

Material Safety Data Sheet

Product	Kixx Compressor P 32		
List No.	Issuing date	Last revised date	Department
LB3078	2012-11-30	2018-01-01	Finished Lubricants R&D Team

1. Identification of the substance/mixture and of the company/undertaking

1) Product identifier

- Kixx Compressor P 32

2) Relevant identified uses of the substance or mixture and uses advised against

- Relevant identified uses : (Lubricants and additives)
- Uses advised against : Do not use for any other purpose.

3) Supplier information

Manufacturer information

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

2. HAZARD IDENTIFICATION

1) Hazard classification

- Not applicable

2) Allocation 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 : Health , Flammability , Reactivity

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

※ Chemical NFPA Level.

- Distillates (petroleum), hydrotreated heavy paraffinic : Health=1, Flammable=1, Reaction=0
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : Health=1, Flammable=0, Reaction=0
- Phenol, tertiary butylated thionophosphate(3:1) : Health=0, Flammable=0, Reaction=0
- Amines, branched alkyl(C=11-14) monoethyl and diethyl phosphates : Health=0, Flammable=0, Reaction=0
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : Health=0, Flammable=1, Reaction=0
- Distillates (petroleum), hydrotreated light : Health=1, Flammable=2, Reaction=0

3. Composition/Information on ingredients

Chemical name	Trade names and Synonyms	CAS No.	EC No.	Contain Ratio(%)
Distillates (petroleum), hydrotreated heavy paraffinic		64742-54-7	265-157-1	95 ~ 100
Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate		71735-74-5	275-965-6	0 ~ 1
Phenol, tertiary butylated thionophosphate(3:1)		192268-65-8	606-267-5	0 ~ 1
Amines, branched alkyl(C=11-14) monoethyl and diethyl phosphates		80939-62-4	279-632-6	0 ~ 1
N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene		68411-46-1	270-128-1	0 ~ 1
Distillates (petroleum), hydrotreated light		64742-47-8	265-149-8	1 ~ 3

4. FIRST AID MEASURES

1) Following eye contact

- In case of contact with material, immediately flush eyes with running water for at least 15 minutes.
- Get medical aid immediately.

2) Following 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.
- Get medical aid immediately.

3) Following inhalation

- Move to fresh air.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- Seek immediate medical assistance.

4) Following ingestion

- If unconscious but breathing, never give anything by mouth.
- Get medical aid immediately.

5) Advice to physician

- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.
- Do not apply drugs of the adrenaline ephedrine group.

5. FIRE FIGHTING MEASURES

1) Suitable (and unsuitable) extinguishing media

○ Suitable 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).

○ Unsuitable extinguishing media

- High-pressure water (Unsuitable extinguishing media).

2) Special hazards arising from the substance or mixture

- May ignited from heat, friction or contamination.
- Containers may explode when heated.
- Some may burn but none ignite readily.
- Fire may produce irritating and/or toxic gases.
- May cause toxic effects if inhaled.
- Some liquids produce vapors that may cause dizziness or suffocation.

3) Special protective equipment for firefighters

- Move containers from fire area if you can do it without risk.
- 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

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- Stop leak if you can do it without risk.
- Please note that materials and conditions to be avoided.
- Ventilate the contaminated area.
- Do not touch or walk through spilled material.
- Prevent dust cloud.
- Do not enter areas which have more than 23.5% oxygen in the atmosphere, without respirator or air supplied mask.

2) Environmental precautions

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

3) For cleaning up

- Small Spill: Flush area with flooding quantities of water.
- Small Spill: Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal.
- 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.

7. HANDLING AND STORAGE

1) Precautions for safe handling

- Please note that materials and conditions to be avoided.
- Wash ... thoroughly after handling.
- Handling refer to engineering control/personal protection section.
- CAUTION: High temperature.
- CAUTION: This material does not contain oxygen and may cause asphyxia if released in a confined area.
- High concentration of this gas will create an oxygen-deficient atmosphere, creating the risk of asphyxiation. Check oxygen content before entering area.
- CAUTION: Vapors displace air and can cause asphyxiation in confined spaces if released material.
- CAUTION: Can be reach toxic concentration quickly in air if released.
- Do not spray. Can be reach toxic concentration quickly in air if sprayed.
- Keep under 20°C. This material evaporate slowly at 20°C and reach toxic concentration.
- Do not spray. This material does not easily evaporated. But can be reach toxic concentration quickly in air if sprayed.
- Check oxygen content before entering area.
- Do not spray. Can be evaporate quickly if sprayed.
- Use adequate machine for prevention when package handling.
- Avoid any skin and eye contact when insert undiluted solution. Wash ... thoroughly after handling.
- Caution: Dangerous fire hazard when exposed to heat, or flame, sparks.
- Wear an appropriate Personal protection. (See Exposure Controls/Personal Protection section.)

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 containers: AVOID the place where can be damage and contamination.
- Store in a cool/low-temperature, well-ventilated {dry} place {away from heat and ignition sources}
- Choose a place that can be protected from strong oxidizers and acid.
- Drum Handling: Must work at safe place., Loading more than 3 stack is prohibited.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

1) Chemical exposure limits, Biological exposure standard

○ Occupational exposure limits (Domestic)

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

- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : TWA Not applicable, STEL Not applicable
- Phenol, tertiary butylated thionophosphate(3:1) : TWA Not applicable, STEL Not applicable
- Amines, branched alkyl(C=11-14) monohexyl and dihexyl phosphates : TWA Not applicable, STEL Not applicable
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : TWA Not applicable, STEL Not applicable
- Distillates (petroleum), hydrotreated light : TWA Not applicable, STEL Not applicable

○ Occupational exposure limits (ACGIH)

- Distillates (petroleum), hydrotreated heavy paraffinic : TWA 5mg/m³, STEL Not applicable
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : TWA Not applicable, STEL Not applicable
- Phenol, tertiary butylated thionophosphate(3:1) : TWA Not applicable, STEL Not applicable
- Amines, branched alkyl(C=11-14) monohexyl and dihexyl phosphates : TWA Not applicable, STEL Not applicable
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : TWA Not applicable, STEL Not applicable
- Distillates (petroleum), hydrotreated light : TWA Not applicable, STEL Not applicable

○ Biological limit values

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : Not applicable
- Phenol, tertiary butylated thionophosphate(3:1) : Not applicable
- Amines, branched alkyl(C=11-14) monohexyl and dihexyl phosphates : Not applicable
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : Not applicable
- Distillates (petroleum), hydrotreated light : Not applicable

2) Appropriate engineering controls

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

3) Personal protection equipment

○ Respiratory protection

- If high frequency of use or exposure, wear air respirator.
- Wear breathing protection, which needs a confirmation from the Korea Occupational Safety and Health Agency.

○ Eye protection

- Wear suitable protective goggles and face shields.
- Wear face shield to protect eyes from scattering dust or hazardous liquid.
- Wear Non-moisture permeable goggle for dust protection.
- Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.

○ Hand protection

- Wear insulated gloves.
- Wear Non-moisture permeable chemical resistance protective gloves(latex, nitrile rubber, PVC) for prevent skin contact.

○ Body protection

- When contact is likely wear chemical resistant, oil and grease resistant, non-moisture permeable shoes and clothes.

9. PHYSICAL AND CHEMICAL PROPERTIES

Item	Input Value
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Appearance	Clear, light yellow liquid
Smell	a specific smell of Hydrocarbon
Smell Threshold	No Data
pH	No Data
Melting/Freezing Point	No Data
Boiling Point	330~500
Flash Point	226
Evaporating Rate	No Data
Flammability	No Data
Explosibility Range	No Data
Steam Pressure	<0.1
Solubility	No Data
Vapor Density	No Data
Specific Gravity	No Data
Distribution Coefficient	No Data
Self-Ignition Temperature	>260
Pyrolysis Temperature	No Data
Viscosity	32
Molecular Weight	No Data

10. STABILITY AND REACTIVITY

1) Stability and hazardous reactivity

- Stable under normal temperatures and pressures.
- Containers may explode when heated.
- Some may burn but none ignite readily.
- Fire may produce irritating and/or toxic gases.
- May cause toxic effects if inhaled.
- Some liquids produce vapors that may cause dizziness or suffocation.

2) Conditions to avoid

- Ignition source(heat, spark, flame, etc.).

3) Incompatible materials

- Combustibles.
- Irritating and/or toxic gas.

4) Hazardous decomposition products

- Not available

11. TOXICOLOGICAL INFORMATION

1) Exposure route information

○ Inhalation

- After inhalation: No data

○ **Skin Contact**

- Following skin contact: No data

○ **Eye Contact**

- After eye contact: No data

○ **Ingestion**

- After ingestion: No data

2) Health hazard information

○ **Acute toxicity**

*** Oral - PRODUCT : Not applicable (ATEMix > 2,000 mg/kg)**

- Distillates (petroleum), hydrotreated heavy paraffinic : LD50 >15000 mg/kg Species : Rat
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : LD50> 5 mL/kg bw(rat, female/male) (OECD Guideline 420)
- Phenol, tertiary butylated thionophosphate(3:1) : LD50 >2000 mg/kg (Rat; GLP)
- Amines, branched alkyl(C=11-14) monohexyl and dihexyl phosphates : No data
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : LD50 >5000 mg/kg Species : Rat (bw OECD401)
- Distillates (petroleum), hydrotreated light : Rat, LD50 >15000 mg/kg

*** Dermal - PRODUCT : Not applicable (ATEMix > 2,000 mg/kg)**

- Distillates (petroleum), hydrotreated heavy paraffinic : LD50 >5000 mg/kg Species : Rabbit
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : LD50> 2000 mg/kg bw(rat, female/male), No deaths (OECD Guideline 402)
- Phenol, tertiary butylated thionophosphate(3:1) : LD50 >2000 mg/kg (Rat; OECD TG 402, GLP)
- Amines, branched alkyl(C=11-14) monohexyl and dihexyl phosphates : No data
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : LD50 >2000 mg/kg
- Distillates (petroleum), hydrotreated light : Rabbit, LD50 >2000 mg/kg

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

- Distillates (petroleum), hydrotreated heavy paraffinic : No data
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : No data
- Phenol, tertiary butylated thionophosphate(3:1) : No data
- Amines, branched alkyl(C=11-14) monohexyl and dihexyl phosphates : No data
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : No data
- Distillates (petroleum), hydrotreated light : No data

*** Inhalation(Vapour) - PRODUCT : Not applicable (ATEMix > 20 mg/L)**

- Distillates (petroleum), hydrotreated heavy paraffinic : No data
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : No data
- Phenol, tertiary butylated thionophosphate(3:1) : No data
- Amines, branched alkyl(C=11-14) monohexyl and dihexyl phosphates : No data
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : No data
- Distillates (petroleum), hydrotreated light : LC50 > 5.28 mg/L Rat

*** Inhalation(Dust, mist) - PRODUCT : Not applicable (ATEMix > 5 mg/L)**

- Distillates (petroleum), hydrotreated heavy paraffinic : LC50 > 5.53 mg/L 4h Rat

- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : No data
- Phenol, tertiary butylated thionophosphate(3:1) : No data
- Amines, branched alkyl(C=11-14) monohexyl and dihexyl phosphates : No data
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : No data
- Distillates (petroleum), hydrotreated light : Rat, LC50 >5.2 mg/l 4 hr

○ Skin corrosion/Irritation

- Distillates (petroleum), hydrotreated heavy paraffinic : Rabbit - slightly irritating
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : Rabbit, non-irritating
- Phenol, tertiary butylated thionophosphate(3:1) : Rabbit, non-irritating(EU Method B.4)
- Amines, branched alkyl(C=11-14) monohexyl and dihexyl phosphates : No data
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : No data
- Distillates (petroleum), hydrotreated light : Rabbit, irritating

○ Serious eye damage/irritation

- Distillates (petroleum), hydrotreated heavy paraffinic : Rabbit, not irritating, OECD TG 405 GLP (Read-across CAS No. 64742-53-6)
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : Rabbit, non-irritating
- Phenol, tertiary butylated thionophosphate(3:1) : Rabbit, non-irritating(EU Method B.5)
- Amines, branched alkyl(C=11-14) monohexyl and dihexyl phosphates : No data
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : No data
- Distillates (petroleum), hydrotreated light : Rabbit, non-irritating

○ Respiratory sensitization

- Distillates (petroleum), hydrotreated heavy paraffinic : No data
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : No data
- Phenol, tertiary butylated thionophosphate(3:1) : No data
- Amines, branched alkyl(C=11-14) monohexyl and dihexyl phosphates : No data
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : No data
- Distillates (petroleum), hydrotreated light : No data

○ Skin sensitization

- Distillates (petroleum), hydrotreated heavy paraffinic : Not sensitising (Guinea Pig)
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : Not sensitising (Guinea Pig) (OECD Guideline 406)
- Phenol, tertiary butylated thionophosphate(3:1) : Not sensitising (Guinea Pig; male) (EU Method B.6, GLP)
- Amines, branched alkyl(C=11-14) monohexyl and dihexyl phosphates : No data
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : Not sensitising (Guinea pig, maximization test; OECD 406 GLP)
- Distillates (petroleum), hydrotreated light : Not sensitising (Guinea Pig)

○ Carcinogenicity

- Distillates (petroleum), hydrotreated heavy paraffinic : EU CLP:1B The classification as a carcinogen need not apply if it can be shown that the substance contains less than 3% DMSO extract as measure by IP 346
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : No data
- Phenol, tertiary butylated thionophosphate(3:1) : No data
- Amines, branched alkyl(C=11-14) monohexyl and dihexyl phosphates : No data

- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : No data
- Distillates (petroleum), hydrotreated light : No data

○ Germ cell mutagenicity

- Distillates (petroleum), hydrotreated heavy paraffinic : CHO cell - Negative
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : In vitro- Negative (Bacterial Reverse Mutation Assay; OECD TG 471)
- Phenol, tertiary butylated thionophosphate(3:1) : in vitro mammalian chromosome aberration test (OECD TG 473, GLP), In vitro Bacterial Reverse Mutation Assay (OECD Guideline 471) : negative, in vivo: no data
- Amines, branched alkyl(C=11-14) monohexyl and dihexyl phosphates : No data
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : In Vitro - Bacterial reverse mutation test : negative (HPVIS), In vivo - Chromosome aberration test (Mouse Bone marrow cell) : negative
- Distillates (petroleum), hydrotreated light : in vitro, in vivo Mutation test; negative

○ Reproductive toxicity

- Distillates (petroleum), hydrotreated heavy paraffinic : Reproductive performance was not adversely affected at any dose level evaluated. (Rat)
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : In the oral toxicity test with dosing of 50, 150, and 400 mg / kg bw in rats did not adversely affect development and were not teratogenic (OECD Guideline 414).
- Phenol, tertiary butylated thionophosphate(3:1) : rat(M/F), no adverse effects. NOAEL(P)=250 mg/kg bw/day ; NOEL(F1)>= 250 mg/kg bw/day (OECD TG 421)
- Amines, branched alkyl(C=11-14) monohexyl and dihexyl phosphates : No data
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : Treatment-related effects on reproduction were observed at 600 mg/kg/day. These were confined to an increase in pre-implantation losses, resulting in lower offspring numbers at this dose level. NOAEL(
- Distillates (petroleum), hydrotreated light : Effects on reproduction, pregnancy, and litter size are not observed. (rat, female)

○ Specific target organ toxicity (single exposure)

- Distillates (petroleum), hydrotreated heavy paraffinic : No systemic effects were observed
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : No data
- Phenol, tertiary butylated thionophosphate(3:1) : No data
- Amines, branched alkyl(C=11-14) monohexyl and dihexyl phosphates : No data
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : No data
- Distillates (petroleum), hydrotreated light : May cause central nervous system depression. Inhalation of high concentration vapors may cause loss of consciousness.

○ Specific target organ toxicity (repeated exposure)

- Distillates (petroleum), hydrotreated heavy paraffinic : No systemic effects were observed
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : As a result of repeated oral administration for 28 days in rats (female / male), NOAEL(female)=250 mg/kg bw/day, NOAEL(male)=500 mg/kg bw/day (OECD Guideline 407; 2012)
- Phenol, tertiary butylated thionophosphate(3:1) : rat(M/F), 28d, oral; Hepatocellular hypertrophy was observed. (NOAEL(28d)=50 mg/kg bw/day, (90d)=150 mg/kg bw/day)(OECD TG 407)
- Amines, branched alkyl(C=11-14) monohexyl and dihexyl phosphates : No data
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : The hepatic changes observed were regarded as adaptive in nature. The NOEL for systemic toxicity was therefore considered to be 5 mg/kg/day. (Rat both M/F; Oral Gavage 43-54d; OECD 422 GLP read across
- Distillates (petroleum), hydrotreated light : degreasing of skin

○ Aspiration hazard

- Distillates (petroleum), hydrotreated heavy paraffinic : No data
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : 5.63 mPa s (40 °C; OECD Test Guideline 114; 2013)
- Phenol, tertiary butylated thionophosphate(3:1) : No data
- Amines, branched alkyl(C=11-14) monohexyl and dihexyl phosphates : No data
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : No data
- Distillates (petroleum), hydrotreated light : If swallowed, aspirate into the lungs and cause chemical pneumonitis. (1-2.4 cSt at 40°C)

12. ECOLOGICAL INFORMATION

1) Aquatic toxicity

○ Fish

- Distillates (petroleum), hydrotreated heavy paraffinic : LC50 > 100 mg/L Fish(Pimephales promelas)
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : LC50 0.15 mg/l 96 hr ((ECOSAR: Esters))
- Phenol, tertiary butylated thionophosphate(3:1) : LC50 >100 mg/l 96 hr
- Amines, branched alkyl(C=11-14) monohexyl and dihexyl phosphates : No data
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : LC50 > 100 mg/L 96h (Danio rerio; OECD TG 203)
- Distillates (petroleum), hydrotreated light : LC50 45 mg/L Fish(Pimephales promelas)

○ Crustacean

- Distillates (petroleum), hydrotreated heavy paraffinic : LC50 > 10000 mg/L Aquatic invertebrates(Gammarus pulex)
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : LC50 0.001 mg/l 48 hr ((ECOSAR: Esters, Dithiophosphates))
- Phenol, tertiary butylated thionophosphate(3:1) : EC50 >100 mg/l 48 mg/l Daphnia magna
- Amines, branched alkyl(C=11-14) monohexyl and dihexyl phosphates : 48h EC50 > 1 mg/L Daphnia magna (OECD TG 202)
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : EC50=51 mg/l 48 hr Daphnia magna(OECD 202)
- Distillates (petroleum), hydrotreated light : EC50 1.4 mg/L Aquatic invertebrates(Daphnia magna)

○ Aquatic algae

- Distillates (petroleum), hydrotreated heavy paraffinic : NOEC >= 100 mg/L Aquatic algae(Pseudokirchnerella subcapitata)
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : EC50 0.92 mg/l 96 hr ((ECOSAR: Esters, Dithiophosphates))
- Phenol, tertiary butylated thionophosphate(3:1) : EC50 >100 mg/l
- Amines, branched alkyl(C=11-14) monohexyl and dihexyl phosphates : 72h ErC50 > 10 mg/L Pseudokirchneriella subcapitata (OECD TG 201)
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : ErC50 > 100 mg/l 72 hr Desmodesmus subspicatus (OECD TG 201)
- Distillates (petroleum), hydrotreated light : EC50 >= 1 mg/L Aquatic algae(Pseudokirchnerella subcapitata)

2) Persistence and degradation

○ Persistence

- Distillates (petroleum), hydrotreated heavy paraffinic : log Kow 6
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : 4.15 log Kow

- Phenol, tertiary butylated thionophosphate(3:1) : 8.8 log Kow ~ 4.8 log Kow (at 25°C)
- Amines, branched alkyl(C=11-14) monohexyl and dihexyl phosphates : log Kow 4.25
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : 7.05 log Kow (>6 (HPVIS))
- Distillates (petroleum), hydrotreated light : log Kow 6

○ Degradation

- Distillates (petroleum), hydrotreated heavy paraffinic : No data
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : No data
- Phenol, tertiary butylated thionophosphate(3:1) : No data
- Amines, branched alkyl(C=11-14) monohexyl and dihexyl phosphates : No data
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : No data
- Distillates (petroleum), hydrotreated light : ThOD 61 %

○ biodegradation

- Distillates (petroleum), hydrotreated heavy paraffinic : BOD 77 %
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : 33% degradation after 28 days (OECD Guideline 301 B; 1988)
- Phenol, tertiary butylated thionophosphate(3:1) : No data
- Amines, branched alkyl(C=11-14) monohexyl and dihexyl phosphates : No data
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : 9 (%) 28 day (read across 68442-68-2)
- Distillates (petroleum), hydrotreated light : 4%

3) Bioaccumulative potential

- Distillates (petroleum), hydrotreated heavy paraffinic : No data
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : 253
- Phenol, tertiary butylated thionophosphate(3:1) : No data
- Amines, branched alkyl(C=11-14) monohexyl and dihexyl phosphates : 1.88
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : 12520 (estimated)
- Distillates (petroleum), hydrotreated light : No data

4) Mobility in soil

- Distillates (petroleum), hydrotreated heavy paraffinic : No data
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : No data
- Phenol, tertiary butylated thionophosphate(3:1) : No data
- Amines, branched alkyl(C=11-14) monohexyl and dihexyl phosphates : 2395(Can be adsorbed on soil)
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : 60460 (estimated)
- Distillates (petroleum), hydrotreated light : No data

5) Hazard to the ozone laye

- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : Not applicable
- Phenol, tertiary butylated thionophosphate(3:1) : Not applicable
- Amines, branched alkyl(C=11-14) monohexyl and dihexyl phosphates : Not applicable
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : Not applicable
- Distillates (petroleum), hydrotreated light : Not applicable

6) Other adverse effects

- Distillates (petroleum), hydrotreated heavy paraffinic : Fish: NOEC(Pimephales promelas) >5000 mg/L/7d
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : No data
- Phenol, tertiary butylated thionophosphate(3:1) : Fish (Oncorhynchus mykiss) NOEC(87d)=4.4 µg/L
- Amines, branched alkyl(C=11-14) monohexyl and dihexyl phosphates : No data
- N-Phenylbenzamine reaction products with 2,4,4-trimethylpentene : No data
- Distillates (petroleum), hydrotreated light : No data

13. DISPOSAL CONSIDERATIONS

1) Disposal methods

- Every commercial waste producer shall either treat wastes generated from his/her place of business by him/herself or commission the treatment of such wastes to a person who has license for a waste treatment business under Article 26(3), a person who recycles of such wastes under Article 44(2), a person who has installed and operates a waste disposal facility under Article 4 or 5, a person who has completed the registration of a business of discharging wastes into the sea under Article 18 of the Marine Environment Management Act.

2) Precautions (including disposal of contaminated container of package)

- Wear an appropriate Personal protection. (See Exposure Controls/Personal Protection section.)
- Do not allow spill material to enter sewers, storm water drains, soil, etc.
- Empty containers recycled under environmental laws.
- Empty containers may rupture when pressured.
- Empty containers may explode and residues can be ignited when pressured, cut, weld, heated.

14. TRANSPORT INFORMATION

1) UN No.

- Not applicable

2) Proper shipping name

- Not applicable

3) Class or division

- 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
- This product is not regulated for carriage according to ADR/RID, ADN, IMDG, ICAO/IATA.

15. REGULATORY INFORMATION

1) Occupational Safety and Health Act in Korea - PRODUCT :

- Amines, branched alkyl(C=11-14) monohexyl and dihexyl phosphates : Not applicable
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : Not applicable

- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : Not applicable
- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Distillates (petroleum), hydrotreated light : Not applicable
- Phenol, tertiary butylated thionophosphate(3:1) : Not applicable

2) Toxic Chemical Control Act in Korea - PRODUCT :

- Amines, branched alkyl(C=11-14) monohexyl and dihexyl phosphates : Existing Commercial Chemical Substances
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : Existing Commercial Chemical Substances
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : Existing Commercial Chemical Substances
- Distillates (petroleum), hydrotreated heavy paraffinic : Existing Commercial Chemical Substances
- Distillates (petroleum), hydrotreated light : Existing Commercial Chemical Substances
- Phenol, tertiary butylated thionophosphate(3:1) : Existing Commercial Chemical Substances

3) Safety Control of Dangerous Substances Act in Korea - PRODUCT :

- Amines, branched alkyl(C=11-14) monohexyl and dihexyl phosphates : Not applicable
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : Not applicable
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : Not applicable
- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Distillates (petroleum), hydrotreated light : Not applicable
- Phenol, tertiary butylated thionophosphate(3:1) : Not applicable

4) Wastes Control Act in Korea - PRODUCT : 지정 폐기물

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5) Other regulations in KOREA and Abroad regulations

○ Clean Air Conservation Act

- Amines, branched alkyl(C=11-14) monohexyl and dihexyl phosphates : Air pollutants
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : Air pollutants
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : Not applicable
- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Distillates (petroleum), hydrotreated light : Not applicable
- Phenol, tertiary butylated thionophosphate(3:1) : Air pollutants

○ Persistent Organic Pollutants (POPs) Control Act

- Amines, branched alkyl(C=11-14) monohexyl and dihexyl phosphates : Not applicable
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : Not applicable
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : Not applicable
- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Distillates (petroleum), hydrotreated light : Not applicable
- Phenol, tertiary butylated thionophosphate(3:1) : Not applicable

○ Act on the registration and evaluation of chemicals

- Amines, branched alkyl(C=11-14) monohexyl and dihexyl phosphates : Not applicable
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : Not applicable
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : Not applicable
- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable

- Distillates (petroleum), hydrotreated light : Not applicable
- Phenol, tertiary butylated thionophosphate(3:1) : Not applicable

○ **U.S.A. management information(OSHA regulation)**

- Amines, branched alkyl(C=11-14) monoethyl and diethyl phosphates : Not applicable
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : Not applicable
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : Not applicable
- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Distillates (petroleum), hydrotreated light : Not applicable
- Phenol, tertiary butylated thionophosphate(3:1) : Not applicable

○ **U.S.A. management information(CERCLA regulation)**

- Amines, branched alkyl(C=11-14) monoethyl and diethyl phosphates : Not applicable
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : Not applicable
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : Not applicable
- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Distillates (petroleum), hydrotreated light : Not applicable
- Phenol, tertiary butylated thionophosphate(3:1) : Not applicable

○ **U.S.A. management information(EPCRA 302 regulation)**

- Amines, branched alkyl(C=11-14) monoethyl and diethyl phosphates : Not applicable
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : Not applicable
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : Not applicable
- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Distillates (petroleum), hydrotreated light : Not applicable
- Phenol, tertiary butylated thionophosphate(3:1) : Not applicable

○ **U.S.A. management information(EPCRA 304 regulation)**

- Amines, branched alkyl(C=11-14) monoethyl and diethyl phosphates : Not applicable
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : Not applicable
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : Not applicable
- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Distillates (petroleum), hydrotreated light : Not applicable
- Phenol, tertiary butylated thionophosphate(3:1) : Not applicable

○ **U.S.A. management information(EPCRA 313 regulation)**

- Amines, branched alkyl(C=11-14) monoethyl and diethyl phosphates : Not applicable
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : Not applicable
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : Not applicable
- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Distillates (petroleum), hydrotreated light : Not applicable
- Phenol, tertiary butylated thionophosphate(3:1) : Not applicable

○ **U.S.A. management information(Rotterdam Convention on Substances)**

- Amines, branched alkyl(C=11-14) monoethyl and diethyl phosphates : Not applicable
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : Not applicable

- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : Not applicable
- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Distillates (petroleum), hydrotreated light : Not applicable
- Phenol, tertiary butylated thionophosphate(3:1) : Not applicable

○ **U.S.A. management information(Stockholm Convention on Substances)**

- Amines, branched alkyl(C=11-14) monoethyl and diethyl phosphates : Not applicable
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : Not applicable
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : Not applicable
- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Distillates (petroleum), hydrotreated light : Not applicable
- Phenol, tertiary butylated thionophosphate(3:1) : Not applicable

○ **U.S.A. management information(Mont- real Protocol on Substances)**

- Amines, branched alkyl(C=11-14) monoethyl and diethyl phosphates : Not applicable
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : Not applicable
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : Not applicable
- Distillates (petroleum), hydrotreated heavy paraffinic : Not applicable
- Distillates (petroleum), hydrotreated light : Not applicable
- Phenol, tertiary butylated thionophosphate(3:1) : Not applicable

○ **EU Classification (CLASSIFICATION)**

- Amines, branched alkyl(C=11-14) monoethyl and diethyl phosphates : Not applicable
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : Not applicable
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : Not applicable
- Distillates (petroleum), hydrotreated heavy paraffinic : Carc. 1B
- Distillates (petroleum), hydrotreated light : Asp. Tox. 1
- Phenol, tertiary butylated thionophosphate(3:1) : Aquatic Chronic 4

○ **EU Classification (Risk Phrases)**

- Amines, branched alkyl(C=11-14) monoethyl and diethyl phosphates : Not applicable
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : Not applicable
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : Not applicable
- Distillates (petroleum), hydrotreated heavy paraffinic : H350
- Distillates (petroleum), hydrotreated light : H304
- Phenol, tertiary butylated thionophosphate(3:1) : H413

○ **EU Classification (Safety Phrases)**

- Amines, branched alkyl(C=11-14) monoethyl and diethyl phosphates : Not applicable
- Ethyl 3-[[bis(1-methylethoxy)phosphinothioyl]thio]propionate : Not applicable
- N-Phenylbenzenamine reaction products with 2,4,4-trimethylpentene : Not applicable
- Distillates (petroleum), hydrotreated heavy paraffinic : S:53-45
- Distillates (petroleum), hydrotreated light : S:(2)-23-24-62
- Phenol, tertiary butylated thionophosphate(3:1) : S:61

16. OTHER INFORMATION

1) Reference

- The information contained herein is believed to be accurate. It is provided independently of any sale of the product for purpose of hazard communication. It is not intended to constitute performance information concerning the product. No express warranty, or implied warranty of merchantability or fitness for a particular purpose is made with respect to the product or the information contained herein.

- This Safety Data Sheet was compiled with data and information from the following sources: KOSHA, NITE, ESIS, NLM, SIDS, IPCS

2) Print date

- 2012-11-30

3) Revision date

Number of revised

- 4

Date of last revision

- 2018-01-01

Last Revision History

- No revision information

4) Other

- 이 정보는 근로자 건강, 환경, 안전을 보호하고자, 현재 가용할 수 있는 DB를 근거로 하여 작성하였음.