

**1 PRODUCT AND COMPANY IDENTIFICATION****Organic Peroxides**

2000 Market Street

Philadelphia, Pa 19103

Information Telephone Numbers

Customer Service

**EMERGENCY PHONE NUMBERS:**

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

Medical: Rocky Mountain Poison Control Center  
(303) 623-5716 (24Hrs)Phone Number

1-800-558-5575

Available Hrs

Business Hours

Product Name LUPEROX DDM-9

Product Synonym(s) Lupersol DDM-9\*

Chemical Family Organic Peroxide - Ketone Peroxide

Chemical Formula Phthalate free formulation

Chemical Name Methyl Ethyl Ketone Peroxide Mixture in Plasticizers

EPA Reg Num

Product Use Polymerization Initiator

**2 COMPOSITION / INFORMATION ON INGREDIENTS**

<u>Ingredient Name</u>	<u>CAS RegistryNumber</u>	<u>Typical Wt. %</u>	<u>OSHA</u>
2,2,4-Trimethyl-1,3-pentanediol diisobutyrate	6846-50-0	58	Y
Methyl ethyl ketone peroxide(s)	1338-23-4	32-34	Y
Hexylene glycol	107-41-5	6	Y
Methyl ethyl ketone	78-93-3	1-2	Y
Hydrogen peroxide	7722-84-1	0.7	N
Water	7732-18-5	< 0.7	N

The substance(s) marked with a "Y" in the OSHA column, are identified as hazardous chemicals according to the criteria of the OSHA 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	71 C/160 F (CC)	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 absorbant material. Sweep or scoop up using non-sparking tools. Wet down and dispose of immediately. 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 only with adequate ventilation. Use explosion proof equipment. Keep container closed. Do not reuse container as it may retain hazardous product residue. Wash thoroughly after handling. Do not get in eyes, on skin or on clothing. Avoid breathing vapor or mist. Do not taste or swallow. Avoid prolonged or repeated contact with skin.

**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.

**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 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

**8 EXPOSURE CONTROLS / PERSONAL PROTECTION**

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 STEL	-	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 CEILING	-	885 mg/m <sup>3</sup> 300 ppm
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 STEL	-	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.

**9 PHYSICAL AND CHEMICAL PROPERTIES**

Appearance/Odor	Clear oily liquid; Ketone odor
pH	NA
Specific Gravity	1.004 @ 25 C
Vapor Pressure	NE
Vapor Density	NE
Melting Point	< 0 C
Freezing Point	NE
Boiling Point	NE
Solubility In Water	Slight
Evaporation Rate	NE
Percent Volatile	98% VOC
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%

**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.

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.

**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 (40-60% in dimethyl phthalate) is moderately toxic to rats if swallowed (LD50 484 mg/kg), slightly toxic to rabbits if absorbed through skin (LD50 4,000 mg/kg), practically non-toxic to rats if inhaled (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 did not produce allergic skin reactions in 34 healthy subjects. Swallowing of this material was reported to cause liver injury in one case report.

Repeated oral administration of this material was reported to result in decreased body weight, mild liver and kidney injury and death in rats. Following repeated application of this material in dimethyl phthalate 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 of this material in dimethyl phthalate was reported to enhance skin tumor production in mice irradiated with UVB. This material has produced genetic changes in standard tests using bacterial or animal cells. However, no genetic changes occurred in a standard test using animals.

**11 TOXICOLOGICAL INFORMATION****2,2,4-Trimethyl-1,3-Pentanediol Diisobutyrate**

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

No skin allergy was observed in guinea pigs following repeated exposure. 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 fed up to 1% in their feed for up to 103 days. 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 to rats, rabbits, mice and guinea pigs if swallowed (LD50 2,800-4,700 mg/kg), practically non-toxic to rabbits if absorbed through skin (LD50 12,300 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.

Skin application of 50% of this material in water showed only minimal irritation in human volunteers, while repeated application of consumer products containing up to 1% showed no irritant or sensitizing effects in humans. Patch tests have shown sensitization responses in individuals working with cutting oils containing this material. Rats and rabbits exposed to 0.7 mg/l for 9 days showed no adverse effects. This material in the diet at up to 150 mg daily for 4 months produced no adverse effects on growth, behavior or fertility in rats. Changes in the kidney were noted at 200 mg/day. 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 to rats if swallowed (LD50 2,700-5,600 mg/kg), practically non-toxic to rabbits if absorbed through skin (LD50 5,000-13,000 mg/kg) or rats if inhaled (4-hr LC50 11,700 ppm), and moderately irritating to rabbit eyes and skin.

Repeated exposure of humans to controlled skin contact studies with this material 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 to this material has been observed in rats, chickens, mice or cats. Animal studies have shown this material to increase the severity of, or shorten the onset of, irreversible nervous system effects due to n-hexane and methyl butyl ketone, as well as effects of chloroform and carbon tetrachloride. This material did not increase the incidence of tumors in long-term skin application studies in mice. A small number of major birth defects were reported in rats exposed to this material by inhalation during pregnancy at a level (3,000 ppm) which produced toxic effects in the offspring, but not in the mothers. However, no birth defects were found in a second repeat study with rats using very similar exposure conditions, while adverse effects were noted in the mothers and their offspring. In mice exposed to 3000 ppm of this material by inhalation during pregnancy, toxic effects were observed in the mothers (mild effects only) and their offspring. This material has generally produced no genetic changes in standard tests using animals and animal or bacterial cells. A positive response was reported in one assay using yeast cells.

**12 ECOLOGICAL INFORMATION**

**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).

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

This material is no more than moderately toxic to fathead minnow, ramshorn snails, aquatic earthworms, sideswimmers, pill bugs and flatworms (96-hr LC50s >1.55 mg/l), and daphnids (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 by acute toxicity testing. 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).

This material inhibits fungal growth and is reported to be bacteriostatic to several microorganisms (Escherichia coli, Salmonella typhimurium, Staphylococcus aureus, Leuconostoc citrovorum and Streptococcus thermophilus) at levels of 10-100 mg/l. Growth inhibition has also been reported for 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 was reported to be readily biodegradable in a closed bottle system. An EC50 of 16 mg/l was reported in an activated sludge respiration inhibition test.

**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**

Chemical oxygen demand (COD) and biological oxygen demand (BOD) indicated that this material is readily biodegraded.

**Methyl Ethyl Ketone**

Extensive data suggests that this material is readily biodegradable. It is non-toxic to sludge microorganisms at concentrations up to 800 ug/l.

<b>13 DISPOSAL CONSIDERATIONS</b>
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**Waste Disposal**

Dispose of in accordance with federal, state and local regulations. 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.

<b>14 TRANSPORT INFORMATION</b>
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DOT Name	Organic Peroxide Type D, Liquid
DOT Technical Name	[Methyl Ethyl Ketone Peroxide(s), <= 45%]
DOT Hazard Class	5.2
UN Number	3105
DOT Packing Group	PG II
RQ	Methyl Ethyl Ketone Peroxide(s) = 10 lbs.

<b>15 REGULATORY INFORMATION</b>
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**Hazard Categories Under Criteria of SARA Title III Rules (40 CFR Part 370)**

Immediate (Acute) Health	Y	Fire	Y
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>	CERCLA RQ	SARA TPQ
Hexylene glycol	NE	
Hydrogen peroxide	NE	1000
Water	NE	
Methyl ethyl ketone	5000 LBS	
Methyl ethyl ketone peroxide(s)	10 LBS	
2,2,4-Trimethyl-1,3-pentanediol diisobutyrate	NE	

**SARA Title III, Section 313**

This product does contain chemical(s) which are defined as toxic chemicals under and subject to the reporting requirements of, Section 313 of Title III of the Superfund Ammendments and Reauthorization Act of 986 and 40 CFR Part 372. See Section 2

Methyl ethyl ketone

**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

**Massachusetts Right to Know**

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



**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 FEB 2001                      Revision Number 4  
Supercedes Revision Dated    16-FEB-2001

**Revision Summary**

Name Change from Lupersol to LUPEROX.  
Synonym added.

**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, glasss, polyethylene, polytetrafluoroethylene and polypropylen are preferred materials for contact with MEK peroxide. Acetone may react with residual hydrogen peroxide to form insoluble shock-sensitie acetone peroxide crystals.

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