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&DCTF 70W		
MSDS Number	List No.	Issuing date	Last revised date
-	LB3747	2023-05-04	2023-05-04

1. IDENTIFICATION

1) Product name

GS MTF&DCTF 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

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
(04300-KX1BA) Mobis MTF&DCTF 70W	2	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		80
Distillates (petroleum), hydrotreated heavy paraffinic	Emulsifiable oil	64742-54-7	265-157-1	3
Unknown				15
Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts		84605-29-8	283-392-8	1.5
Phosphonic acid dibutyl ester		1809-19-4	217-316-1	0.5

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.

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

○ **Eye protection**
- An eye wash unit and safety shower station should be available nearby work place.
- Wear breathable safety goggles to protect from vapour state organic material causing eye irritation or other disorder.

○ **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	Liquid
Color	No Data
Smell	No Data
Smell Threshold	No Data
pH (Numerical value)	No Data
Melting/Freezing Point	No Data
Boilling Point	No Data
Flash Point	226 ℃
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	No Data
Distribution Coefficient	No Data
SelfIgnition Temperature	No Data
Pyrolysis Temperature	No Data
Viscosity	25 mm2/s (at 40℃)
Molecular Weight	No Data

10. STABILITY AND REACTIVITY

1) Chemical Stability and
- Can form explosive mixtures at temperatures at or above the flashpoint.

hazardous reactivity	- 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)**

- 1-Decene, homopolymer, hydrogenated : rat(male/female); LD50 > 5000 mg/kg bw, no deaths (OECD TG 423, GLP) (ECHA)
- 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)
- Unknown : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : rat(male/female), LD50 = 4468 mg/kg bw (OECD TG 401) (ECHA)
- Phosphonic acid dibutyl ester : rat(male/female); LD50 > 3000 mg/kg bw (OECD TG 420) (ECHA)

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

- 1-Decene, homopolymer, hydrogenated : rat(male/female); LD50 > 2000 mg/kg bw, no deaths (OECD TG 402, GLP) (read across: Oronite XS 1010) (ECHA)
- 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)
- Unknown : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : rat(male/female), LD50 > 2002 mg/kg bw (OECD TG 402) (ECHA)
- Phosphonic acid dibutyl ester : rabbit(male); LD50 =5000 mg/kg bw (OECD TG 434) (ECHA)

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

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

- Phosphonic acid dibutyl ester : Not applicable

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

- 1-Decene, homopolymer, hydrogenated : 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)
- Unknown : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : rat(male/female), inhalation: vapour, LC50 > 2.3 mg/L 4 hr, no death (OECD TG 403) (ECHA)
- Phosphonic acid dibutyl ester : Not available

*** 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)
- Distillates (petroleum), hydrotreated heavy paraffinic : Not available
- Unknown : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not available
- Phosphonic acid dibutyl ester : Not available

○ Skin corrosion/Irritation : Not classified

- 1-Decene, homopolymer, hydrogenated	:	rabbit; not irritating (OECD TG 404, GLP) (ECHA)
- 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)
- Unknown	:	Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts	:	rabbit; irritant (OECD TG 404, GLP) (ECHA)
- Phosphonic acid dibutyl ester	:	rabbit; irritating (49CFR:173.1200) (ECHA)

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

- 1-Decene, homopolymer, hydrogenated	:	rabbit; not irritating (OECD TG 405, GLP) (ECHA)
- 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)
- Unknown	:	Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts	:	rabbit; Under the conditions of this study, the test material caused ocular irritation that persisted through Day 21. ; irreversible effects on the eye (ECHA)
- Phosphonic acid dibutyl ester	:	rabbit; irritating (ECHA)

○ Respiratory sensitization : Not classified

- 1-Decene, homopolymer, hydrogenated	:	Not available

- Distillates (petroleum), hydrotreated heavy paraffinic : Not available
- Unknown : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not available
- Phosphonic acid dibutyl ester : Not available

○ **Skin sensitization : Not classified**

- 1-Decene, homopolymer, hydrogenated : guinea pig; not sensitising (OECD TG 406, GLP) (ECHA)
- 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)
- Unknown : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : guinea pig; not sensitising (OECD TG 406, GLP) (ECHA)
- Phosphonic acid dibutyl ester : not sensitising (ECHA)

○ **Carcinogenicity : Not classified**

- 1-Decene, homopolymer, hydrogenated : IARC, EU CLP 1272/2008, OSHA, ACGIH, US EPA IRIS, NTP : not listed
- 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)
- Unknown : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : IARC, EU CLP 1272/2008, OSHA, ACGIH, US EPA IRIS, NTP : not listed
- Phosphonic acid dibutyl ester : 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)
- 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)

- Unknown : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : In vitro Bacterial reverse mutation test: negative(OECD TG 471) (ECHA)
In vivo Mammalian Erythrocyte Micronucleus Test: negative (OECD TG 474, GLP) (ECHA)
- Phosphonic acid dibutyl ester : In vitro bacterial reverse mutation assay : negative (OECD TG 471) (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 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)
- 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)
- Unknown : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : EC 283-392-8 has not been tested for reproduction toxicity, however experimental data on structurally related substances EC 270-608-0 was available and suitable for read-across. Based on this study, NOAEL(reproductive fertility, neonatal toxicity)=160mg/kg/day. (read-across: 68457-79-4) (OECD TG 422) (ECHA)
- Phosphonic acid dibutyl ester : rat(male/female); 0, 30, 90 or 270 mg/kg bw/day; NOAEL = 90 mg/kg bw/day. Reproductive parameters (insemination parameters, fertility index, gestation indices, gestation length, prenatal loss, number of implantation sites, macroscopically visible corpora lutea, life birth index, sex ratio, pup birth weight, litter size, pup weight development, viability and lactation of F1 rats) were not affected at 30 and 90 mg/kg bw/day. (OECD TG 421) (ECHA)
rat; developmental toxicity; 0, 300, 1000, 5000 mg/kg bw/day; Some development impairment were recorded in all dosed groups. However, there is no dose related effects. Since there is no statistics on this type of strain, it is not possible to define whether it is a real development problem caused by butanol administration or a simple variation which may be common. (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)

- 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)
- Unknown : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Dermal; rat(male/female), LD50 > 2002 mg/kg bw; Prostration in one animal. No other behavioral anomalies. (OECD TG 402) (ECHA)
- Phosphonic acid dibutyl ester : Not available

○ **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)
- 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)
- Unknown : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : rat(male/female); oral; 0, 10, 40, or 160 mg/kg/day; The oral repeat dose toxicity of an analog substance was evaluated with rats at doses as high as 160 mg/kg/day for up to 52 days. Substance-related toxicity was limited to morbundity, adverse clinical signs, and epithelial hyperplasia, hyperkeratosis, and inflammation of the stomach. NOAEL(systemic toxicity)=160 mg/kg/day (read across: EC 270-608-0) (OECD TG 422, GLP) (ECHA)
- Phosphonic acid dibutyl ester : dermal; Repeated applications to rabbits of 20 ml/kg bw/day for 30 days over a period of 6 weeks produced no fatalities. (ECHA)

○ **Aspiration hazard : Not classified**

- 1-Decene, homopolymer, hydrogenated : 31.0 mm2/s (40°C) (ECHA) & hydrocarbons
- Distillates (petroleum), hydrotreated heavy paraffinic : Viscosity: 73.9 mm2/s (40°C)(ECHA) & hydrocarbons
- Unknown : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Viscosity: 407.6 cSt(40 °C; ASTM D445-97; 2009)(ECHA) & not hydrocarbons

- Phosphonic acid dibutyl ester : > 2.23 - < 2.26 cSt (25°C) (ASTM D445) (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
- Distillates (petroleum), hydrotreated heavy paraffinic : 96h-LL50(Pimephales promelas) > 100 mg/L (OECD TG 203, GLP)(ECHA)
- Unknown : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : 96h-LL50(Oncorhynchus mykiss)=4.5 mg/L (OECD TG 203) (ECHA)
- Phosphonic acid dibutyl ester : 96h-LC50(Danio rerio) > 63.4 mg/l (OECD TG 203, GLP) (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
- 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)
- Unknown : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : 48h-EC50(Daphnia magna)=23 mg/L (OECD TG 202) (ECHA)
- Phosphonic acid dibutyl ester : 48h-IC50(Daphnia magna) = ca. 20.8 mg/l (OECD TG 202, GLP) (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
- Distillates (petroleum), hydrotreated heavy paraffinic : Not available
- Unknown : 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)
- Phosphonic acid dibutyl ester : 72h-ErC50(Pseudokirchneriella subcapitata) = 14.4 mg/L (OECD TG 201, GLP) (ECHA)

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

Fish

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

Invertebrates

- 1-Decene, homopolymer, hydrogenated : 21d-NOELR(Daphnia magna) = 125 mg/L (OECD TG 211, GLP)

(ECHA)

- Distillates (petroleum), hydrotreated heavy paraffinic : 21d-NOEL(Daphnia magna)=10 mg/L(OECD TG 211, GLP)(ECHA)
- Unknown : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : 21d-NOEC(Daphnia magna)=0.4 mg/L (OECD TG 211, GLP)(ECHA)
- Phosphonic acid dibutyl ester : Not available

Aquatic algae

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

2) Persistence and degradability

○ **Persistence**

- 1-Decene, homopolymer, hydrogenated : log Kow > 6.5 (20 °C; pH:7) (OECD TG 117, GLP) (ECHA)
- Distillates (petroleum), hydrotreated heavy paraffinic : This substance is UVCB, so not applicable.(ECHA)
- Unknown : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : log Kow = 0.56(ECHA)
- Phosphonic acid dibutyl ester : log Kow = 1.81 (25 °C) (ECHA)

○ **Degradability**

- 1-Decene, homopolymer, hydrogenated : Not available
- Distillates (petroleum), hydrotreated heavy paraffinic : Not available
- Unknown : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not available
- Phosphonic acid dibutyl ester : Half-life in air: 2.442 h Half-life for hydrolysis: 18 h (ECHA)

3) Bioaccumulative potential

○ **Bioaccumulation**

- 1-Decene, homopolymer, hydrogenated : Members of this category are not expected to be bioaccumulative. (ECHA)
- Distillates (petroleum), hydrotreated heavy paraffinic : This substance is UVCB, so not applicable.(ECHA)
- Unknown : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not available
- Phosphonic acid dibutyl ester : BCF = 1.07 (estimated) (EPISUITE)

○ **Biodegradation**

- 1-Decene, homopolymer, hydrogenated : 2 % degradation after 28d; Not readily biodegradable (OECD TG 301D, GLP) (ECHA)
- 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)
- Unknown : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : 1.5% degradation after 28

days; not readily biodegradable (OECD TG 301 B, GLP) (ECHA)

- Phosphonic acid dibutyl ester : ca. 89.8 % degradation after 28d; readily biodegradable (OECD TG 301F, GLP) (ECHA)

4) Mobility in soil

- 1-Decene, homopolymer, hydrogenated : Not available
- Distillates (petroleum), hydrotreated heavy paraffinic : Not available
- Unknown : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Koc=1017000
- Phosphonic acid dibutyl ester : Koc = 107.1 (EPISUITE)

5) Hazard to the ozone layer

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

6) Other adverse effects

- 1-Decene, homopolymer, hydrogenated : Not available
- Distillates (petroleum), hydrotreated heavy paraffinic : Not available
- Unknown : Not available
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Not available
- Phosphonic acid dibutyl ester : 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
- Distillates (petroleum), hydrotreated heavy paraffinic : European EINECS phase-in substance
- Unknown : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : European EINECS phase-in substance
- Phosphonic acid dibutyl ester : European EINECS phase-in substance

EU CLP (CLASSIFICATION) - PRODUCT : Not applicable

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

Substances restricted under REACH

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

Substances subject to authorization under REACH

REACH SVHC List

Korea

○ **Occupational Safety and Health Act**

- 1-Decene, homopolymer, hydrogenated : Not applicable
- Distillates (petroleum), hydrotreated heavy paraffinic : Harmful agents subject to work environment monitoring, Harmful agents subject to workers requiring health examination
- Unknown : Not applicable
- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : Hazardous substance subject to control
- Phosphonic acid dibutyl ester : Substance subject to submission of process safety reports

○ **K-REACH**

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

○ **Chemical Control Act in Korea**

- 1-Decene, homopolymer, hydrogenated : Not applicable
- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Unknown : Not applicable

- Phosphorodithioic acid mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters zinc salts : List of substance subjected to the PRTR
- Phosphonic acid dibutyl ester : Not applicable

○ **Safety Control of Dangerous Substances Act**

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

U.S.A

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

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

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

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

○ **CERCLA Section 302 regulation**

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

○ **CERCLA Section 304 regulation**

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

○ **CERCLA Section 313 regulation**

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

Interntional Convention on Environment

○ **Rotterdam Convention list**

- 1-Decene, homopolymer, hydrogenated : Not applicable
- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Unknown : Not applicable

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

○ **Stockholm Convention list**

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

○ **Montreal Protocol list**

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

National Inventory

○ **Korea**

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

○ **U.S.A**

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

○ **China**

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

○ **Japan**

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

- 2023-05-04

3) Revision number and Last date revised

○ **Number of revised**

- 0

○ **Date of last revision**

- 2023-05-03

○ **Last Revision History**

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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.