

## GPS Safety Summary

**Substance Name:**

**Dicumyl peroxide**

### 1. General Statement

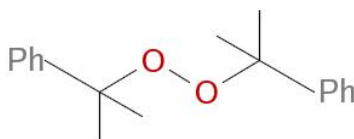
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Dicumyl peroxide is primarily used in the manufacture of polymers and elastomers.

### 2. Chemical Identity

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**Name:** Dicumyl peroxide, bis( $\alpha,\alpha$ -dimethylbenzyl) peroxide, DCP  
**Brand names:** Luperox® DC, Luperox® DC40 grades, Di-Cup® R, Di-Cup® 40 grades  
**Chemical name (IUPAC):** 1,1'-(dioxydipropane-2,2-diyl)dibenzene  
**CAS number:** 80-43-3  
**EC number:** 201-279-3  
**Molecular formula:** C<sub>18</sub>H<sub>22</sub>O<sub>2</sub>  
**Structure:**



### 3. Use and applications

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Dicumyl peroxide is mainly used as cross-linking agent for polymers and elastomers. Polymers which can be cross-linked with organic peroxides are used to produce hose, wires, tires, rubber seals, etc.

Dicumyl peroxide can also be used as flame-retardant synergist in expanded polystyrene (EPS). In that case, the peroxide is incorporated in small quantities in EPS, and will catalyse the flame retardant action in case of heating.

### 4. Physical / Chemical properties

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Property	Value
Physical state	Solid at 20°C and 1013 hPa
Form	Granules, blocks, powder, sheet
Particle size	Median size: 1700 $\mu$ m
Colour	White
Odour	Pungent
Molecular weight	270.37 g/mol
Density	1.107 g/cm <sup>3</sup> at 20°C

Vapour pressure	0.001 Pa at 25°C
Melting point	39.8°C at 1013 hPa
Self-Accelerating Decomposition Temperature (SADT)	90°C
Oxidising properties	Not relevant, as the substance is an organic peroxide
Explosive properties	Non explosive
Water solubility	0.43 mg/L at 20°C
Octanol-water partition coefficient (Log K <sub>ow</sub> )	5.6 at 20°C

## 5. Health Effects

Based on the available data, there is low toxicological concern for DCP. Nevertheless the peroxide is classified for eye and skin irritation despite very slight effects in animals studies.

Effect Assessment	Result
Acute Toxicity Oral / inhalation / dermal	Based on the available data, no acute toxic effects
Irritation / corrosion Skin / eye/ respiratory tract	Very slightly irritating to eyes and skin. Irritating to nasal mucous membranes and upper respiratory tract in case of dust inhalation
Sensitisation	Based on the available test data, did not cause skin allergic reaction
Toxicity after repeated exposure Oral / inhalation / dermal	Based on the available test data, did not cause significant target organ toxicity after oral repeated exposure
Genotoxicity / Mutagenicity	Based on the available test data, did not cause adverse genetic effects <i>in vitro</i>
Carcinogenicity	Based on the available data, not expected to cause cancer
Reproductive / Developmental Toxicology	No data available

## 6. Environmental Effects

Acute toxicity tests performed on aquatic organisms have shown no toxicity, partly due to a low solubility in water. As a consequence dicumyl peroxide is not classified on short-term for this compartment.

Dicumyl peroxide has a high Log Kow value, but has a low value for the BCF and is inherently biodegradable: dicumyl peroxide is thus neither PBT nor vPvB.

Effect Assessment	Result
Aquatic Toxicity	No effect up to the limit of solubility
Fate and behaviour	Result
Biodegradation	Inherently biodegradable.
Bioaccumulation potential	Low potential to bioaccumulate
PBT / vPvB conclusion	Not considered as PBT nor vPvB

## 7. Exposure

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### 7.1 Human health

The manufacture of dicumyl peroxide is a closed process that occurs behind anti-deflagration walls, which minimizes worker exposure during the production process.

However, workers can be exposed during loading/unloading operations, mixing, sampling or maintenance operations.

The primary routes of industrial/professional exposure of dicumyl peroxide are skin contact and inhalation.

In addition, general population is not expected to be exposed to dicumyl peroxide by inhalation, dermal or oral exposure, the product does not remain in the plastic products.

Based on the risk assessment, risk is controlled when activities are carried out under conditions recommended in the extended safety data sheet (chapter 8 and exposure scenarios).

Potential exposure of consumers and releases into the environment of dicumyl peroxide as flame retardant synergist in finished articles are expected to be unlikely. For this use, a small quantity of organic peroxide is trapped in the hardened polymer matrix and is completely degraded after its reaction when exposed to fire. Therefore, exposure to the general population is not expected.

### 7.2 Environment

Releases of dicumyl peroxide into the environment are to be expected during production, processing (formulation) and industrial/professional uses mainly via wastewater. Emissions of vapour or powder are unlikely due to its low dustiness and its low vapour pressure.

Potential release during production is treated by on-site and off-site risk management measures.

Dicumyl peroxide is used for production of polymers and resins, which can either be dry or wet processes. In case of wet processes, releases to water have to be directed to wastewater treatment plant.

As the substance has a low water solubility, and is inherently biodegradable, the water compartment is not the compartment of concern. Due to the high value of  $K_{ow}$ , the environmental risk is driven by the sediment (due to a high potential of adsorption). However, the quantity of the substance used in polymer/elastomer production is low, and it is almost totally consumed during the process. Therefore the release to environment is very low and the use is considered as safe for the environment (which has been confirmed by a quantitative risk assessment performed in the framework of REACH regulation).

In addition, direct or indirect exposure of the substance used as flame retardant synergist to water and soil is highly unlikely, due to the unstable nature of organic peroxides. Upon contact with water and organic matter, substance undergoes rapid degradation resulting in the formation of respective alcohols and acids. Consequently, direct/indirect exposure through the environment can be reasonably neglected.

## 8. Risk Management recommendations

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Human health measures	
Eye/Face protection	Safety glasses/goggles Half-mask during the discharge
Skin protection	Protective suit
Hand protection	Gloves: neoprene, PVC (suitable gloves tested to EN374)

Respiratory protection	Suitable respiratory equipment in case of insufficient ventilation
Organizational measures	Ensure workers are duly trained to minimize exposure
Engineering control	Provide sufficient air exchange and/or exhaust ventilation in work rooms
<b>Environmental measures</b>	
Can be disposed of as waste water, when in compliance with local regulations. Do not spread sludge on natural soils. Eliminate the product by incineration after dilution in a suitable flammable solvent (in accordance with local and national regulations) – amount of active oxygen must be below 1%.	

## 9. Regulatory Information / Classification and Labelling

### 9.1 Regulatory Information

A dossier was generated by the Organic Peroxide Producers Association during the High Production Volume Program.

On top of that, the substance has been registered under EU Regulation EC 1907/2006 (REACH).




As organic peroxides are sensitive substances (as they are liable to exothermic decomposition), the carriage of dicumyl peroxide is strongly regulated, under the rules and conditions of class 5.2 of UN Recommendations on the Transport of Dangerous Goods regulation.

%	Form	UN Number	Classification	OP Category
>52% -100%	as solid	UN 3110	OP Type F, Solid, no temperature control	Type F: neither detonates in the cavitated state nor deflagrates at all and shows only a low or no effect when heated under confinement as well as low or no explosive power
≤52%	as solid	Exempt	Not subject to requirements of class 5.2	

### 9.2 Classification and labelling

Under GHS substances are classified according to their physical, health, and environmental hazards. The hazards are communicated via specific labels and the eSDS. GHS attempts to standardize hazard communication so that the intended audience (workers, consumers, transport workers, and emergency responders) can better understand the hazards of the chemicals in use. Substances registered for REACH are classified according CLP (EC) 1272/2008, implementation of the GHS in the European Union.

Classification
<p>According to REGULATION (EC) no 1272/2008:</p> <ul style="list-style-type: none"> <li>– Organic peroxides; Type F; Heating may cause a fire.</li> <li>– Skin irritation; Category 2; Causes skin irritation.</li> <li>– Eye irritation; Category 2; Causes serious eye irritation.</li> <li>– Chronic aquatic toxicity; Category 2; Toxic to aquatic life with long lasting effects.</li> </ul>

Pictogram	
– GHS02: Flame	
– GHS07: Exclamation mark	
– GHS09: Environment	
Hazard statement	
<ul style="list-style-type: none"> <li>– H242: Heating may cause a fire.</li> <li>– H315: Causes skin irritation.</li> <li>– H319: Causes serious eye irritation.</li> <li>– H411: Toxic to aquatic life with long lasting effects.</li> </ul>	
Alternative classification according to Globally Harmonized System (GHS)	
None.	

## 10. Contact Information within Company

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For further information on this substance or product safety summary in general, please contact:

- [arkema.peroxides-reach-uses@arkema.com](mailto:arkema.peroxides-reach-uses@arkema.com)
- **ICCA portal where the GPS Safety Summary is posted:**  
<http://www.icca-chem.org/en/Home/ICCA-initiatives/global-product-strategy/>

## 11. Date of Issues / Revision

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- Date of issue: 2013/03/11
- Date of revision:

## 12. Disclaimer

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The information contained in this paper is intended as advice only and whilst the information is provided in utmost good faith and has been based on the best information currently available, is to be relied upon at the user's own risk.

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