SAFETY DATA SHEET

DUPONT TORAY SPECIALTY MATERIALS
KABUSHIKI KAISHA

Product name: MOLYKOTE® BR-2 Plus Grease

Issue Date: 2018/10/18
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DUPONT TORAY SPECIALTY MATERIALS KABUSHIKI KAISHA encourages and expects you to read and understand the entire (M)SDS, as there is important information throughout the document. We expect you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

1. PRODUCT AND COMPANY IDENTIFICATION

Product name: MOLYKOTE® BR-2 Plus Grease

Recommended use of the chemical and restrictions on use
Identified uses: Lubricants and lubricant additives

COMPANY IDENTIFICATION
DUPONT TORAY SPECIALTY MATERIALS
KABUSHIKI KAISHA
11-1, NAGATA-CHO 2-CHOME, CHIYODA-KU
TOKYO
100-6111 JAPAN

Customer Information Number: 81 3 62058900
SDSQuestion-AP@dupont.com

EMERGENCY TELEPHONE NUMBER
24-Hour Emergency Contact: 0120 814 221
Local Emergency Contact: 0120-814-221

2. HAZARDS IDENTIFICATION

GHS Classification
Serious eye damage/eye irritation - Category 1
Acute aquatic toxicity - Category 3
Chronic aquatic toxicity - Category 3

GHS label elements
Hazard pictograms

Signal word: **DANGER!**

Hazard statements
Causes serious eye damage.
Harmful to aquatic life with long lasting effects.

Precautionary statements

Prevention
Avoid release to the environment.
Wear eye protection/ face protection.

Response
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor.

Disposal
Dispose of contents/ container to an approved waste disposal plant.

Other hazards
No data available

3. COMPOSITION/INFORMATION ON INGREDIENTS

This product is a mixture.

Component	CASRN	ENCS number	ISHL number	Concentration
Distillates (petroleum), hydrotreated heavy naphthenic	64742-52-5	9-1692	(9)-1692	>= 40.0 - < 50.0 %
Solvent dewaxed heavy paraffinic distillates	64742-65-0	(9)-1692	(9)-1692	>= 40.0 - < 50.0 %
Lithium 12-hydroxyoctadecanoate	7620-77-1	2-1416	(2)-1416	>= 1.0 - < 10.0 %
Solvent dewaxed residual oil (petroleum)	64742-62-7	9-1692	9-1692	>= 1.0 - < 10.0 %
Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts	68457-79-4	2-2945	(2)-2945	>= 3.0 - < 10.0 %
Graphite	7782-42-5	未収載/Not Listed	未収載/Not Listed	>= 1.0 - < 10.0 %

Molybdenum disulfide	1317-33-5	(1)-481	(1)-481	>= 1.0 - < 10.0 %
Lithium hydroxide	1310-65-2	1-712	(1)-712	>= 0.1 - < 0.25 %
Triethanolamine	102-71-6	(2)-308	(2)-308	< 0.1 %

4. FIRST AID MEASURES

Description of first aid measures
General advice:
First Aid responders should pay attention to self-protection and use the recommended protective clothing (chemical resistant gloves, splash protection). If potential for exposure exists refer to Section 8 for specific personal protective equipment.

Inhalation: Move person to fresh air; if effects occur, consult a physician.

Skin contact: Wash off with plenty of water. Suitable emergency safety shower facility should be available in work area.

Eye contact: Wash immediately and continuously with flowing water for at least 30 minutes. Remove contact lenses after the first 5 minutes and continue washing. Obtain prompt medical consultation, preferably from an ophthalmologist. Suitable emergency eye wash facility should be immediately available.

Ingestion: If swallowed, seek medical attention. Do not induce vomiting unless directed to do so by medical personnel.

Most important symptoms and effects, both acute and delayed: Aside from the information found under Description of first aid measures (above) and Indication of immediate medical attention and special treatment needed (below), any additional important symptoms and effects are described in Section 11: Toxicology Information.

Indication of any immediate medical attention and special treatment needed
Notes to physician: Chemical eye burns may require extended irrigation. Obtain prompt consultation, preferably from an ophthalmologist. No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

5. FIREFIGHTING MEASURES

Suitable extinguishing media: Water spray Alcohol-resistant foam Carbon dioxide (CO2) Dry chemical

Unsuitable extinguishing media: None known.

Special hazards arising from the substance or mixture
Hazardous combustion products: Carbon oxides Metal oxides Oxides of phosphorus Sulphur oxides

Unusual Fire and Explosion Hazards: Exposure to combustion products may be a hazard to health.

Advice for firefighters
Fire Fighting Procedures: Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations. Contain fire water run-off if possible. Fire water run-off, if not contained, may cause environmental damage.
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Use water spray to cool unopened containers. Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Remove undamaged containers from fire area if it is safe to do so. Evacuate area.

Special protective equipment for firefighters: In the event of fire, wear self-contained breathing apparatus. Use personal protective equipment.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures: Use personal protective equipment. Follow safe handling advice and personal protective equipment recommendations.

Environmental precautions: Do not release the product to the aquatic environment above defined regulatory levels Prevent further leakage or spillage if safe to do so. Retain and dispose of contaminated wash water. Local authorities should be advised if significant spillages cannot be contained.

Methods and materials for containment and cleaning up: Wipe up or scrape up and contain for salvage or disposal. Local or national regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which regulations are applicable. For large spills, provide dyking or other appropriate containment to keep material from spreading. If dyked material can be pumped, Sections 13 and 15 of this SDS provide information regarding certain local or national requirements.
See sections: 7, 8, 11, 12 and 13.

7. HANDLING AND STORAGE

Handling: Do not get on skin or clothing. Do not swallow. Do not get in eyes. Keep container tightly closed. Take care to prevent spills, waste and minimize release to the environment. Handle in accordance with good industrial hygiene and safety practice.
Use only with adequate ventilation. See Engineering measures under EXPOSURE CONTROLS/PERSONAL PROTECTION section.

Storage: Keep in properly labelled containers. Keep tightly closed. Store in accordance with the particular national regulations.

Do not store with the following product types: Strong oxidizing agents.

Unsuitable materials for containers**:** None known. None known.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters
If exposure limits exist, they are listed below. If no exposure limits are displayed, then no values are applicable.

Component	Regulation	Type of listing	Value/Notation
Distillates (petroleum), hydrotreated heavy naphthenic	ACGIH	TWA Inhalable fraction	5 mg/m3
	JP OEL JSOH	OEL-M Mist	3 mg/m3
Solvent dewaxed heavy paraffinic distillates	ACGIH	TWA Inhalable fraction	5 mg/m3
	JP OEL JSOH	OEL-M Mist	3 mg/m3
Lithium 12-hydroxyoctadecanoate	ACGIH	TWA Inhalable fraction	10 mg/m3
	ACGIH	TWA Respirable fraction	3 mg/m3
Solvent dewaxed residual oil (petroleum)	ACGIH	TWA Inhalable fraction	5 mg/m3
	JP OEL JSOH	OEL-M Mist	3 mg/m3
Graphite	ACGIH	TWA Respirable fraction	2 mg/m3
	JP OEL JSOH	OEL-M Respirable dust	0.5 mg/m3
	JP OEL JSOH	OEL-M Total dust	2 mg/m3
Molybdenum disulfide	ACGIH	TWA Inhalable fraction	10 mg/m3 , Molybdenum
	ACGIH	TWA Respirable fraction	3 mg/m3 , Molybdenum
Lithium hydroxide	US WEEL	CEIL	1 mg/m3
	JP OEL JSOH	OEL-M	1 mg/m3
Triethanolamine	ACGIH	TWA	5 mg/m3

Exposure controls
Engineering controls: Use local exhaust ventilation, or other engineering controls to maintain airborne levels below exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, general ventilation should be sufficient for most operations. Local exhaust ventilation may be necessary for some operations.

Individual protection measures

Respiratory protection: Respiratory protection should be worn when there is a potential to exceed the exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, wear respiratory protection when adverse effects, such as respiratory irritation or discomfort have been experienced, or where indicated by your risk assessment process. For most conditions, no respiratory protection should be needed; however, if handling at elevated temperatures without sufficient ventilation, use an approved air-purifying respirator.

The following should be effective types of air-purifying respirators: Organic vapor cartridge.
Hand protection: Use gloves chemically resistant to this material. Examples of preferred glove barrier materials include: Chlorinated polyethylene. Neoprene. Nitrile/butadiene rubber ("nitrile" or "NBR"). Polyethylene. Ethyl vinyl alcohol laminate ("EVAL"). Polyvinyl alcohol ("PVA"). Viton. Examples of acceptable glove barrier materials include: Butyl rubber. Natural rubber ("latex"). Polyvinyl chloride ("PVC" or "vinyl"). NOTICE: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: Other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials, as well as the instructions/specifications provided by the glove supplier.
Eye protection: Use chemical goggles.
Skin and body protection: Use protective clothing chemically resistant to this material. Selection of specific items such as face shield, boots, apron, or full body suit will depend on the task.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	
Physical state	Grease
Color	black
Odor	slight
Odor Threshold	No data available
pH	Not applicable
Melting point/range	No data available
Freezing point	No data available
Boiling point (760 mmHg)	Not applicable
Flash point	**Seta closed cup** > 200 °C
Evaporation Rate (Butyl Acetate = 1)	Not applicable
Flammability (solid, gas)	Not classified as a flammability hazard
Lower explosion limit	No data available
Upper explosion limit	No data available
Vapor Pressure	Not applicable
Relative Vapor Density (air = 1)	No data available
Relative Density (water = 1)	0.89
Water solubility	No data available
Partition coefficient: n-octanol/water	No data available
Auto-ignition temperature	No data available
Decomposition temperature	No data available
Dynamic Viscosity	Not applicable
Kinematic Viscosity	Not applicable
Explosive properties	Not explosive

Oxidizing properties	The substance or mixture is not classified as oxidizing.
Molecular weight	No data available
Particle size	No data available

NOTE: The physical data presented above are typical values and should not be construed as a specification.

10. STABILITY AND REACTIVITY

Reactivity: Not classified as a reactivity hazard.

Chemical stability: Stable under normal conditions.

Possibility of hazardous reactions: Can react with strong oxidizing agents.

Conditions to avoid: None known.

Incompatible materials: Oxidizing agents

Hazardous decomposition products
No hazardous decomposition products are known.

11. TOXICOLOGICAL INFORMATION

Toxicological information appears in this section when such data is available.

Acute toxicity

Acute oral toxicity
Low toxicity if swallowed. Small amounts swallowed incidentally as a result of normal handling operations are not likely to cause injury; however, swallowing larger amounts may cause injury.
As product: Single dose oral LD50 has not been determined.

Acute dermal toxicity
Prolonged skin contact is unlikely to result in absorption of harmful amounts.
As product: The dermal LD50 has not been determined.

Acute inhalation toxicity
At room temperature, exposure to vapor is minimal due to low volatility; vapor from heated material may cause respiratory irritation.
As product: The LC50 has not been determined.

Skin corrosion/irritation
Brief contact may cause slight skin irritation with local redness.
Prolonged contact may cause moderate skin irritation with local redness.
May cause drying and flaking of the skin.

Serious eye damage/eye irritation
May cause severe irritation with corneal injury which may result in permanent impairment of vision, even blindness. Chemical burns may occur.

Sensitization
For skin sensitization:
Contains component(s) which did not cause allergic skin sensitization in guinea pigs.

For respiratory sensitization:
No relevant data found.

Specific Target Organ Systemic Toxicity (Single Exposure)
Evaluation of available data suggests that this material is not an STOT-SE toxicant.

Specific Target Organ Systemic Toxicity (Repeated Exposure)
Contains component(s) which have been reported to cause effects on the following organs in animals:
Liver

Carcinogenicity
Contains component(s) which did not cause cancer in laboratory animals.

Teratogenicity
Contains component(s) which, in laboratory animals, have been toxic to the fetus only at doses toxic to the mother.

Reproductive toxicity
Contains component(s) which did not interfere with reproduction in animal studies.

Mutagenicity
Contains component(s) which were negative in some in vitro genetic toxicity studies and positive in others. Contains component(s) which were negative in animal genetic toxicity studies.

Aspiration Hazard
Based on physical properties, not likely to be an aspiration hazard.

COMPONENTS INFLUENCING TOXICOLOGY:

Distillates (petroleum), hydrotreated heavy naphthenic

Acute oral toxicity
LD50, Rat, > 5,000 mg/kg OECD Test Guideline 401

Acute dermal toxicity
LD50, Rabbit, > 5,000 mg/kg OECD Test Guideline 402

Acute inhalation toxicity
LC50, Rat, 4 Hour, dust/mist, > 5.53 mg/l OECD Test Guideline 403

Solvent dewaxed heavy paraffinic distillates

Acute oral toxicity
Typical for this family of materials. LD50, Rat, > 5,000 mg/kg

Acute dermal toxicity

Typical for this family of materials. LD50, Rabbit, > 2,000 mg/kg

Acute inhalation toxicity
LC50, Rat, male and female, 4 Hour, dust/mist, > 5 mg/l No deaths occurred at this concentration.

Lithium 12-hydroxyoctadecanoate

Acute oral toxicity
LD50, Rat, female, > 2,000 mg/kg OECD Test Guideline 420 No deaths occurred at this concentration.

Acute dermal toxicity
LD50, Rat, male and female, > 2,000 mg/kg OECD Test Guideline 402 No deaths occurred at this concentration.

Acute inhalation toxicity
The LC50 has not been determined.

Solvent dewaxed residual oil (petroleum)

Acute oral toxicity
LD50, Rat, male and female, > 5,000 mg/kg

Acute dermal toxicity
LD50, Rabbit, male and female, > 2,000 mg/kg No deaths occurred at this concentration.

Acute inhalation toxicity
LC50, Rat, male and female, 4 Hour, dust/mist, > 5.53 mg/l No deaths occurred at this concentration.

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

Acute oral toxicity
LD50, Rat, male, 3,600 mg/kg

Acute dermal toxicity
LD50, Rabbit, male and female, > 20,000 mg/kg

Acute inhalation toxicity
The LC50 has not been determined.

Graphite

Acute oral toxicity
LD50, Rat, > 2,000 mg/kg OECD Test Guideline 401 No deaths occurred at this concentration.

Acute dermal toxicity
The dermal LD50 has not been determined.

Acute inhalation toxicity
LC50, Rat, 4 Hour, dust/mist, > 2 mg/l OECD Test Guideline 403 No deaths occurred at this concentration.

Molybdenum disulfide

Acute oral toxicity
LD50, Rat, > 2,000 mg/kg No deaths occurred at this concentration.

Acute dermal toxicity
LD50, Rat, male and female, > 2,000 mg/kg No deaths occurred at this concentration.

Acute inhalation toxicity
LC50, Rat, 4 Hour, dust/mist, > 2.82 mg/l No deaths occurred at this concentration.

Lithium hydroxide

Acute oral toxicity
Swallowing may result in burns of the mouth and throat. LD50, Rat, male, 368 mg/kg

Acute dermal toxicity
The dermal LD50 has not been determined.

Acute inhalation toxicity
LC50, Rat, male and female, 4 Hour, dust/mist, > 6.15 mg/l OECD Test Guideline 403 No deaths occurred at this concentration.

Triethanolamine

Acute oral toxicity
LD50, Rat, 6,400 mg/kg

Acute dermal toxicity
LD50, Rabbit, > 2,000 mg/kg No deaths occurred at this concentration.

Acute inhalation toxicity
Based on the available data, respiratory irritation was not observed. No deaths occurred following exposure to a saturated atmosphere.

12. ECOLOGICAL INFORMATION

Ecotoxicological information appears in this section when such data is available.

Ecotoxicity

Distillates (petroleum), hydrotreated heavy naphthenic

Acute toxicity to fish
Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50/EL50/LL50 >100 mg/L in the most sensitive species tested).
LL50, Pimephales promelas (fathead minnow), 96 Hour, > 100 mg/l, OECD Test Guideline 203

Acute toxicity to aquatic invertebrates
EL50, Daphnia magna (Water flea), 48 Hour, > 10,000 mg/l

Acute toxicity to algae/aquatic plants
EL50, Pseudokirchneriella subcapitata (green algae), 72 Hour, > 100 mg/l, OECD Test Guideline 201

NOELR, Pseudokirchneriella subcapitata (green algae), 72 Hour, 100 mg/l, OECD Test Guideline 201

Toxicity to bacteria
NOEC, 10 min, >= 1.93 mg/l

Chronic toxicity to aquatic invertebrates
NOELR, Daphnia magna (Water flea), 21 d, 10 mg/l

Solvent dewaxed heavy paraffinic distillates

Acute toxicity to fish
Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50/EL50/LL50 >100 mg/L in the most sensitive species tested).
LL50, Pimephales promelas (fathead minnow), static test, 96 Hour, > 100 mg/l

Acute toxicity to aquatic invertebrates
EL50, Daphnia magna (Water flea), static test, 48 Hour, > 10,000 mg/l

Acute toxicity to algae/aquatic plants
NOEC, Pseudokirchneriella subcapitata (green algae), static test, 72 Hour, Growth rate, > 100 mg/l

Toxicity to bacteria
Based on data from similar materials
NOEC, 10 min, > 1.93 mg/l, DIN 38 412 Part 8

Chronic toxicity to aquatic invertebrates
Based on data from similar materials
NOEC, Daphnia magna (Water flea), 21 d, 10 mg/l

Lithium 12-hydroxyoctadecanoate

Acute toxicity to fish
Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50/EL50/LL50 >100 mg/L in the most sensitive species tested).
LC50, Oncorhynchus mykiss (rainbow trout), semi-static test, 96 Hour, > 100 mg/l, OECD Test Guideline 203

Acute toxicity to aquatic invertebrates
EC50, Daphnia magna (Water flea), static test, 48 Hour, > 100 mg/l, OECD Test Guideline 202

Acute toxicity to algae/aquatic plants
EC50, Pseudokirchneriella subcapitata (green algae), static test, 72 Hour, Growth rate, > 160 mg/l, OECD Test Guideline 201

Solvent dewaxed residual oil (petroleum)

Acute toxicity to fish
Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50/EL50/LL50 >100 mg/L in the most sensitive species tested).
LL50, Pimephales promelas (fathead minnow), Static, 96 Hour, > 100 mg/l, OECD Test Guideline 203 or Equivalent

Acute toxicity to aquatic invertebrates
LL50, scud Gammarus sp., semi-static test, 48 Hour, > 10,000 mg/l, OECD Test Guideline 202 or Equivalent
EL50, water flea Daphnia magna, Static, 48 Hour, > 10,000 mg/l, OECD Test Guideline 202 or Equivalent

Acute toxicity to algae/aquatic plants
NOEC, green alga Pseudokirchneriella subcapitata (formerly known as Selenastrum capricornutum), Static, 72 Hour, Growth rate inhibition, > 100 mg/l, OECD Test Guideline 201 or Equivalent

Toxicity to bacteria
Based on data from similar materials
NOEC, 10 min, > 1.93 mg/l

Chronic toxicity to aquatic invertebrates
NOEC, Daphnia magna, semi-static test, 21 d, number of offspring, 10 mg/l

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

Acute toxicity to fish
Material is moderately toxic to aquatic organisms on an acute basis (LC50/EC50 between 1 and 10 mg/L in the most sensitive species tested).
Based on data from similar materials
LL50, Cyprinodon variegatus (sheepshead minnow), semi-static test, 96 Hour, 4.5 mg/l, OECD Test Guideline 203

Acute toxicity to aquatic invertebrates
Based on data from similar materials
EL50, Daphnia magna (Water flea), static test, 48 Hour, 23 mg/l, OECD Test Guideline 202

Acute toxicity to algae/aquatic plants
Based on data from similar materials
EL50, Desmodesmus subspicatus (green algae), 72 Hour, 24 mg/l, OECD Test Guideline 201

Toxicity to bacteria
Based on data from similar materials
EC50, 3 Hour, > 1,000 mg/l, OECD Test Guideline 209

Chronic toxicity to aquatic invertebrates
Based on data from similar materials
NOEC, Daphnia magna (Water flea), 21 d, 0.4 mg/l

Graphite

Acute toxicity to fish
Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50/EL50/LL50 >100 mg/L in the most sensitive species tested).
LC50, Danio rerio (zebra fish), 96 Hour, > 100 mg/l, OECD Test Guideline 203

Acute toxicity to aquatic invertebrates
EC50, Daphnia magna (Water flea), 48 Hour, > 100 mg/l, OECD Test Guideline 202

Acute toxicity to algae/aquatic plants

EC50, Pseudokirchneriella subcapitata (green algae), 72 Hour, > 100 mg/l, OECD Test Guideline 201

Toxicity to bacteria
EC50, 3 Hour, > 1,012.5 mg/l, OECD Test Guideline 209

Molybdenum disulfide

Acute toxicity to fish
Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50/EL50/LL50 >100 mg/L in the most sensitive species tested).
For similar material(s):
LC50, Fish, 96 Hour, > 100 mg/l

Acute toxicity to aquatic invertebrates
Based on data from similar materials
EC50, Daphnia magna (Water flea), 48 Hour, > 100 mg/l

Acute toxicity to algae/aquatic plants
Based on data from similar materials
ErC50, algae, 72 Hour, Growth rate, > 100 mg/l

Toxicity to bacteria
EC50, 30 Hour, Respiration rates., > 100 mg/l

Chronic toxicity to fish
Based on data from similar materials
NOEC, Fish, 34 d, > 10 mg/l

Chronic toxicity to aquatic invertebrates
Based on data from similar materials
NOEC, Daphnia magna, 21 d, > 10 mg/l

Lithium hydroxide

Acute toxicity to fish
Material is slightly toxic to aquatic organisms on an acute basis (LC50/EC50 between 10 and 100 mg/L in the most sensitive species tested).
LC50, Danio rerio (zebra fish), Static, 96 Hour, 62.2 mg/l, OECD Test Guideline 203

Acute toxicity to aquatic invertebrates
EC50, Daphnia magna (Water flea), Static, 48 Hour, 60.1 mg/l, OECD Test Guideline 202

Acute toxicity to algae/aquatic plants
EC50, Pseudokirchneriella subcapitata (green algae), Static, 72 Hour, 87.57 mg/l, OECD Test Guideline 201
NOEC, Pseudokirchneriella subcapitata (green algae), 72 Hour, 5.71 mg/l, OECD Test Guideline 201

Toxicity to bacteria
EC50, 3 Hour, 180.8 mg/l, OECD Test Guideline 209

Chronic toxicity to fish
NOEC, Danio rerio (zebra fish), 34 d, 9.9 mg/l

Chronic toxicity to aquatic invertebrates
NOEC, Daphnia magna (Water flea), 21 d, 2.3 mg/l

Triethanolamine

Acute toxicity to fish
Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50/EL50/LL50 >100 mg/L in the most sensitive species tested).
May increase pH of aquatic systems to > pH 10 which may be toxic to aquatic organisms.
LC50, Pimephales promelas (fathead minnow), flow-through test, 96 Hour, 11,800 mg/l, OECD Test Guideline 203 or Equivalent

Acute toxicity to aquatic invertebrates
EC50, Ceriodaphnia dubia (water flea), static test, 48 Hour, 609.9 mg/l, OECD Test Guideline 202 or Equivalent

Acute toxicity to algae/aquatic plants
ErC50, alga Scenedesmus sp., static test, 72 Hour, Growth rate inhibition, 512 mg/l, OECD Test Guideline 201 or Equivalent, Test substance: Neutralised product

Toxicity to bacteria
EC50, activated sludge, 3 Hour, > 1,000 mg/l, OECD 209 Test

Chronic toxicity to aquatic invertebrates
NOEC, Daphnia magna (Water flea), semi-static test, 21 d, number of offspring, 16 mg/l

Persistence and degradability

Distillates (petroleum), hydrotreated heavy naphthenic
Biodegradability: Material is expected to biodegrade very slowly (in the environment). Fails to pass OECD/EEC tests for ready biodegradability.
10-day Window: Fail
Biodegradation: 31 %
Exposure time: 28 d
Method: OECD Test Guideline 301F

Solvent dewaxed heavy paraffinic distillates
Biodegradability: Material is expected to biodegrade very slowly (in the environment). Fails to pass OECD/EEC tests for ready biodegradability.
10-day Window: Fail
Biodegradation: 2 %
Exposure time: 28 d
Method: OECD Test Guideline 301B

Lithium 12-hydroxyoctadecanoate
Biodegradability: Material is readily biodegradable. Passes OECD test(s) for ready biodegradability.
10-day Window: Pass
Biodegradation: 78 %
Exposure time: 28 d
Method: OECD Test Guideline 301C

Solvent dewaxed residual oil (petroleum)

Biodegradability: Based on information for a similar material: Material is expected to biodegrade very slowly (in the environment). Fails to pass OECD/EEC tests for ready biodegradability.

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

Biodegradability: Material is expected to biodegrade very slowly (in the environment). Fails to pass OECD/EEC tests for ready biodegradability.
Based on data from similar materials 10-day Window: Fail
Biodegradation: 1.5 %
Exposure time: 28 d
Method: OECD Test Guideline 301B

Graphite

Biodegradability: Biodegradation is not applicable.

Molybdenum disulfide

Biodegradability: Biodegradability is not applicable to inorganic substances.

Lithium hydroxide

Biodegradability: Biodegradability is not applicable to inorganic substances.

Triethanolamine

Biodegradability: Material is readily biodegradable. Passes OECD test(s) for ready biodegradability.
10-day Window: Pass
Biodegradation: 97 %
Exposure time: 28 d
Method: OECD Test Guideline 301A or Equivalent
10-day Window: Not applicable
Biodegradation: 89 %
Exposure time: 14 d
Method: OECD Test Guideline 302B or Equivalent

Theoretical Oxygen Demand: 2.04 mg/mg

Photodegradation
Test Type: Half-life (indirect photolysis)
Sensitization: OH radicals
Atmospheric half-life: 0.097 d
Method: Estimated.

Bioaccumulative potential

Distillates (petroleum), hydrotreated heavy naphthenic

Bioaccumulation: No relevant data found.

Solvent dewaxed heavy paraffinic distillates

Bioaccumulation: Bioconcentration potential is high (BCF > 3000 or Log Pow between 5 and 7).
Partition coefficient: n-octanol/water(log Pow): 3.9 - 6 Estimated.

Lithium 12-hydroxyoctadecanoate

Bioaccumulation: No relevant data found.

Solvent dewaxed residual oil (petroleum)

Bioaccumulation: No relevant data found.

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

Bioaccumulation: For similar material(s): Bioconcentration potential is low (BCF < 100 or Log Pow < 3).
Partition coefficient: n-octanol/water(log Pow): 0.69 OECD Test Guideline 107

Graphite

Bioaccumulation: No relevant data found.

Molybdenum disulfide

Bioaccumulation: Partitioning from water to n-octanol is not applicable.

Lithium hydroxide

Bioaccumulation: No relevant data found.

Triethanolamine

Bioaccumulation: Bioconcentration potential is low (BCF < 100 or Log Pow < 3).
Partition coefficient: n-octanol/water(log Pow): -2.3 at 25 °C Measured
Bioconcentration factor (BCF): < 3.9 Cyprinus carpio (Carp) 42 d Measured

Mobility in Soil

Distillates (petroleum), hydrotreated heavy naphthenic

No relevant data found.

Solvent dewaxed heavy paraffinic distillates

No relevant data found.

Lithium 12-hydroxyoctadecanoate

No relevant data found.

Solvent dewaxed residual oil (petroleum)

No relevant data found.

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

No specific, relevant data available for assessment.

Graphite

No relevant data found.

Molybdenum disulfide

No relevant data found.

Lithium hydroxide

No relevant data found.

Triethanolamine

Potential for mobility in soil is very high (Koc between 0 and 50).
Partition coefficient (Koc): 10 Estimated.

Hazardous to the ozone layer

Distillates (petroleum), hydrotreated heavy naphthenic
This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

Solvent dewaxed heavy paraffinic distillates
This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

Lithium 12-hydroxyoctadecanoate
This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

Solvent dewaxed residual oil (petroleum)
This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts
This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

Graphite
This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

Molybdenum disulfide
This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

Lithium hydroxide
This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

Triethanolamine
This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

Other adverse effects

Distillates (petroleum), hydrotreated heavy naphthenic
This substance has not been assessed for persistence, bioaccumulation and toxicity (PBT).

Solvent dewaxed heavy paraffinic distillates
This substance is not considered to be persistent, bioaccumulating and toxic (PBT). This substance is not considered to be very persistent and very bioaccumulating (vPvB).

Lithium 12-hydroxyoctadecanoate
This substance has not been assessed for persistence, bioaccumulation and toxicity (PBT).

Solvent dewaxed residual oil (petroleum)
This substance is not considered to be persistent, bioaccumulating and toxic (PBT). This substance is not considered to be very persistent and very bioaccumulating (vPvB).

Phosphorodithioic acid, mixed O,O-bis(iso-Bu and pentyl) esters, zinc salts
This substance is not considered to be persistent, bioaccumulating and toxic (PBT). This substance is not considered to be very persistent and very bioaccumulating (vPvB).

Graphite

This substance is not considered to be persistent, bioaccumulating and toxic (PBT). This substance is not considered to be very persistent and very bioaccumulating (vPvB).

Molybdenum disulfide

This substance has not been assessed for persistence, bioaccumulation and toxicity (PBT).

Lithium hydroxide

This substance is not considered to be persistent, bioaccumulating and toxic (PBT). This substance is not considered to be very persistent and very bioaccumulating (vPvB).

Triethanolamine

This substance is not considered to be persistent, bioaccumulating and toxic (PBT). This substance is not considered to be very persistent and very bioaccumulating (vPvB).

13. DISPOSAL CONSIDERATIONS

Disposal methods: Customers are advised to check their local legislation governing the disposal of waste materials.

Treatment and disposal methods of used packaging: For PLASTIC OR PAPER BAGS, DO NOT REUSE CONTAINER. Dispose of empty bag by incineration if allowed, or in an approved landfill or by other procedures approved by federal, state/provincial and local authorities. For CARTONS AND FIBER DRUMS, offer clean empty container for recycling. In such case, this label should be removed or defaced in its entirety. Dispose of empty liner (or non-recyclable container) by incineration if allowed, or in an approved landfill, or by other procedures approved by federal, state/provincial and local authorities.

14. TRANSPORT INFORMATION

Classification for ROAD and Rail transport (ADR/RID):

Not regulated for transport

Classification for SEA transport (IMO-IMDG):

Not regulated for transport

Transport in bulk according to Annex I or II of MARPOL 73/78 and the IBC or IGC Code	Consult IMO regulations before transporting ocean bulk

Classification for AIR transport (IATA/ICAO):

Not regulated for transport

This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Transportation classifications may vary by container volume and may be influenced by regional or country variations in regulations. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

15. REGULATORY INFORMATION

Chemical Substance Control Law
Priority Assessment Chemical Substance

Component
Triethanolamine

Japan. ENCS - Existing and New Chemical Substances Inventory (ENCS)
All intentional components are listed on the inventory, are exempt, or are supplier certified.

Industrial Safety and Health Law
Substances Subject to be Notified Names
Article 57-2 (Enforcement Order Table 9)

Component	Concentration
Molybdenum and its compounds	>= 1.0 - < 10.0 %
Lithium hydroxide	>= 0.1 - < 1.0 %
Mineral oil	>= 90.0 - <= 100.0 %

Substances Subject to be Indicated Names
Article 57 (Enforcement Order Article 18)

Component	Concentration
Molybdenum and its compounds	>= 1.0 - < 10.0 %
Mineral oil	>= 90.0 - <= 100.0 %

Ordinance on Prevention of Hazards Due to Specified Chemical Substances
Not applicable

Ordinance on Prevention of Organic Solvent Poisoning
Not applicable

Substances Prevented From Impairment of Health
Not applicable

Circular concerning Information on Chemicals having Mutagenicity - Annex 2: Information on Existing Chemicals having Mutagenicity
Not applicable

Circular concerning Information on Chemicals having Mutagenicity - Annex 1: Information on Notified Substances having Mutagenicity
Not applicable

Enforcement Order of the Industrial Safety and Health Law - Attached table 1 (Dangerous Substances)
Not applicable

Fire Service Law
Designated Flammable Substances, Synthetic resins, others, (Designated Quantity 3000 kilogram), Keep away from fire

Poisonous and Deleterious Substances Control Law
Not applicable

Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof
Not applicable

High Pressure Gas Safety Act
Not applicable

Waste Disposal and Public Cleansing Law
Industrial waste

16. OTHER INFORMATION

Revision
Identification Number: 3254259 / A857 / Issue Date: 2018/10/18 / Version: 4.0
Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

Legend

ACGIH	USA. ACGIH Threshold Limit Values (TLV)
CEIL	Ceiling
JP OEL JSOH	Japan. The Japan Society for Occupational Health. Recommendation of Occupational Exposure Limits
OEL-M	Occupational Exposure Limit-Mean
TWA	8-hour, time-weighted average
US WEEL	USA. Workplace Environmental Exposure Levels (WEEL)

Full text of other abbreviations
AICS - Australian Inventory of Chemical Substances; ANTT - National Agency for Transport by Land of Brazil; ASTM - American Society for the Testing of Materials; bw - Body weight; CMR - Carcinogen, Mutagen or Reproductive Toxicant; CPR - Controlled Products Regulations; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated

with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; Nch - Chilean Norm; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NOM - Official Mexican Norm; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TDG - Transportation of Dangerous Goods; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative; WHMIS - Workplace Hazardous Materials Information System

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