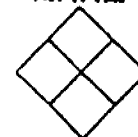


## MATERIAL SAFETY DATA SHEET

N.F.P.A.

(Approved by U.S. Department of Labor "Essentially Similar" to Form LSB-00S-4)



Information on this form is furnished solely for the purpose of compliance with the Occupational Safety and Health Act of 1970 and shall not be used for any other purpose. Use or dissemination of all or any part of this information for any other purpose or purposes is illegal.

PRODUCT USP-245

| PRODUCT SECTION I                                                                                    |   |             |                                                           |    |             |
|------------------------------------------------------------------------------------------------------|---|-------------|-----------------------------------------------------------|----|-------------|
| MANUFACTURER'S NAME<br>U. S. PEROXYGEN DIVISION, WITCO CHEMICAL CORPORATION                          |   |             | EMERGENCY TELEPHONE NO.<br>415-233-5911                   |    |             |
| ADDRESS (NUMBER, STREET, CITY, STATE, AND ZIP CODE)<br>850 Morton Avenue, Richmond, California 94804 |   |             |                                                           |    |             |
| CHEMICAL NAME AND SYNONYMS<br>2,5 Dimethyl Hexane-2,5 Diper 2-Ethyl Hexoate                          |   |             | TRADE NAME AND SYNONYMS<br>USP-245                        |    |             |
| CHEMICAL FAMILY<br>Peroxy Ester                                                                      |   |             | FORMULA<br>C <sub>24</sub> H <sub>46</sub> O <sub>6</sub> |    |             |
| SECTION II HAZARDOUS INGREDIENTS                                                                     |   |             |                                                           |    |             |
| INGREDIENT                                                                                           | % | TLV (UNITS) | INGREDIENT                                                | %  | TLV (UNITS) |
|                                                                                                      |   |             |                                                           |    |             |
|                                                                                                      |   |             |                                                           |    |             |
|                                                                                                      |   |             |                                                           |    |             |
|                                                                                                      |   |             |                                                           |    |             |
|                                                                                                      |   |             |                                                           |    |             |
| HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES                                                |   |             |                                                           | %  | TLV (UNITS) |
| 2,5-Dimethyl Hexane-2,5-Diper 2-Ethyl Hexoate (Octoate)                                              |   |             |                                                           | 95 |             |
|                                                                                                      |   |             |                                                           |    |             |
|                                                                                                      |   |             |                                                           |    |             |
|                                                                                                      |   |             |                                                           |    |             |
|                                                                                                      |   |             |                                                           |    |             |
|                                                                                                      |   |             |                                                           |    |             |

| SECTION III - PHYSICAL DATA |                                |                                         |      |
|-----------------------------|--------------------------------|-----------------------------------------|------|
| BOILING POINT (°F.)         | Decomposes                     | SPECIFIC GRAVITY (H <sub>2</sub> O = 1) | 0.96 |
| VAPOR PRESSURE (mm Hg.)     |                                | PERCENT VOLATILE BY VOLUME (%)          |      |
| VAPOR DENSITY (AIR = 1)     |                                | EVAPORATION RATE ( = 1)                 |      |
| SOLUBILITY IN WATER         | <1%                            |                                         |      |
| APPEARANCE AND ODOR         | Clear Liquid, faint sweet odor |                                         |      |

| SECTION IV FIRE AND EXPLOSION HAZARD DATA                                                                                                                                                              |  |                  |     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|------------------|-----|
| FLASH POINT (METHOD USED)<br>200°F (Cleveland Open Micro Cup)                                                                                                                                          |  | FLAMMABLE LIMITS |     |
| EXTINGUISHING MEDIA<br>Water, Foam, CO <sub>2</sub>                                                                                                                                                    |  | LFL              | UEL |
| SPECIAL FIRE FIGHTING PROCEDURES<br>Fight fire with water from a safe distance. Potential explosion hazard.                                                                                            |  |                  |     |
| UNUSUAL FIRE AND EXPLOSION HAZARDS<br>Do not add to any hot material. Prevent contamination with all foreign materials, especially oxidizables and accelerators as explosive decomposition may result. |  |                  |     |

# SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE

EFFECTS OF OVEREXPOSURE

EMERGENCY AND FIRST AID PROCEDURES

Mildly irritating to skin, wash with soap and water. Eye contact--flush with water and call a doctor. Ingestion--administer an emetic to induce vomiting and call a physician.

# SECTION VI REACTIVITY DATA

|                                      |                |   |                                                                        |
|--------------------------------------|----------------|---|------------------------------------------------------------------------|
| STABILITY                            | UNSTABLE       |   | CONDITIONS TO AVOID<br>Store below 60°F. Temperatures above 110°F will |
|                                      | STABLE         | X | cause loss of activity and gassing.                                    |
| INCOMPATIBILITY (MATERIALS TO AVOID) |                |   |                                                                        |
| HAZARDOUS DECOMPOSITION PRODUCTS     |                |   |                                                                        |
| HAZARDOUS POLYMERIZATION             | MAY OCCUR      |   | CONDITIONS TO AVOID<br>Uncontrolled contact with polymerizable         |
|                                      | WILL NOT OCCUR | X | materials.                                                             |

# SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED  
Immediately-soak-up spill with perlite or vermiculite. Sweep up with non-sparking equipment.

WASTE DISPOSAL METHOD  
Dig a trench and distribute spillage. Ignite with a kerosene soaked rag on the end of a six foot rod and retreat to a safe distance.

# SECTION VIII SPECIAL PROTECTION INFORMATION

|                                       |                      |             |                |
|---------------------------------------|----------------------|-------------|----------------|
| RESPIRATORY PROTECTION (SPECIFY TYPE) |                      |             |                |
| PROTECTIVE GLOVES                     |                      | Recommended | EYE PROTECTION |
|                                       |                      |             | Recommended    |
| VENTILATION                           | LOCAL EXHAUST        |             | SPECIAL        |
|                                       | MECHANICAL (GENERAL) | Recommended | OTHER          |
| OTHER PROTECTIVE EQUIPMENT            |                      |             |                |

# SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING  
Store in original container away from heat. Keep closed to avoid contamination.  
Isolated storage is desirable. Never mix any promoter with USP-245 as violent explosion may result.

Date Issued September 29, 1976

Supplier's Signature

Dr. Reidar Halle

Title Acting Technical Director

Company

U. S. Peroxygen

RETURN TO

Name

Company

UCC 108427

U.S. DEPARTMENT OF LABOR  
WAGE AND LABOR STANDARDS ADMINISTRATION  
Bureau of Labor Standards

MATERIAL SAFETY DATA SHEET

SECTION I

|                                                                                                    |                                         |
|----------------------------------------------------------------------------------------------------|-----------------------------------------|
| MANUFACTURER'S NAME<br>Lucidol Div., Pennwalt Corporation                                          | EMERGENCY TELEPHONE NO.<br>716-877-1740 |
| ADDRESS (Number, Street, City, State, and ZIP Code)<br>1740 Military Road, Buffalo, New York 14240 |                                         |
| CHEMICAL NAME AND SYNONYMS<br>2,5-Dimethyl-2,5-bis(2-ethylhexanoylperoxy) hexane                   |                                         |
| TRADE NAME AND SYNONYMS<br>Lupersol 256                                                            |                                         |
| CHEMICAL FAMILY<br>Organic Peroxide (peroxyester)                                                  | FORMULA<br>$C_{23}H_{46}O_6$            |

SECTION II HAZARDOUS INGREDIENTS

| PAINTS, PRESERVATIVES, & SOLVENTS                     | % | TLV<br>(Units) | ALLOYS AND METALLIC COATINGS              | %  | TLV<br>(Units) |
|-------------------------------------------------------|---|----------------|-------------------------------------------|----|----------------|
| PIGMENTS                                              |   |                | BASE METAL                                |    |                |
| CATALYST                                              |   |                | ALLOYS                                    |    |                |
| VEHICLE                                               |   |                | METALLIC COATINGS                         |    |                |
| SOLVENTS                                              |   |                | FILLER METAL<br>PLUS COATING OR CORE FLUX |    |                |
| ADDITIVES                                             |   |                | OTHERS                                    |    |                |
| OTHERS                                                |   |                |                                           |    |                |
| HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES |   |                |                                           | %  | TLV<br>(Units) |
| 2,5-Dimethyl-2,5-bis(2-ethylhexanoylperoxy) hexane    |   |                |                                           | 90 | --             |
|                                                       |   |                |                                           |    |                |
|                                                       |   |                |                                           |    |                |
|                                                       |   |                |                                           |    |                |

SECTION III PHYSICAL DATA

|                         |                  |                                               |      |
|-------------------------|------------------|-----------------------------------------------|------|
| Freezing Point (°F.)    | <-4              | SPECIFIC GRAVITY (H <sub>2</sub> O=1) 25/25°C | .928 |
| VAPOR PRESSURE (mm Hg.) | Unknown          | PERCENT VOLATILE<br>BY VOLUME (%)             |      |
| VAPOR DENSITY (AIR=1)   | Unknown          | EVAPORATION RATE<br>(=1)                      |      |
| SOLUBILITY IN WATER     | Slight           |                                               |      |
| APPEARANCE AND ODOR     | Colorless liquid |                                               |      |

SECTION IV FIRE AND EXPLOSION HAZARD DATA

|                                                                                                         |                  |                |                 |
|---------------------------------------------------------------------------------------------------------|------------------|----------------|-----------------|
| FLASH POINT (Method used)<br>Micro open cup 190°F                                                       | FLAMMABLE LIMITS | Let<br>Unknown | High<br>Unknown |
| EXTINGUISHING MEDIA<br>CO <sub>2</sub> , dry chemical or foam.                                          |                  |                |                 |
| SPECIAL FIRE FIGHTING PROCEDURES<br>Evacuate area and fight from a safe distance.                       |                  |                |                 |
| UNUSUAL FIRE AND EXPLOSION HAZARDS<br>If confined during a fire, Lupersol 256 can decompose with force. |                  |                |                 |

## SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE Unknown

EFFECTS OF OVEREXPOSURE Unknown

EMERGENCY AND FIRST AID PROCEDURES  
In case of eye contact, flush with water. In case of skin contact,  
wash with soap and water.

## SECTION VI REACTIVITY DATA

|                                                                              |                |   |                                                             |
|------------------------------------------------------------------------------|----------------|---|-------------------------------------------------------------|
| STABILITY                                                                    | UNSTABLE       |   | CONDITIONS TO AVOID<br>Extended exposure to 105°F or higher |
|                                                                              | STABLE         |   | temperatures may lead to rapid decomposition with gassing.  |
| INCOMPATIBILITY (Materials to avoid)<br>Strong oxidizing or reducing agents. |                |   |                                                             |
| HAZARDOUS DECOMPOSITION PRODUCTS<br>Decomposition products are flammable.    |                |   |                                                             |
| HAZARDOUS<br>POLYMERIZATION                                                  | MAY OCCUR      |   | CONDITIONS TO AVOID                                         |
|                                                                              | WILL NOT OCCUR | X |                                                             |

## SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Soak up spilled Lupersol 256 on vermiculite or perlite and sweep up  
using non-sparking utensils.

WASTE DISPOSAL METHOD

Place absorbed material in a shallow trench and ignite from a safe  
distance (6 ft. - min.). Any disposal must comply with local,  
state and federal regulations..

## SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)

None required. Avoid prolonged exposure to vapors.

VENTILATION

LOCAL EXHAUST

SPECIAL

MECHANICAL (General) OK

OTHER

PROTECTIVE GLOVES Yes

EYE PROTECTION Yes

OTHER PROTECTIVE EQUIPMENT Rubber apron or jacket.

## SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Do not store near sources of ignition. Store only in original container.

OTHER PRECAUTIONS

Store below 60°F to maintain active oxygen content.

UCC 108429

Approved 5/17/72  
JCN

# USP-245®

2,5-Dimethyl-2,5-bis(2-ethyl hexoyl peroxy) Hexane

U.S. Patent No. 3,264,274

## DESCRIPTION:

U.S. Peroxygen USP-245 (2,5-Dimethyl-2,5-bis(2-ethyl hexoyl peroxy) Hexane) is a difunctional peroxyester in a clear, liquid state.

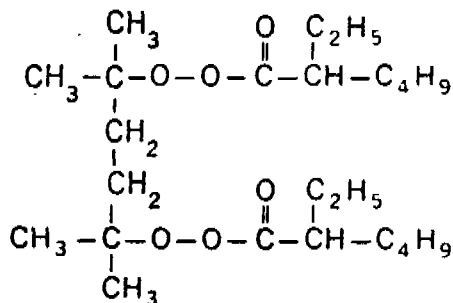
## SPECIFICATIONS:

|                         |           |
|-------------------------|-----------|
| Purity . . . . .        | 90% min.  |
| Active Oxygen . . . . . | 6.7% min. |

## PROPERTIES:

|                                         |                        |
|-----------------------------------------|------------------------|
| Color . . . . .                         | Water White            |
| Flash Point (Micro Open Cup) . . . . .  | 93° C. (200° F.)       |
| Freezing Point . . . . .                | Below -20° C. (-3° F.) |
| Refractive Index (25° C) . . . . .      | 1.449                  |
| Specific Gravity (20° C/4° C) . . . . . | 0.965                  |
| Water Solubility . . . . .              | None                   |
| Soluble in Most Organic Solvents        |                        |

## STRUCTURAL FORMULA:



Molecular Weight 430.60

Empirical Formula  $\text{C}_{24}\text{H}_{46}\text{O}_6$

**DANGER! Refer to Sections on Handling, Hazards and Shipping**

## APPLICATIONS:

USP-245 has broad application as an initiator for reinforced polyester laminates formed in heated molds, operating in the temperature range of 180°F to 300°F. It is extremely useful in molding operations as a direct replacement for Benzoyl Peroxide. Because of the increased reactivity of USP-245, concentrations of 25%w to 50%w of those normally used for Benzoyl Peroxide can be used. In addition, with the growing interest in automated production operations and in reducing the time required to produce a single reinforced plastic part, USP-245 will provide faster cure cycles than possible with Benzoyl Peroxide while yielding parts with vastly improved surface finishes, higher gloss, less cracking and crazing, less yellowing and better color stability with many pigments.

## TYPICAL POLYESTER CURE DATA:

Modified SPI Gel Data:

| Resin: Typical Molding Resin |              |                 |                  |
|------------------------------|--------------|-----------------|------------------|
| A. Temperature - 180°F       |              |                 |                  |
| Catalyst                     | Gel Time     | Reactivity Time | Peak Temperature |
| 1.00% BPO                    | 5 min 45 sec | 6 min 22 sec    | 292°F            |
| 1.00% USP-245                | 4 min 57 sec | 5 min 30 sec    | 293°F            |
| B. Temperature - 250°F       |              |                 |                  |
| 1.00% BPO                    | 1 min 07 sec | 1 min 26 sec    | 302°F            |
| 1.00% USP-245                | 36 sec       | 55 sec          | 293°F            |
| 0.50% USP-245                | 58 sec       | 1 min 23 sec    | 307°F            |
| 0.30% USP-245                | 1 min 29 sec | 1 min 50 sec    | 318°F            |

USP-245 is not normally affected by standard promoters for room temperature cures of unsaturated polyesters. At slightly elevated temperatures, certain promoters can significantly reduce gel and cure times in combination with USP-245. Dimethyl aniline and DMA in conjunction with Emcol CC-42 (Organics Division, Witco Chemical Corporation) are found to be effective in moderate temperature cures of polyester systems.

## Typical Polyester Cure Data

USP-245 @ 0.5% wt.

### A. Temperature = 140° F.

| Promoter          | Gel Time | Reactivity Time     | Peak Temperature |
|-------------------|----------|---------------------|------------------|
| 1. None           |          | No gel after 1 hour |                  |
| 2. 0.50% DMA      | 18'00"   | 32'30"              | 356° F           |
| 3. 0.20% DMA      | 9'45"    | 19'00"              | 370° F.          |
| 0.30% Emcol CC-42 |          |                     |                  |

#### HANDLING AND STORAGE:

USP-245 should be stored in its original containers in a cool location, away from all sources of heat or flame, such as steam pipes, radiators, sparks or sunlight. Containers should be kept closed to avoid contamination which could result in decomposition. For maximum shelf life, storage below 60° F. (15° C.) is recommended. Short term storage at temperatures up to 90° F. (32° C.) is permissible; however, prolonged storage at these temperatures will result in loss of activity accompanied by gassing. Never allow USP-245 to be stored above 100° F. (37° C.) or violent decomposition may occur. Extreme care must be exercised to avoid contamination of USP-245 with foreign materials, especially combustibles, oxidizing and reducing agents, etc. If USP-245 becomes contaminated, decomposition may readily occur and can possibly proceed with explosive force.

Stocks of USP-245 should be systematically rotated according to lot number or date received in order that the oldest material is used first.

#### HALF-LIFE DATA

| Concentration—0.2 Moles/Liter in Benzene |      |                              |                                       |
|------------------------------------------|------|------------------------------|---------------------------------------|
| Temperature<br>°C      °F                |      | Half-Life (Hours)<br>USP-245 | Half-Life (Hours)<br>Benzoyl Peroxide |
| 70°                                      | 158° | 6.1                          | 13.0                                  |
| 80°                                      | 176° | 1.7                          | 4.0                                   |
| 90°                                      | 194° | 0.50                         | 1.0                                   |
| 100°                                     | 212° | 0.14                         | 0.33                                  |

#### HAZARDS:

USP-245 is easily ignited and will burn vigorously with possible explosive force. In the event of fire, use foam extinguishers and copious amounts of water and coolants. Care should be taken not to bring USP-245 into prolonged contact with sensitive areas of the skin, as irritation may result. Immediately flush the contacted area with copious amounts of soap and water. In the event of eye contact, immediately flush the eye with copious amounts of soap and water and consult a physician. In case of ingestion, immediately contact a physician.

#### SHIPPING REGULATIONS:

USP-245 is shipped under a Dept. of Transportation YELLOW cautionary label, and quantities of over one pound must have this label affixed to the outside of the package. In addition, U.S. Peroxygen affixes its own cautionary label, which should be read by all persons handling the material, and should not be defaced or obscured.

When shipping USP-245, compliance is required with Dept of Transportation regulations. USP-245 may be shipped by motor freight, and is classified by the Dept. of Transportation as "PEROXIDES, ORGANIC, LIQUIDS, N.O.S., OXIDIZING MATERIAL, YELLOW LABEL". This must be so designated on bills of lading and on outside containers.

#### DISPOSAL OF CONTAMINATED MATERIAL:

Burning is the preferred method of disposing of contaminated material. Material accidentally spilled should be soaked up with an absorbent substance such as perlite or vermiculite. When igniting, use a torch attached to a six-foot steel pole and retreat immediately to a safe area. No more than one pound of contaminated material should be burned at one time.

Should the burning method be impractical, the material may be disposed of by hydrolysis; this involves the addition of USP-245 to ten times its weight of 10% sodium hydroxide solution. This addition should be accomplished slowly and with constant agitation. The resulting reaction is mildly exothermic, and there may be some foaming. It is complete in 24 hours, or when no further bubble evolution is observed, at which time the aqueous residue may be disposed of.