(male/female); LD50 > 5000 ㎎/kg bw, no deaths (OECD TG 423, GLP) (ECHA)
- Alkyl ester polymer : Not available
- 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)
- 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)

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

- 1-Decene, homopolymer, hydrogenated : rat(male/female); LD50 > 2000 ㎎/kg bw, no deaths (OECD TG 402, GLP) (read across: Oronite XS 1010) (ECHA)
- Alkyl ester polymer : Not available
- 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)
- 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)

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

- 1-Decene, homopolymer, hydrogenated : Not applicable
- Alkyl ester polymer : Not available
- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not applicable

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

- 1-Decene, homopolymer, hydrogenated : Not available

- Alkyl ester polymer : Not available
- Distillates (petroleum), hydrotreated heavy paraffinic : rat(male/female), LC50 > 5.53 mg/L air /4h No deaths (read-across: MRD-87-102) (OECD TG 403)(ECHA)
- 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)

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

- 1-Decene, homopolymer, hydrogenated : rat(male/female); inhalation: aerosol; LC50 > 5.2 mg/L air /4h, no deaths (OECD TG 403, GLP) (ECHA)
- Alkyl ester polymer : Not available
- Distillates (petroleum), hydrotreated heavy paraffinic : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not available

○ Skin corrosion/Irritation : Not classified

- 1-Decene, homopolymer, hydrogenated	:	rabbit; not irritating (OECD TG 404, GLP) (ECHA)
- Alkyl ester polymer	:	Not available
- 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)
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts	:	rabbit; irritant (OECD TG 404, GLP) (ECHA)

○ Serious eye damage/irritation : Not classified

- 1-Decene, homopolymer, hydrogenated	:	rabbit; not irritating (OECD TG 405, GLP) (ECHA)
- Alkyl ester polymer	:	Not available
- Distillates (petroleum), hydrotreated heavy paraffinic	:	Solvent dewaxed light paraffinic oil is not considered to be an ocular irritant. (read-aross: 64742-56-9) (OECD TG 405, GLP)(ECHA)
- 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)

○ Respiratory sensitization : Not classified

- 1-Decene, homopolymer, hydrogenated	:	Not available
- Alkyl ester polymer	:	Not available
- Distillates (petroleum), hydrotreated heavy paraffinic	:	Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts	:	Not available

○ Skin sensitization : Not classified

- 1-Decene, homopolymer, hydrogenated : guinea pig; not sensitising (OECD TG 406, GLP) (ECHA)
- Alkyl ester polymer : Not available
- Distillates (petroleum), hydrotreated heavy paraffinic : Under the conditions of the test, Solvent dewaxed light paraffinic oil is considered non-sensitizing. (read-aross: 64742-56-9) (OECD TG 406, GLP)(ECHA)
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : guinea pig; not sensitising (OECD TG 406, GLP) (ECHA)

○ **Carcinogenicity : Not classified**

- 1-Decene, homopolymer, hydrogenated : IARC, EU CLP 1272/2008, OSHA, ACGIH, US EPA IRIS, NTP : not listed
- Alkyl ester polymer : Not available
- 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)
- 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

○ **Germ cell mutagenicity : Not classified**

- 1-Decene, homopolymer, hydrogenated : In vitro Bacterial Reverse Mutation Assay : negative (OECD TG 471, GLP) (ECHA)
  In vivo Mammalian Erythrocyte Micronucleus Test : negative (OECD TG 474, GLP) (read across: Oronite XS 101) (ECHA)
- Alkyl ester polymer : Not available
- Distillates (petroleum), hydrotreated heavy paraffinic : In vitro(CHO cell) Chromosome Aberration Test: negative (read-aross : 64742-53-6) (OECD TG 473, GLP)
  In vivo (mouse micronucleus assay) : negative (read-across : SDPO = solvent-extracted, dewaxed paraffin oil) (OECD TG 474)(ECHA)
- 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)

○ **Reproductive toxicity : Not classified**

- 1-Decene, homopolymer, hydrogenated : rat(male/female); 0, 100, 500, or 1000 mg/kg/day; one-generation reproductive toxicity; Ethylflo 166 did not appear to have any effects on reproduction. (OECD TG 415, GLP) (ECHA)
- Alkyl ester polymer : Not available
- Distillates (petroleum), hydrotreated heavy paraffinic : 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)
- Phosphorodithioic acid : EC 283-392-8 has not been tested for reproduction toxicity, however

mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts		experimental data on structurally related substances EC 270-608-0 was available and suitable for read-across. Based on this study, NOAEL(reproductive fertility, neonatal toxicity)=160mg/kg/day. (read-across: 68457-79-4) (OECD TG 422) (ECHA)

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

- 1-Decene, homopolymer, hydrogenated	:	oral; rat(male/female); Clinical observations included transient mild depression and oily hair coats. Animals appeared grossly normal by day 5 post-exposure. LD50 > 5000 ㎎/㎏ bw, no deaths (OECD TG 423, GLP) (ECHA) dermal; rat(male/female); Necropsy at the end of the 14 day observation period revealed a dilated pelvis in the kidney of one male rat treated at 2000 mg/kg, but this was not considered to be a treatment-related. LD50 > 2000 ㎎/㎏ bw, no deaths (OECD TG 402, GLP) (read across: Oronite XS 1010) (ECHA) inhalation: aerosol; rat(male/female); No treatment-related changes in pathology were observed. LC50 > 5.2 mg/L air /4h, no deaths (OECD TG 403, GLP) (ECHA)
- Alkyl ester polymer	:	Not available
- 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)
- 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)

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

- 1-Decene, homopolymer, hydrogenated	:	oral; rat(male/female); 91 days; 0, 100, 500, or 1000 mg/kg/day; The subchronic NOAEL for ethylflo 166 in rats is 1000 mg/kg/day. (OECD TG 408, GLP) (ECHA)
- Alkyl ester polymer	:	Not available
- Distillates (petroleum), hydrotreated heavy paraffinic	:	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) 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. (read-aross : 64742-70-7) (OECD TG 412)(ECHA)
- 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)

○ **Aspiration hazard : Not classified**

- 1-Decene, homopolymer, hydrogenated : 31.0 mm2/s (40°C) (ECHA) & hydrocarbons
- Alkyl ester polymer : Not available
- Distillates (petroleum), hydrotreated heavy paraffinic : Viscosity: 73.9 mm2/s (40°C)(ECHA) & hydrocarbons
- 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

12. ECOLOGICAL INFORMATION

1) Ecotoxicity

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

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

Fish

- 1-Decene, homopolymer, hydrogenated : Water solubility:< 0.1 mg/L (ECHA), 96h-LL50(Oncorhynchus mykiss) > 1000 mg/L (US EPA, GLP) (ECHA); No toxic effects up to the limit of water solubility
- Alkyl ester polymer : Not available
- Distillates (petroleum), hydrotreated heavy paraffinic : 96h-LL50(Pimephales promelas) > 100 mg/L (OECD TG 203, GLP)(ECHA)
- 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)

Invertebrates

- 1-Decene, homopolymer, hydrogenated : Water solubility:< 0.1 mg/L (ECHA), 48h-EL50(Daphnia magna) > 1000 mg/L (OECD TG 202, GLP) (ECHA); No toxic effects up to the limit of water solubility
- Alkyl ester polymer : Not available
- Distillates (petroleum), hydrotreated heavy paraffinic : 48h-EL50(Daphnia magna) > 10,000 mg/L(read across : 64742-53-6 or 64741-97-5) (OECD TG 202)(ECHA)
- 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)

Aquatic algae

- 1-Decene, homopolymer, hydrogenated : Water solubility:< 0.1 mg/L (ECHA), 72h-ErL50(Scenedesmus capricornutum) > 1000 mg/L (OECD TG 201, GLP) (ECHA); No toxic effects up to the limit of water solubility
- Alkyl ester polymer : Not available
- Distillates (petroleum), hydrotreated heavy paraffinic : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : 72h-ErL50(Desmodesmus subspicatus)=24 mg/L (OECD TG 201, GLP) (ECHA)

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

Fish

- 1-Decene, homopolymer, hydrogenated : Not available
- Alkyl ester polymer : Not available
- Distillates (petroleum), hydrotreated heavy paraffinic : Not available

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

Invertebrates

- 1-Decene, homopolymer, hydrogenated : 21d-NOELR(Daphnia magna) = 125 mg/L (OECD TG 211, GLP) (ECHA)
- Alkyl ester polymer : Not available
- Distillates (petroleum), hydrotreated heavy paraffinic : 21d-NOEL(Daphnia magna)=10 mg/L(OECD TG 211, GLP)(ECHA)
- 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)

Aquatic algae

- 1-Decene, homopolymer, hydrogenated : 72h-NOErLR(Scenedesmus capricornutum) = 1000 mg/L (OECD TG 201, GLP) (ECHA)
- Alkyl ester polymer : Not available
- Distillates (petroleum), hydrotreated heavy paraffinic : 72h-NOErL(Pseudokirchnerella subcapitata) >= 100 mg/L (OECD TG 201) (ECHA)
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not available

2) Persistence and degradability

○ **Persistence**

- 1-Decene, homopolymer, hydrogenated : log Kow > 6.5 (20 °C; pH:7) (OECD TG 117, GLP) (ECHA)
- Alkyl ester polymer : Not available
- Distillates (petroleum), hydrotreated heavy paraffinic : This substance is UVCB, so not applicable.(ECHA)
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : log Kow = 0.56(ECHA)

○ **Degradability**

- 1-Decene, homopolymer, hydrogenated : Not available
- Alkyl ester polymer : Not available
- Distillates (petroleum), hydrotreated heavy paraffinic : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not available

3) Bioaccumulative potential

○ **Bioaccumulation**

- 1-Decene, homopolymer, hydrogenated : Members of this category are not expected to be bioaccumulative. (ECHA)
- Alkyl ester polymer : Not available
- Distillates (petroleum), hydrotreated heavy paraffinic : This substance is UVCB, so not applicable.(ECHA)
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not available

○ **Biodegradation**

- 1-Decene, homopolymer, hydrogenated : 2 % degradation after 28d; Not readily biodegradable (OECD TG 301D, GLP) (ECHA)
- Alkyl ester polymer : Not available
- Distillates (petroleum), hydrotreated heavy paraffinic : 31% degradation after 28 days (OECD TG 301F) (read across: Solvent Neutral 600 Base Oil (MRD-94-981)) (OECD TG 301F, GLP)(ECHA)
- 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)

4) Mobility in soil

- 1-Decene, homopolymer, hydrogenated : Not available

- Alkyl ester polymer : Not available
- Distillates (petroleum), hydrotreated heavy paraffinic : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Koc=1017000

5) Hazard to the ozone layer

- 1-Decene, homopolymer, hydrogenated : Not applicable
- Alkyl ester polymer : Not available
- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not applicable

6) Other adverse effects

- 1-Decene, homopolymer, hydrogenated : Not available
- Alkyl ester polymer : Not available
- Distillates (petroleum), hydrotreated heavy paraffinic : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : 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)

- 1-Decene, homopolymer, hydrogenated : Not applicable
- Alkyl ester polymer : Not applicable
- Distillates (petroleum), hydrotreated heavy paraffinic : European EINECS phase-in substance

- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : European EINECS phase-in substance

EU CLP (CLASSIFICATION) - PRODUCT : Not applicable

- 1-Decene, homopolymer, hydrogenated : Not applicable
- Alkyl ester polymer : Not applicable
- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not applicable

Substances restricted under REACH

- 1-Decene, homopolymer, hydrogenated : Not applicable
- Alkyl ester polymer : Not applicable
- Distillates (petroleum), hydrotreated heavy paraffinic : Substances restricted under REACH
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not applicable

Substances subject to authorization under REACH

REACH SVHC List

Korea

○ **Occupational Safety and Health Act**

- 1-Decene, homopolymer, hydrogenated : Not applicable
- Alkyl ester polymer : Not applicable
- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Hazardous substance subject to control

○ **K-REACH**

- 1-Decene, homopolymer, hydrogenated : Not applicable
- Alkyl ester polymer : Not applicable
- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not applicable

○ **Chemical Control Act in Korea**

- 1-Decene, homopolymer, hydrogenated : Not applicable
- Alkyl ester polymer : Not applicable
- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : List of substance subjected to the PRTR

○ **Safety Control of Dangerous Substances Act**

- 1-Decene, homopolymer, hydrogenated : Not applicable
- Alkyl ester polymer : Not applicable
- Distillates (petroleum), hydrotreated heavy paraffinic : Dangerous substance
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not applicable

U.S.A

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

- 1-Decene, homopolymer, hydrogenated : Not applicable
- Alkyl ester polymer : Not applicable
- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not applicable

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

- 1-Decene, homopolymer, hydrogenated : Not applicable
- Alkyl ester polymer : Not applicable
- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not applicable

○ **CERCLA Section 302 regulation**

- 1-Decene, homopolymer, hydrogenated : Not applicable
- Alkyl ester polymer : Not applicable
- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not applicable

○ **CERCLA Section 304 regulation**

- 1-Decene, homopolymer, hydrogenated : Not applicable
- Alkyl ester polymer : Not applicable
- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not applicable

○ **CERCLA Section 313 regulation**

- 1-Decene, homopolymer, hydrogenated : Not applicable
- Alkyl ester polymer : Not applicable
- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not applicable

Interntional Convention on Environment

○ **Rotterdam Convention list**

- 1-Decene, homopolymer, hydrogenated : Not applicable
- Alkyl ester polymer : Not applicable
- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not applicable

○ **Stockholm Convention list**

- 1-Decene, homopolymer, hydrogenated : Not applicable
- Alkyl ester polymer : Not applicable
- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not applicable

○ **Montreal Protocol list**

- 1-Decene, homopolymer, hydrogenated : Not applicable
- Alkyl ester polymer : Not applicable
- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not applicable

National Inventory

○ **Korea**

- 1-Decene, homopolymer, hydrogenated : Not applicable
- Alkyl ester polymer : Not applicable
- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not applicable

○ **U.S.A**

- 1-Decene, homopolymer, hydrogenated : US TSCA phase-in substance
- Alkyl ester polymer : Not applicable
- Distillates (petroleum), hydrotreated heavy paraffinic : 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

○ **China**

- 1-Decene, homopolymer, hydrogenated : China phase-in substance
- Alkyl ester polymer : Not applicable
- Distillates (petroleum), hydrotreated heavy paraffinic : China phase-in substance
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : China phase-in substance

○ **Japan**

- 1-Decene, homopolymer, hydrogenated : Not applicable
- Alkyl ester polymer : Not applicable
- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not applicable

16. OTHER INFORMATION

1) Reference

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

2) Issue Date

- 2013-07-30

3) Revision number and Last date revised

○ **Number of revised**

- 6

○ **Date of last revision**

- 2020-09-28

○ **Last Revision History**

- English version MSDS

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.