



# LUPEROX DDM-9

Material Safety Data Sheet

Arkema Inc.

## 1 PRODUCT AND COMPANY IDENTIFICATION

Organic Peroxides  
2000 Market Street

Philadelphia, Pa 19103

Information Telephone Numbers

Customer Service

Product Name LUPEROX DDM-9  
Product Synonym(s)

Chemical Family Ketone Peroxide

Chemical Formula

Chemical Name

EPA Reg Num

Product Use Polymerization Initiator

### EMERGENCY PHONE NUMBERS:

Chemtrec: (800) 424-9300 (24hrs) or (703) 527-3887

Medical: Rocky Mountain Poison Control Center  
(866) 767-5089 (24Hrs)

Phone Number

1-800-558-5575

Available Hrs

Business Hours

## 2 COMPOSITION / INFORMATION ON INGREDIENTS

Ingredient Name	CAS RegistryNumber	Typical %	OSHA
Methyl ethyl ketone peroxide(s)	1338-23-4	32-34% By Wt.	Y
2,2,4-Trimethyl-1,3-pentanediol diisobutyrate	6846-50-0	58% By Wt.	Y
Hexylene glycol	107-41-5	6% By Wt.	Y
Proprietary ingredient	NJTSN 03365400-5071P	<or= 1% By Wt.	Y
Methyl ethyl ketone	78-93-3	<or= 2% By Wt.	Y
Hydrogen peroxide	7722-84-1	<or= 1% By Wt.	Y

The substance(s) marked with a "Y" in the OSHA column, are identified as hazardous chemicals according to the criteria of the OSHA Hazard Communication Standard (29 CFR 1910.1200)

This material is classified as hazardous under Federal OSHA regulation.

The components of this product are either on the TSCA Inventory list or exempt as impurities.

## 3 HAZARDS IDENTIFICATION

### Emergency Overview

Clear oily liquid, ketone odor

DANGER!

ORGANIC PEROXIDE

CAUSES EYE BURNS. MAY CAUSE BLINDNESS.

HARMFUL IF SWALLOWED.

CAUSES SKIN IRRITATION.

MAY CAUSE RESPIRATORY TRACT IRRITATION.

MAY CAUSE ALLERGIC SKIN REACTION.

### Potential Health Effects



Skin contact and inhalation are expected to be the primary routes of exposure to this material. Based on its composition, it is anticipated to be moderately toxic if swallowed, slightly toxic if absorbed through skin, practically non-toxic if inhaled, severely irritating to skin and corrosive to eyes. Prolonged or repeated contact may cause an allergic skin reaction. Overexposure to vapor may lead to digestive disorders, narcosis and central nervous system (CNS) effects such as headache, dizziness, loss of coordination, loss of consciousness or convulsions. If swallowed, this material may cause CNS effects as noted above, irritation of the mouth, throat and stomach and, in severe cases, death.

#### 4 FIRST AID MEASURES

IF IN EYES, immediately flush with plenty of water for at least 15 minutes. Get medical attention immediately.

IF ON SKIN, immediately flush the area with plenty of water. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Destroy contaminated shoes.

IF SWALLOWED, do NOT induce vomiting. Give water to drink. Get medical attention immediately. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON.

IF INHALED, remove to fresh air. If breathing is difficult, get medical attention.

#### 5 FIRE FIGHTING MEASURES

##### Fire and Explosive Properties

Auto-Ignition Temperature	NE		
Flash Point	95 C	Flash Point Method	Seta CC
Flammable Limits- Upper	NE		
Lower	NE		

##### Extinguishing Media

Use water spray, foam or dry chemical.

##### Fire Fighting Instructions

Fight fire with large amounts of water from a safe distance. Use water spray to cool containers exposed to fire. 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). Fire fighting equipment should be thoroughly decontaminated after use. After a fire, wait until the material has cooled to room temperature before initiating clean up activities.

##### Fire and Explosion Hazards

Contact with incompatible materials or exposure to temperatures exceeding the SADT may result in a self accelerating decomposition reaction with release of flammable vapors which may autoignite.

#### 6 ACCIDENTAL RELEASE MEASURES

##### In Case of Spill or Leak

Use inert, non-combustible absorbent materials such as sodium bicarbonate, sodium carbonate, calcium carbonate, clean sand or non-acidic clay directly on the spilled peroxide, then wet down (dampen) the mixture with water. DO NOT USE vermiculite or peat moss. Sweep or scoop up using non-sparking tools and place into a polyethylene bag for disposal. The sweepings should be wetted down further with water. Dispose of immediately. After all of the material has been collected, wash down the area with detergent and water.



## 6 ACCIDENTAL RELEASE MEASURES

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.

## 7 HANDLING AND STORAGE

### Handling

Contact with incompatible materials or exposure to temperatures exceeding SADT (See Section (9)) may result in a self accelerating decomposition reaction with release of flammable vapors which may autoignite. Keep away from heat sparks and flame. Avoid contamination. Use explosion proof equipment.

- Do not get in eyes, on skin or on clothing.
- Do not taste or swallow.
- Avoid breathing vapor or mist.
- Avoid prolonged or repeated contact with skin.
- Keep container closed.
- Use only with adequate ventilation.
- Wash thoroughly after handling.
- Do not reuse container as it may retain hazardous product residue.

### Storage

Store below 38 C/100 F to maintain stability and active oxygen content. Detached storage is preferred. Store out of direct sunlight in a cool well-ventilated place. Store away from combustibles and incompatible materials. Refer also to National Fire Protection Agency (NFPA) Code 432, Code for the Storage of Organic Peroxide Formulations.

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## 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

### Engineering Controls

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

### Eye / Face Protection

Where there is potential for eye contact, wear a face shield, chemical goggles, and have eye flushing equipment immediately available.

### 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 chemical goggles, a face shield, and chemical resistant clothing such as a rubber apron when splashing may occur. Rinse immediately if skin is contaminated. Remove contaminated clothing promptly and wash before reuse. Clean protective equipment before reuse. Provide a safety shower at any location where skin contact can occur. Wash skin thoroughly after handling.

### Respiratory Protection

Avoid breathing vapor or mist. Where airborne exposure is likely, use NIOSH approved respiratory protection equipment appropriate to the material and/or its components. Full facepiece equipment is recommended and, if used, replaces need for face shield and/or chemical goggles. If exposures cannot be



## 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

kept at a minimum with engineering controls, consult respirator manufacturer to determine appropriate type equipment for 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, 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.

### Airborne Exposure Guidelines for Ingredients

Exposure Limit	Value
<b>Hexylene glycol</b>	
ACGIH CEILING	25 ppm (121 mg/m <sup>3</sup> )
<b>Hydrogen peroxide</b>	
ACGIH TWA	1 ppm 1.4 mg/m <sup>3</sup>
OSHA TWA PEL	1 ppm 1.4 mg/m <sup>3</sup>
<b>Methyl ethyl ketone</b>	
ACGIH STEL	300 ppm (885 mg/m <sup>3</sup> )
ACGIH TWA	200 ppm (590 mg/m <sup>3</sup> )
OSHA TWA PEL	200 ppm (590 mg/m <sup>3</sup> )
<b>Methyl ethyl ketone peroxide(s)</b>	
ACGIH CEILING	0.2 ppm (1.5 mg/m <sup>3</sup> )

-Only those components with exposure limits are printed in this section.

-Skin contact limits designated with a "Y" above have skin contact effect. Air sampling alone is insufficient to accurately quantitate exposure. Measures to prevent significant cutaneous absorption may be required.

-ACGIH Sensitizer designator with a value of "Y" above means that exposure to this material may cause allergic reactions.

-WEEL-AIHA Sensitizer designator with a value of "Y" above means that exposure to this material may cause allergic skin reactions.

## 9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance/Odor	Clear oily liquid, ketone odor
pH	NA
Specific Gravity	1.0088 @ 20 C
Vapor Pressure	5.2 torr @ 19C
Vapor Density	NE
Melting Point	NE
Freezing Point	NE
Boiling Point	NE
Solubility In Water	Slight
Viscosity	17.30 cps @ 20C
SADT	75 C/169 F (45 lb ctn.)

This material is chemically unstable and should only be handled under specified conditions. See HANDLING AND STORAGE section of this MSDS 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 generated 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.

### Other Physical Data

Active Oxygen Content = 8.7-9.0%  
Refractive index = 1.4356



## 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 MSDS for specified conditions.

### Hazardous Polymerization

Does not occur.

### Incompatibility

Contact with strong acids, alkalis, oxidizers, transition metal salts, promoters/accelerators & reducing agents may result in a violent decomposition reaction or product degradation. (see SECTION 16)

### Hazardous Decomposition Products

Temperatures at or above the SADT can result in the release of hazardous decomposition products which are flammable and may autoignite.

## 11 TOXICOLOGICAL INFORMATION

### Toxicological Information

Data on this material and/or its components are summarized below.

#### Methyl ethyl ketone peroxide(s)

Single exposure (acute) studies indicate that this material is moderately toxic if swallowed (rat LD50 484 mg/kg), slightly toxic if absorbed through skin (rabbit LD50 4,000 mg/kg), practically non-toxic if inhaled (rat 4-hr LC50 17-50 mg/l), corrosive to rabbit eyes and moderately irritating to rabbit skin (4-hr exposure, 4.5/8.0).

Following an allergic skin reaction in a paint sprayer, patch testing produced an allergic skin reaction with this material as well as other components of the paint. However, subsequent patch testing produced no allergic skin reactions in 34 healthy subjects. No skin allergy was observed in guinea pigs following repeated exposure. Repeated oral administration resulted in decreased body weight, mild liver and kidney injury and death in rats. Following repeated application to the skin of rats and mice, severe skin damage and animal deaths (only at the highest dose levels) were the primary effects. Spleen and bone marrow changes considered secondary to the severe skin damage were noted in animals at the high doses. Higher doses applied to rat and mouse skin for a shorter time produced similar effects. Long-term repeated skin application was reported to enhance skin tumor production in mice irradiated with UVB. Genetic changes were observed in tests using bacteria or animal cells. However, no genetic changes occurred in a test using animals.

#### 2,2,4-Trimethyl-1,3-Pentanediol Diisobutyrate

Single exposure (acute) studies indicate that this material is no more than slightly toxic if swallowed (rat LD50 >3,200 mg/kg), practically non-toxic if absorbed through skin (guinea pig LD50 >20 ml/kg) or inhaled (rat 6-hr LC50 >5.3 mg/l), and slightly irritating to rabbit eyes and guinea pig skin.

No skin allergy was observed in guinea pigs following repeated exposures. Increased liver weights, which were probably adaptive changes due to the induction of drug metabolizing enzymes in these tissues, were observed in rats or dogs following long-term administration in their feed. This material is eliminated in the excreta of rats following a single oral dose with little or no retention in the tissues or organs.

#### Hexylene Glycol

Single exposure (acute) studies indicate that this material is slightly toxic if swallowed (rat, rabbit, mice & guinea pig LD50 2,800-4,700 mg/kg), practically non-toxic if absorbed through skin (rabbit LD50 12,300-13,200 mg/kg), severely irritating to rabbit eyes and moderately irritating to rabbit skin. No deaths occurred in rats exposed to about 160 ppm for 8-hours.

**11 TOXICOLOGICAL INFORMATION**

No skin allergy was observed in guinea pigs following repeated exposure. Skin application showed minimal irritation and no skin allergy in humans. Patch tests have shown allergic skin responses in individuals working with cutting oils. Short-term inhalation exposure produced no adverse effects in rats and rabbits. Repeated exposure in the diet produced no adverse effects on growth, behavior or fertility in rats, although kidney changes were noted, and some signs of developmental toxicity were observed at doses which produced maternal toxicity. No genetic changes were observed in tests using bacteria or animal cells.

**Methyl Ethyl Ketone**

Single exposure (acute) studies indicate that this material is no more than slightly toxic if swallowed (rat LD50 2,700-5,600 mg/kg), practically non-toxic if absorbed through skin (rabbit (LD50 5,000-13,000 mg/kg) or inhaled (rat 4-hr LC50 11,700 ppm) and moderately irritating to rabbit eyes and skin.

Repeated exposure of humans produced no skin irritation or skin allergy. Central nervous system (CNS) effects and peripheral neuropathy have been reported in the industrial setting following exposure to mixtures containing this material; however, these mixtures contained other solvents known to cause nervous system injury. Following repeated inhalation exposure, slight changes in organ weights and blood chemistry were reported in rats. No evidence of nervous system injury following long-term inhalation exposure has been observed in rats, chickens, mice or cats. Animal studies have shown an increased severity of, or shortened onset of, irreversible nervous system effects due to n-hexane and methyl butyl ketone, as well as effects of chloroform and carbon tetrachloride. No increase in the incidence of tumors was observed in long-term skin application studies in mice. A small number of major birth defects were reported in the offspring of rats exposed by inhalation during pregnancy at a level that produced toxic effects in the offspring, but not in the mothers. However, no birth defects were found in a second study with rats using very similar exposure conditions, while adverse effects were noted in the mothers and their offspring. In mice exposed by inhalation during pregnancy, toxic effects were observed in the mothers (mild effects only) and their offspring. Generally, no genetic changes were observed in tests using bacteria, animal cells or animals.

**12 ECOLOGICAL INFORMATION****Ecotoxicological Information**

Data on this material and/or its components are summarized below.

**Methyl ethyl ketone peroxide(s)**

This material is slightly toxic to guppies (96-hr LC50 44.2 mg/l) and daphnia (48-hr EC50 39 mg/l). It is moderately toxic to algae (72-hr EC50 3.2 mg/l).

**2,2,4-Trimethyl-1,3-Pentanediol Diisobutyrate**

This material is no more than moderately toxic to fathead minnow (96-hr LC50 >1.55 mg/l), ramshorn snail (96-hr LC50 >1.55 mg/l), aquatic earthworm (96-hr LC50 >1.55 mg/l), sideswimmer (96-hr LC50 >1.55 mg/l), pill bug (96-hr LC50 >1.55 mg/l), flatworm (96-hr LC50 >1.55 mg/l), and Daphnia (96-hr EC50 >1.46 mg/l).

**Hexylene Glycol**

This material has been reported to be practically non-toxic to a variety of aquatic organisms. Freshwater fish including rainbow trout, bluegill sunfish, fathead minnow, mosquito fish, goldfish and channel catfish had LC50 values in excess of 1,000 mg/l and generally were in the range of 8,000 to 10,000 mg/l. Aquatic invertebrates such as Daphnia and crayfish had EC50 values greater than 2,800 mg/l.

**Methyl Ethyl Ketone**

This material is practically non-toxic to goldfish, brine shrimp, Daphnia magna, fathead minnow, mosquito fish, bluegill sunfish and golden orfe (LC50s >1,000 mg/l). It inhibits fungal growth and is reported to be bacteriostatic to several microorganisms at levels of 10-100 mg/l. Growth inhibition has also been reported for



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## 12 ECOLOGICAL INFORMATION

freshwater algae at levels ranging from 120 mg/l (blue-green algae) to 4,300 mg/l (green algae).

### Chemical Fate Information

Data on this material and/or its components are summarized below.

#### Methyl ethyl ketone peroxide(s)

This material is readily biodegradable (87% after 28-days) and not bioaccumulable (log Pow -0.43). The 30-min EC50 in activated sludge is 16 mg/l.

#### 2,2,4-Trimethyl-1,3-Pentanediol Diisobutyrate

In a 28-day modified Sturm Test, this material was found to undergo 32-59% degradation to CO<sub>2</sub>. The bioconcentration factor without metabolism was estimated to be 670 and with metabolism 1-40. The log Pow is estimated to be 4.1

#### Hexylene Glycol

This material is biodegradable (35-76% after 28-days). The log Pow is -0.14

#### Methyl Ethyl Ketone

This material is readily biodegradable (89% after 20-days). It is practically not bioaccumulable (log Pow 0.29) and is slightly adsorbed in soils and sediments (log Koc 0.71). This material is rapidly degraded by OH radicals in air (half-life 6.9-days) and has an evaporation half-life of 27.1-hours. It is non-toxic to sludge microorganisms at concentrations up to 800 ug/l.

## 13 DISPOSAL CONSIDERATIONS

### Waste Disposal

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

## 14 TRANSPORT INFORMATION

DOT Name	Organic Peroxide Type D, Liquid
DOT Technical Name	[Methyl Ethyl Ketone Peroxide(s), <=45%]
DOT Hazard Class	5.2
UN Number	UN 3105
DOT Packing Group	PG II
RQ	Methyl Ethyl Ketone Peroxide(s) = 10 lbs.

## 15 REGULATORY INFORMATION

### Hazard Categories Under Criteria of SARA Title III Rules (40 CFR Part 370)

Immediate (Acute) Health	Y	Fire	N
Delayed (Chronic) Health	N	Reactive	Y
		Sudden Release of Pressure	N



The components of this product are either on the TSCA Inventory list or exempt as impurities.

**Ingredient Related Regulatory Information:**

<b>SARA Reportable Quantities</b>	<b>CERCLA RQ</b>	<b>SARA TPQ</b>
Hexylene glycol	NE	
Hydrogen peroxide	NE	1000 LBS
Methyl ethyl ketone	5000 LBS	
Methyl ethyl ketone peroxide(s)	10 LBS	
2,2,4-Trimethyl-1,3-pentanediol diisobutyrate	NE	
Proprietary ingredient	NE	

**SARA Title III, Section 302**

This product does contain chemical(s), as indicated below, currently on the Extremely Hazardous Substance List, Section 302, SARA Title III. See Section 2 for further details regarding concentrations and registry numbers.

Hydrogen peroxide

**DEA - precursor element**

This product does contain the following chemical(s), as indicated below, currently on the DEA Final Precursors and Essential Chemicals Listed Components list.

Methyl ethyl ketone

**Massachusetts Right to Know**

This product does contain the following chemical(s), as indicated below, currently on the Massachusetts Right to Know Substance List.

Hexylene glycol

Hydrogen peroxide

Methyl ethyl ketone

Methyl ethyl ketone peroxide(s)

**New Jersey Right to Know**

This product does contain the following chemical(s), as indicated below, currently on the New Jersey Right-to-Know Substances List.

Hexylene glycol

Hydrogen peroxide

Methyl ethyl ketone

Methyl ethyl ketone peroxide(s)

**Pennsylvania Environmental Hazard**

This product does contain the following chemical(s), as indicated below, currently on the Pennsylvania Environmental Hazard List.

Hydrogen peroxide

Methyl ethyl ketone

Methyl ethyl ketone peroxide(s)

**Pennsylvania Right to Know**

This product does contain the following chemical(s), as indicated below, currently on the Pennsylvania Hazardous Substance List.

Hexylene glycol

Hydrogen peroxide

Methyl ethyl ketone

Methyl ethyl ketone peroxide(s)

**16 OTHER INFORMATION**





**Revision Information**

Revision Date 16 DEC 2005 Revision Number 8  
Supercedes Revision Dated 28-DEC-2004

**Revision Summary**

Updated ingredient information

**Key**

NE= Not Established NA= Not Applicable (R) = Registered Trademark

**Miscellaneous**

**ADDITIONAL INCOMPATIBILITY DATA:**

Rust, copper, and brass are not compatible with MEK peroxide. 316 stainless steel, glass, polyethylene, polytetrafluoroethylene and polypropylene are preferred materials for contact with MEK peroxide. Acetone may react with residual hydrogen peroxide to form insoluble shock-sensitive acetone peroxide crystals.

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