## 1. PRODUCT AND COMPANY IDENTIFICATION

**Company**

**Arkema Inc.**
**900 First Avenue**
**King of Prussia, Pennsylvania 19406**

**Functional Additives**

**Customer Service Telephone Number:** (800) 331-7654
(Monday through Friday, 8:00 AM to 5:00 PM EST)

**Emergency Information**

**Transportation:** CHEMTREC: (800) 424-9300
(24 hrs., 7 days a week)
**Medical:** Rocky Mountain Poison Center: (866) 767-5089
(24 hrs., 7 days a week)

**Product Information**

**Product name:** LUPEROX® DI
**Synonyms:** Di-t-butyl peroxide
**Molecular formula:** C8H18O2
**Chemical family:** Organic peroxide - dialkyl peroxides
**Molecular weight:** 146.23 g/mol
**Product use:** initiator/catalyst

## 2. HAZARDS IDENTIFICATION

**Emergency Overview**
**Color:** colorless to light yellow
**Physical state:** liquid
**Odor:** menthol

***Classification of the substance or mixture:**
Flammable liquid., Category 2, H225
Organic peroxides, Type E, H242
Germ cell mutagenicity, Category 2, H341
Chronic aquatic toxicity, Category 3, H412

*For the full text of the H-Statements mentioned in this Section, see Section 16.

**GHS-Labelling**

Hazard pictograms:

Signal word: **Danger**

**Hazard statements:**

H225 : Highly flammable liquid and vapour.
H242 : Heating may cause a fire.
H341 : Suspected of causing genetic defects.
H412 : Harmful to aquatic life with long lasting effects.

**Supplemental Hazard Statements:**

Organic peroxide. Hazardous decomposition may occur. Static accumulating flammable liquid. Can become electrostatically charged even in bonded and grounded equipment. Sparks may ignite liquid and vapor. May cause flash fire.

**Precautionary statements:**

**Prevention:**
P201 : Obtain special instructions before use.
P202 : Do not handle until all safety precautions have been read and understood.
P210 : Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P220 : Keep/Store away from clothing/ combustible materials.
P233 : Keep container tightly closed.
P234 : Keep only in original container.
P240 : Ground/bond container and receiving equipment.
P241 : Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242 : Use only non-sparking tools.
P243 : Take precautionary measures against static discharge.
P273 : Avoid release to the environment.
P280 : Wear protective gloves/ eye protection/ face protection.
P281 : Use personal protective equipment as required.

**Response:**
P303 + P361 + P353 : IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P308 + P313 : IF exposed or concerned: Get medical advice/ attention.
P370 + P378 : In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.

**Storage:**
P405 : Store locked up.
P410 : Protect from sunlight.
P411 + P235 : Maximum storage temperature is specified on label and in section 7 of SDS. Keep cool.
P420 : Store away from other materials.

**Disposal:**
P501 : Dispose of contents/ container to an approved waste disposal plant.

## 3. COMPOSITION/INFORMATION ON INGREDIENTS

| Chemical Name | CAS-No. | Wt/Wt | GHS Classification** |
|---|---|---|---|
| Peroxide, bis(1,1-dimethylethyl) | 110-05-4 | >= 98.5 % | H242, H225, H412, H341 |

**For the full text of the H-Statements mentioned in this Section, see Section 16.

## 4. FIRST AID MEASURES

**Inhalation:**
If inhaled, remove victim to fresh air.

**Skin:**
In case of contact, immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse.

**Eyes:**
Immediately flush eye(s) with plenty of water.

**Ingestion:**
If swallowed, DO NOT induce vomiting. Get medical attention. Never give anything by mouth to an unconscious person.

## 5. FIREFIGHTING MEASURES

**Extinguishing media (suitable):**

Water spray, Foam, Dry chemical

**Extinguishing media (unsuitable):**
Water may be ineffective., Do not use a solid water stream as it may scatter and spread fire., Halons

**Protective equipment:**
Fire fighters and others who may be exposed to products of combustion should wear full fire fighting turn out gear (full Bunker Gear) and self-contained breathing apparatus (pressure demand / NIOSH approved or equivalent).

**Further firefighting advice:**
Fight fire with large amounts of water from a safe distance.
Cool closed containers exposed to fire with water spray.
Closed containers of this material may explode when subjected to heat from surrounding fire.
After a fire, wait until the material has cooled to room temperature before initiating clean-up activities.
Do not allow run-off from fire fighting to enter drains or water courses.
Fire fighting equipment should be thoroughly decontaminated after use.

**Fire and explosion hazards:**
Contact with materials to avoid or exposure to temperatures exceeding the SADT may result in a self-accelerating decomposition reaction with release of flammable vapors which may autoignite.
When burned, the following hazardous products of combustion can occur:
Carbon oxides
Hazardous organic compounds

Special Engineering Controls: To minimize static charge accumulation, flow rate should be restricted to less than 1 m/s (3 ft/s). When adding product to a hot reactor, closed system addition is recommended due to product volatility and flammability.

## 6. ACCIDENTAL RELEASE MEASURES

**Personal precautions, Emergency procedures, Methods and materials for containment/clean-up:**
Prevent further leakage or spillage if you can do so without risk. Evacuate area of all unnecessary personnel. Ventilate the area. Eliminate all ignition sources. Avoid generation of vapors. Contain and collect spillage with non-combustible absorbent material such as sodium bicarbonate, sodium carbonate, calcium carbonate, clean sand or non-acidic clay and then wet down (dampen) the mixture with water. DO NOT USE peat moss. Sweep or scoop up using non-sparking tools and place into suitable properly labeled containers for prompt disposal. The sweepings should be wetted down further with water. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Consult a regulatory specialist to determine appropriate state or local reporting requirements, for assistance in waste characterization and/or hazardous waste disposal and other requirements listed in pertinent environmental permits.

**Protective equipment:**
Appropriate personal protective equipment is set forth in Section 8.

## 7. HANDLING AND STORAGE

**Handling**

**General information on handling:**
Contact with materials to avoid or exposure to temperatures exceeding the SADT may result in a self-accelerating decomposition reaction with release of flammable vapors which may autoignite.
Do not taste or swallow.
Do not get in eyes, on skin, or on clothing.
Keep away from heat, sparks and flames.
No smoking.
Eliminate sources of ignition.
Avoid spark promoters.
These alone may be insufficient to remove static electricity.
Vapors are heavier than air and may travel along the ground or be moved by ventilation and ignited by heat, pilot lights, and other flames and ignition sources at locations distant from material handling point.
Use only with adequate ventilation.
Wash thoroughly after handling.
Prevent product contamination.
Keep container tightly closed and away from combustible materials.
Keep only in the original container.
Check that all equipment is properly grounded and installed to satisfy electrical classification requirements.
Container hazardous when empty.
Follow label warnings even after container is emptied.
RESIDUAL VAPORS MAY EXPLODE ON IGNITION.
DO NOT CUT, DRILL, GRIND, OR WELD ON OR NEAR THIS CONTAINER.
Do not reuse container as it may retain hazardous product residue.
Improper disposal or reuse of this container may be dangerous and/or illegal.

**Storage**

**General information on storage conditions:**
Keep away from direct sunlight. Keep container closed when not in use. Store in closed containers, in a secure area to prevent container damage and subsequent spillage. Outside or detached storage is preferred. Store in well ventilated area away from heat and sources of ignition such as flame, sparks and static electricity. Ensure that all storage and handling equipment is properly grounded and installed to satisfy electrical classification requirements. Store out of direct sunlight in a cool well-ventilated place. Store in original container. Store away from combustibles

and materials to avoid. Refer also to National Fire Protection Association (NFPA) Code 400, Hazardous Materials Code. Static electricity may accumulate when transferring material. All metal and groundable storage containers, including but not limited to drums, cylinders, Returnable Intermodal Bulk Containers (RIBCs) and Class C Flexible Intermodal Bulk Containers (FIBCs) must be bonded and grounded during filling and emptying operations. Observe all federal, state and local regulations and National Fire Protection Association (NFPA) Codes which pertain to the specific local conditions of storage and use, including OSHA 29 CFR 1910.106 and NFPA 30, 70, 77, and 497.

**Storage stability – Remarks:**
Follow the recommended storage temperatures provided in this Section in order to maintain stability and oxygen content.

**Storage incompatibility – General:**
Store away from combustibles and materials to avoid. Store separate from:

Strong acids

Strong oxidizing agents

Reducing agents

Accelerators

Friedel - Crafts reaction catalyst

Brass

Copper

Iron

For all Organic Peroxides, compatible materials of contact are stainless steel 304 or 316 (preferred), high-density polyethylene (HDPE), polytetrafluoroethylene or glass linings.

**Temperature tolerance – Do not store below:–**
-22 °F (-30 °C)

**Temperature tolerance – Do not store above:**
100 °F (38 °C)

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

**Airborne Exposure Guidelines:**

**Engineering controls:**
Investigate engineering techniques to reduce exposures below airborne exposure limits or to otherwise reduce exposures. Provide ventilation if necessary to minimize exposures or to control exposure levels to below airborne exposure limits (if applicable see above).If practical, use local mechanical exhaust ventilation at sources of air contamination such as open process equipment.

Consult ACGIH ventilation manual or NFPA Standard 91 for design of exhaust systems.

**Respiratory protection:**
Where airborne exposure is likely or airborne exposure limits are exceeded (if applicable, see above), use NIOSH approved respiratory protection equipment appropriate to the material and/or its components. Consult

respirator manufacturer to determine appropriate type equipment for a given application. Observe respirator use limitations specified by NIOSH or the manufacturer. For emergency and other conditions where there may be a potential for significant exposure or where exposure limit may be significantly exceeded, use an approved full face positive-pressure, self-contained breathing apparatus or positive-pressure airline with auxiliary self-contained air supply. Respiratory protection programs must comply with 29 CFR § 1910.134.

**Skin protection:**
Wear appropriate chemical resistant protective clothing and chemical resistant gloves to prevent skin contact. Consult glove manufacturer to determine appropriate type glove material for given application. Wear face shield and chemical resistant clothing such as a rubber apron when splashing may occur. Rinse immediately if skin is contaminated. Remove contaminated clothing immediately and wash before reuse. Clean protective equipment before reuse. Wash thoroughly after handling.

**Eye protection:**
Where eye contact may be likely, wear chemical goggles and have eye flushing equipment available.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

| | |
|---|---|
| **Color:** | colorless to light yellow |
| **Physical state:** | liquid |
| **Odor:** | menthol |
| **Odor threshold:** | No data available |
| **Flash point** | estimated < 46 °F (< 8 °C) (Setaflash closed cup) |
| **Auto-ignition temperature:** | 320 °F (160 °C) |
| **Lower flammable limit (LFL):** | < 1 %(V) estimated |
| **Upper flammable limit (UFL):** | > 70 %(V) estimated |
| **pH:** | No data available |
| **Density:** | 0.79 g/cm3 (77 °F (25 °C)) |
| **Specific Gravity (Relative density):** | 0.793 (77 °F( 25 °C))Water=1 (liquid) |
| **Vapor pressure:** | 19.510 mmHg (68 °F (20 °C)) |
| **Vapor density:** | No data available |
| **Boiling point/boiling range:** | 232 °F (111 °C) |
| **Melting point/range:** | Not applicable |
| **Freezing point:** | -35 °F (-37 °C) |

| | |
|---|---|
| **Evaporation rate:** | No data available. |
| **Solubility in water:** | insoluble |
| **Viscosity, dynamic:** | 1.15 mPa.s 104 °F (40 °C) |
| **Molecular weight:** | 146.23 g/mol |
| **Oil/water partition coefficient:** | No data available |
| **Self-Accelerating Decomposition Temperature (SADT):** | 180 °F (82 °C) 30 pound container |
| **Thermal decomposition** | No data available |
| **Active oxygen content:** | 10.94 % |
| **Flammability:** | See GHS Classification in Section 2 |
| **Resistivity:** | 830,000 MOhm.m estimated 72 °F (22 °C) |

## 10. STABILITY AND REACTIVITY

**Stability:**
This material is chemically unstable and should only be handled under specified conditions. See HANDLING AND STORAGE section of this SDS for specified conditions.

**Hazardous reactions:**
Hazardous polymerization does not occur.

**Materials to avoid:**
Strong acids
Strong bases
Strong oxidizing agents
Reducing agents
Accelerators
Friedel - Crafts reaction catalyst
transition metal salts
metal ions
Brass
Copper
Iron
For all Organic Peroxides, compatible materials of contact are stainless steel 304 or 316 (preferred), high-density polyethylene (HDPE), polytetrafluoroethylene or glass linings.

**Conditions / hazards to avoid:**
See HANDLING AND STORAGE section of this SDS for specified conditions. SADT - Self Accelerating Decomposition Temperature. Lowest temperature at which the tested package size will undergo a self-accelerating decomposition reaction. This reaction will generate flammable vapors which may autoignite. The length of time to generate a decomposition reaction, after the SADT has been reached or exceeded, is dependent upon how much the SADT has been exceeded and the length of time needed for the reaction exotherm (heat spike from increasing decomposition rate) to initiate a rapid decomposition reaction. Typically, SADT is inversely proportional to package

size. Larger packages will have a lower SADT due to smaller ratio to heat transfer area to volume of product.

**Hazardous decomposition products:**

Temperatures at or above SADT can result in the release of hazardous decomposition products which are flammable and may autoignite.
Thermal decomposition giving flammable and toxic products:
Carbon oxides
Hazardous organic compounds

## 11. TOXICOLOGICAL INFORMATION

Data on this material and/or a similar material are summarized below.

**Data for Peroxide, bis(1,1-dimethylethyl) (110-05-4)**

**Acute toxicity**

**Oral:**
No deaths occurred. (rat) LD0 > 2,000 mg/kg.

**Dermal:**
No deaths occurred. (rat) LD0 > 2,000 mg/kg.

**Inhalation:**
No deaths occurred. (rat) 4 h LC0 > 22 mg/l.

**Skin Irritation:**
Causes mild skin irritation. (rabbit)

**Eye Irritation:**
Causes mild eye irritation. (rabbit)

**Skin Sensitization:**
Not a sensitizer. Repeated skin exposure. (guinea pig) No skin allergy was observed

**Repeated dose toxicity**
Repeated oral administration to rat / affected organ(s): Thyroid gland, forestomach, liver, kidney / signs: Kidney disorders, changes in food or water consumption, changes in body weight, changes in organ weights

**Carcinogenicity**
Chronic dermal administration to mouse / signs: Did not show a tumor promoting effect.

**Genotoxicity**

**Assessment in Vitro:**
No genetic changes were observed in laboratory tests using: bacteria, fungi, animal cells

**Genotoxicity**

**Assessment in Vivo:**
Both positive and negative responses for genetic changes were observed in laboratory tests using: mice

No genetic changes were observed in a laboratory test using: rats

**Developmental toxicity**

Exposure during pregnancy. Oral (rat) / No birth defects were observed.

**Reproductive effects**
Reproductive/Developmental Effects Screening Assay. Oral (rat) / No toxicity to reproduction. / (No birth defects were observed)

## 12. ECOLOGICAL INFORMATION

**Chemical Fate and Pathway**
Data on this material and/or a similar material are summarized below.

**Data for Peroxide, bis(1,1-dimethylethyl) (110-05-4)**

**Biodegradation:**
Not readily biodegradable. (28 d) 6 %

**Octanol Water Partition Coefficient:**
log Pow = 3.2

**Photodegradation:**
Air reaction with OH radicals Half-life direct photolysis: = 8 d

**Ecotoxicology**
Data on this material and/or a similar material are summarized below.

**Data for Peroxide, bis(1,1-dimethylethyl) (110-05-4)**

**Aquatic toxicity data:**
Practically nontoxic. Poecilia reticulata (guppy) 96 h LC0 > 160 mg/l (No effect up to the limit of solubility.)

**Aquatic invertebrates:**
Harmful. Daphnia magna (Water flea) 48 h EC50 > 73.1 mg/l

**Algae:**
Harmful. Pseudokirchneriella subcapitata (green algae) 72 h LC50 = 36 mg/l

**Microorganisms:**
Respiration inhibition / Activated sludge 30 min EC0 > 160 mg/l (No effect up to the limit of solubility.)

## 13. DISPOSAL CONSIDERATIONS

**Waste disposal:**
Dilution followed by incineration is the preferred method. Dilution ratio of 10:1 in a clean, compatible, combustible solvent (i.e., Fuel Oil #2, mineral oil) will reduce reactivity hazard during incineration and transportation. Dispose of in accordance with federal, state and local regulations. Consult a regulatory specialist to determine appropriate state

or local reporting requirements, for assistance in waste characterization and/or hazardous waste disposal and other requirements listed in pertinent environmental permits. Note: Chemical additions to, processing of, or otherwise altering this material may make this waste management information incomplete, inaccurate, or otherwise inappropriate. Furthermore, state and local waste disposal requirements may be more restrictive or otherwise different from federal laws and regulations.

Take appropriate measures to prevent release to the environment.

## 14. TRANSPORT INFORMATION

**US Department of Transportation (DOT)**

| | | |
|---|---|---|
| UN Number | : | 3107 |
| Proper shipping name | : | Organic peroxide type E, liquid |
| Technical name | : | (Di-tert-butyl peroxide, >52-100%) |
| Class | : | 5.2 |
| Packaging group | : | II |
| Marine pollutant | : | no |

**International Maritime Dangerous Goods Code (IMDG)**

| | | |
|---|---|---|
| UN Number | : | 3107 |
| Proper shipping name | : | ORGANIC PEROXIDE TYPE E, LIQUID |
| Technical name | : | (DI-tert-BUTYL PEROXIDE, >52-100%) |
| Class | : | 5.2 |
| Marine pollutant | : | no |
| Flash point | : | estimated < 46 °F (< 8 °C) Setaflash closed cup |

## 15. REGULATORY INFORMATION

**Chemical Inventory Status**

| | | |
|---|---|---|
| EU. EINECS | EINECS | Conforms to |
| United States TSCA Inventory | TSCA | The components of this product are all on the TSCA Inventory. |
| Canadian Domestic Substances List (DSL) | DSL | All components of this product are on the Canadian DSL |
| China. Inventory of Existing Chemical Substances in China (IECSC) | IECSC (CN) | Conforms to |
| Japan. ENCS - Existing and New Chemical Substances Inventory | ENCS (JP) | Conforms to |
| Japan. ISHL - Inventory of Chemical Substances | ISHL (JP) | Conforms to |
| Korea. Korean Existing Chemicals Inventory (KECI) | KECI (KR) | Conforms to |

| | | |
|---|---|---|
| Philippines Inventory of Chemicals and Chemical Substances (PICCS) | PICCS (PH) | Conforms to |
| Australia Inventory of Chemical Substances (AICS) | AICS | Conforms to |

**United States – Federal Regulations**

**SARA Title III – Section 302 Extremely Hazardous Chemicals:**

The components in this product are either not SARA Section 302 regulated or regulated but present in negligible concentrations.

**SARA Title III - Section 311/312 Hazard Categories:**
Fire Hazard, Chronic Health Hazard, Reactivity Hazard

**SARA Title III – Section 313 Toxic Chemicals:**
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

**Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) - Reportable Quantity (RQ):**

| Chemical Name | CAS-No. | Reportable quantity |
|---|---|---|
| 2-Propanol, 2-methyl- | 75-65-0 | 100 lbs |
| Peroxide, bis(1,1-dimethylethyl) | 110-05-4 | 100 lbs |

**United States – State Regulations**

**New Jersey Right to Know**

| Chemical Name | CAS-No. |
|---|---|
| Peroxide, bis(1,1-dimethylethyl) | 110-05-4 |

**New Jersey Right to Know – Special Health Hazard Substance(s)**

| Chemical Name | CAS-No. |
|---|---|
| Peroxide, bis(1,1-dimethylethyl) | 110-05-4 |

**Pennsylvania Right to Know**

| Chemical Name | CAS-No. |
|---|---|
| Peroxide, bis(1,1-dimethylethyl) | 110-05-4 |

**California Prop. 65**
This product does not contain any chemicals known to the State of California to cause cancer, birth defects, or any other reproductive defects.

## 16. OTHER INFORMATION

**Full text of H-Statements referred to under sections 2 and 3.**

H225 Highly flammable liquid and vapour.
H242 Heating may cause a fire.
H341 Suspected of causing genetic defects.
H412 Harmful to aquatic life with long lasting effects.

Miscellaneous:

| | |
|---|---|
| Other information: | Refer to National Fire Protection Association (NFPA) Codes 30, 70, 77, and 497 and OSHA 29 CFR 1910.106, for safe handling. |

**Latest Revision(s):**

| | |
|---|---|
| Reference number: | 000000034043 |
| Date of Revision: | 10/18/2015 |
| Date Printed: | 11/29/2016 |

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*Arkema has implemented a Medical Policy regarding the use of Arkema products in Medical Devices applications that are in contact with the body or circulating bodily fluids (http://www.arkema.com/en/social-responsibility/responsible-product-management/medical-device-policy/index.html) Arkema has designated Medical grades to be used for such Medical Device applications. Products that have not been designated as Medical grades are not authorized by Arkema for use in Medical Device applications that are in contact with the body or circulating bodily fluids. In addition, Arkema strictly prohibits the use of any Arkema products in Medical Device applications that are implanted in the body or in contact with bodily fluids or tissues for greater than 30 days. The Arkema trademarks and the Arkema name shall not be used in conjunction with customers' medical devices, including without limitation, permanent or temporary implantable devices , and customers shall not represent to anyone else, that Arkema allows, endorses or permits the use of Arkema products in such medical devices.*
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