

## GPS Safety Summary

**Substance Name:**

Di-tert-butyl peroxide

### 1. General Statement

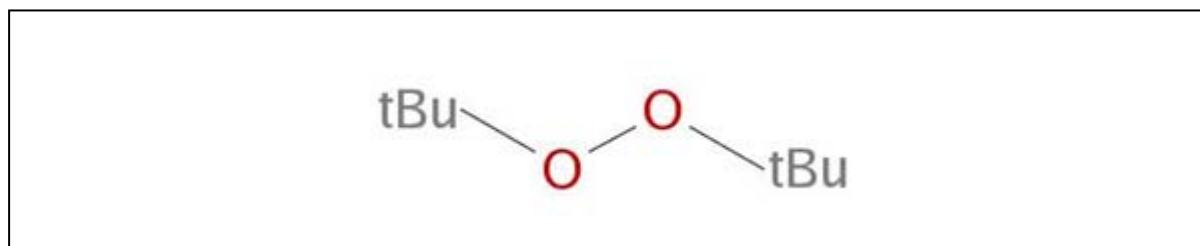
---

Di-tert-butyl peroxide is primarily used as a polymerisation initiator and cross-linking agent. The substance is used as an industrial product and is not sold to consumers.

### 2. Chemical Identity

---

**Name:** Di-tert-butyl peroxide  
**Brand names:** Luperox® DI, Luperox® DIM grades  
**Chemical name (IUPAC):** 2,2'-dioxybis(2-methylpropane)  
**CAS number(s):** 110-05-4  
**EC number:** 203-733-6  
**Molecular formula:** C<sub>8</sub>H<sub>18</sub>O<sub>2</sub>  
**Structure:**



### 3. Use and applications

---

The substance is primarily used as a radical initiator to induce polymerisation (free radical polymerisation process) for the manufacture of plastic (polypropylene visbreaking, acrylic resins, LDPE/EVA), and as a cross-linking agent for the production of resins (resin hardener).

### 4. Physical / Chemical properties

---

Organic peroxides are thermally unstable substances or mixtures, which can undergo exothermic self-accelerating decomposition.

Di-tert-butyl peroxide is classified as Organic Peroxide, Type E, H242 (see section 8 and 9 below):

Property	Value
Physical state	Liquid at 20°C and 1013 hPa
Colour	Colourless
Odour	Menthol
Molecular weight	146.23 g/mol

Density	0.79 g/cm <sup>3</sup> at 20°C
Vapour pressure	3.5 kPa at 25°C
Freezing point	<-29°C
Boiling point	Not relevant, the substance decomposes before boiling
Flash point	6°C at 1013 hPa
Self-Accelerating Decomposition Temperature (SADT)	80°C (30 lb container)
Explosive properties	Non-explosive
Water solubility	171 mg/L at 20°C
Octanol-water partition coefficient (LogKow)	3.2 at 25°C

## 5. Health Effects

Di-tert-butyl peroxide has to be handled with caution due to its potential *in vivo* genotoxic properties.

Effect Assessment	Result
Acute Toxicity Oral / inhalation / dermal	No acute toxic effects following oral / inhalation / dermal exposures.
Irritation / corrosion Skin / eye	Not an irritant to skin or eyes.
Sensitisation	Does not cause skin allergic reaction.
Toxicity after repeated exposure Oral / inhalation / dermal	Does not cause significant target toxicity following oral exposure.
Genotoxicity / Mutagenicity	The substance has an <i>in vivo</i> genotoxic potential.
Carcinogenicity	No data available.
Reproductive / Developmental Toxicity	Based on the available data, does not cause adverse effects on reproduction.

## 6. Environmental Effects

Di-tert-butyl peroxide is presumably persistent but is not bioaccumulative. Furthermore, its toxicity potential towards aquatic life toxicity is low.

Effect Assessment	Result
Aquatic Toxicity	Harmful to algae and daphnids

Fate and behaviour	Result
Biodegradation	Not readily biodegradable
Bioaccumulation potential	No potential to bioaccumulate
PBT / vPvB conclusion	Not considered as PBT nor vPvB

## 7. Exposure

---

### 7.1 Human health

The manufacture of organic 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 the substance are skin contact and inhalation.

In addition, the general population is not expected to be exposed to this organic peroxide by inhalation, dermal or oral exposure, as 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).

### 7.2 Environment

Releases of organic peroxides into the environment are to be expected during production, processing (formulation) and industrial uses mainly via wastewater and lesser amounts via emissions of vapour (due to its physical state and its vapour pressure).

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

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

The substance is used in low quantity in polymer production, and is almost totally consumed during the process. Therefore the release to environment is very low and, in spite of the environmental hazard profile of the substance, the use is considered as safe for the environment (this was confirmed by a quantitative risk assessment performed in the framework of REACH regulation).

## 8. Risk Management recommendations

---

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

Environmental measures
<p>Can be discharged in waste water, when in compliance with local regulations. Do not spread sludge on natural soils.</p> <p>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%.</p>
Storage and handling
<p>Strictly limit the quantities of product in the work area to those which are absolutely necessary for the work in hand. Great cleanliness in work areas is a necessary and important factor for safety. Never weigh out in the storage room. Handle and open container with care (risk of over pressurization in containers). Eliminate all sources of ignition, and do not generate flames or sparks. Take precautionary measures against static discharges. Apply earthing when transferring from one container to another. Confinement must be avoided. Use explosion protected equipment.</p> <p>Use non-sparking tools in areas where explosive vapor/air mixtures may occur. Keep product and emptied container away from heat and sources of ignition. Do not cut or weld on or near this container even when empty. Keep away from incompatible materials such as: strong oxidizing agents, powerful reducers, acids, bases, amines, transition metal salts, sulphur compounds, rust, ash, dusts (risk of self-accelerating exothermic decomposition).</p> <p>Never return any product to the container from which it was originally removed (risk of decomposition).</p> <p>Avoid temperatures above 40 °C (to maintain the technical properties). Storage buildings must be built and equipped so as not to exceed the maximum proscribed temperature limit.</p>

## 9. Regulatory Information / Classification and Labelling

### 9.1 Regulatory Information

This 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 tert-amyl hydroperoxide 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%	Liquid	UN 3107	OP Type E, Liquid, No temperature control	Type E: the mixture, in laboratory testing, neither detonates nor deflagrates at all and shows low or no effect when heated under confinement
≤52%	Liquid	UN 3109	OP Type F, Liquid, 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

### 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 e-SDS. 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.

### GPS Safety Summary

Functional Additives – Di-tert-butyl peroxide – GPS - 2013-11-30 – V0

Classification	
<ul style="list-style-type: none"> <li>– Flammable Liquid; Category 2; Highly flammable liquid and vapours.</li> <li>– Organic peroxide; type E; Heating may cause a fire.</li> <li>– Germ cell mutagenicity; Category 2; Suspected of causing genetic defects.</li> <li>– Chronic aquatic toxicity; Category 3; Harmful to aquatic life with long-lasting effects.</li> </ul>	
Pictograms	
– GHS02: Flame	
– GHS08: health hazard	
Hazard statement	
<ul style="list-style-type: none"> <li>– H225: Highly flammable liquid and vapours.</li> <li>– H242: Heating may cause a fire.</li> <li>– H341: Suspected of causing genetic defects.</li> <li>– H412: Harmful to aquatic life with long-lasting effects.</li> </ul>	
Alternative classification according to Globally Harmonized System (GHS)	
– Acute aquatic toxicity; Category 3; Harmful to aquatic life.	

## 10. Contact Information within Company

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

- Date of issue: 2013/11/30
- Date of revision:

## 12. Disclaimer

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.

**NO WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE, WARRANTY OF MERCHANTABILITY, OR ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, IS MADE CONCERNING THE INFORMATION PROVIDED HEREIN.**

No liability will be accepted by ARKEMA for damages of any nature whatsoever resulting from the use of or reliance on the information.