

GPS Safety Summary

Substance Name:

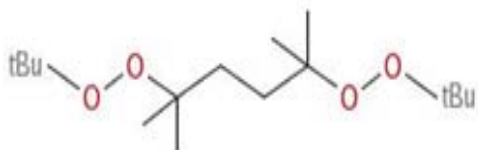
2,5-dimethyl-2,5-di(tert-butylperoxy)hexane

1. General Statement

The substance is primarily used as a radical initiator. The substance is used at the industrial stage and is not sold to general population.

2. Chemical Identity

Name:	2,5-dimethyl-2,5-di(tert-butylperoxy)hexane
Brand names:	Luperox® 101 grades
Chemical name (IUPAC):	2,5-bis(tert-butylperoxy)-2,5-dimethylhexane
CAS number(s):	78-63-7
EC number:	201-128-1
Molecular formula:	C ₁₆ H ₃₄ O ₄
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 e.g. polypropylene or cross-linked polyethylene. The substance is used at the industrial stage and is not sold to general population

4. Physical / Chemical properties

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

Property	Value
Physical state	Liquid at 20°C and 1013 hPa
Colour	Colourless
Odour	Ether-like
Molecular weight	290.44 g/mol
Density	0.872 g/cm ³ at 20°C
Vapour pressure	0.00175 Pa at 20°C
Freezing point	8°C

Boiling point	Not relevant, the substance decomposes before boiling
Self-Accelerating Decomposition Temperature (SADT)	80°C
Flash point	68°C
Explosive properties	Risk of explosion if heated under confinement
Water solubility	152 µg/L at 20°C
Octanol-water partition coefficient (LogKow)	7.34 at 25°C

5. Health Effects

2,5-dimethyl-2,5-di(tert-butylperoxy)hexane peroxide is of low toxicity for human health.

Effect Assessment	Result
Acute Toxicity Oral / inhalation / dermal	Low acute toxicity by oral and dermal routes. No data following inhalation acute exposure.
Irritation / corrosion Skin / eye	Causes mild irritation to skin. Causes mild irritation to eyes.
Sensitisation	Based on analogy with a similar substance, does not cause skin allergic reaction.
Toxicity after repeated exposure Oral	Based on the available test data, does not cause significant target organ toxicity after oral repeated exposure.
Genotoxicity / Mutagenicity	Does not cause genotoxic effects, based on <i>in vitro</i> and <i>in vivo</i> tests.
Carcinogenicity	No data available.
Toxicity for reproduction	No data available.

6. Environmental Effects

The substance is poorly soluble in water and no effect on aquatic organism was observed up to the water solubility limit. Furthermore, it is not considered as a PBT nor vP/vB substance.

Effect Assessment	Result
Aquatic Toxicity	No effect up to the water solubility limit

Fate and behaviour	Result
Biodegradation	Not readily biodegradable
Bioaccumulation potential	Not bioaccumulable
PBT / vPvB conclusion	Not PBT/vPvB substance

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 small quantities 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 (which has been 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

Can be discharged in 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%.

Storage and handling

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 overpressurization 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.

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)

Never return any product to the container from which it was originally removed (risk of decomposition).

Avoid temperatures above 30 °C (to maintain the technical properties of the product). Storage buildings must be built and equipped so as not to exceed the maximum proscribed temperature limit.

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 2,5-dimethyl-2,5-di(tert-butylperoxy)hexane 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
>90-100%	liquid	UN 3103	OP Type C, Liquid, No temperature control	Type C: the mixture possesses explosive properties but cannot detonate or deflagrate rapidly or undergo a thermal explosion when packaged
>52-90%	liquid	UN 3105	OP Type D, Liquid, No temperature control	Type D: (i) detonates partially, does not deflagrate rapidly, no violent effects when heated under confinement; or (ii) does not detonate at all, deflagrates slowly, no violent effects when heated under confinement; or (iii) does not detonate or deflagrate, medium effect when heated under confinement

≤77%	Solid	UN 3108	OP Type E, Solid, 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
≤77%	Solid, as a paste	UN 3108	OP Type E, Solid, 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 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 to CLP (EC) 1272/2008, implementation of the GHS in the European Union.

Classification	
According to REGULATION (EC) N° 1272/2008:	
<ul style="list-style-type: none"> – Organic peroxide; type C; Heating may cause a fire. – Skin irritation; Category 2; Causes skin irritation. 	
Pictogram	
– GHS02: Flame	
– GHS07: Exclamation mark	
Signal word	
– Danger	
Hazard statement	
<ul style="list-style-type: none"> – H242: Heating may cause a fire. – H315: Causes skin irritation. 	
Alternative classification according to Globally Harmonized System (GHS)	
– Flammable Liquid; Category 4; Combustible liquid.	

10. Contact Information within Company

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

- 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: 2014/07/10
- 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.

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