

## GPS Safety Summary

Substance Name:

### Tert-butyl peroxybenzoate

#### 1. General Statement

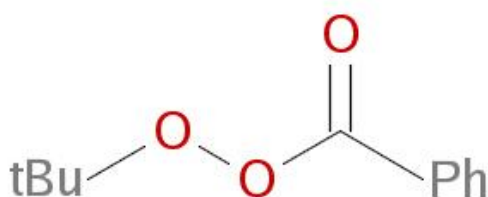
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Tert-butyl peroxy-2-ethylhexanoate is primarily used in the manufacture of polymer, as a polymerisation initiator.

#### 2. Chemical Identity

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<b>Name:</b>	tert-butyl peroxybenzoate
<b>Brand names:</b>	Luperox® P grades, Luperox® DP10G, Luperox® DP20
<b>Chemical name (IUPAC):</b>	tert-butyl benzenecarboperoxoate
<b>CAS number:</b>	614-45-9
<b>EC number:</b>	210-382-2
<b>Molecular formula:</b>	C <sub>11</sub> H <sub>14</sub> O <sub>3</sub>
<b>Structure:</b>	



#### 3. Use and applications

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Tert-Butyl peroxybenzoate is primarily used as a radical initiator to induce polymerisation (free radical polymerisation process), for the manufacture of e.g. PVC, and as a curing agent for the production of unsaturated polyester resins.

#### 4. Physical / Chemical properties

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

Tert-butyl peroxybenzoate is classified as Organic Peroxide, Type C, H242 (see section 8 and 9 below):

Property	Value
Physical state	Liquid at 20°C and 1013 hPa
Colour	Slightly yellow
Odour	Slightly aromatic
Molecular weight	194.2 g/mol
Density	1.04 g/cm <sup>3</sup> at 20°C
Vapour pressure	0.003 Pa at 20°C
Melting range	9-11°C at 1013hPa
Self-Accelerating Decomposition Temperature (SADT)	60°C
Explosive properties	Risk of explosion if heated under confinement.
Water solubility	325 mg/L at 20°C
Octanol-water partition coefficient (Log K <sub>ow</sub> )	3 at 25°C

## 5. Health Effects

Effect Assessment	Result
Acute Toxicity Oral / inhalation / dermal	Harmful by inhalation.
Irritation / corrosion Skin / eye/ respiratory tract	Skin irritant. Mild eye irritant.
Sensitisation	Product may cause allergic skin 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, caused gene mutation <i>in vitro</i> . Did not cause chromosomal damages <i>in vivo</i> .
Carcinogenicity	No data available.
Reproductive / Developmental Toxicology	Based on the available test data, did not cause significant adverse effects on reproduction after oral exposure.

## 6. Environmental Effects

Tert-butyl peroxybenzoate is highly toxic to aquatic organisms. However, tests have shown that this substance is readily biodegradable and not bioaccumulable.

Effect Assessment	Result
Aquatic Toxicity	Very toxic to aquatic life

Fate and behaviour	Result
Biodegradation	Readily biodegradable
Bioaccumulation potential	Not bioaccumulative
PBT / vPvB conclusion	Not considered as PBT or vPvB

## 7. Exposure

### 7.1 Human health

The manufacture of tert-butyl peroxybenzoate 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 tert-butyl peroxybenzoate are skin contact and inhalation.

In addition, the general population is not expected to be exposed to tert-butyl peroxybenzoate 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).

### 7.2 Environment

Releases of tert-butyl peroxybenzoate into the environment are to be expected during production, processing (formulation) and industrial/professional uses mainly via wastewater and lesser amounts via emissions of vapour or powder (due to its physical state and its vapour pressure).

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

Tert-butyl peroxybenzoate 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.

The substance is used in low quantity in polymer/resin production, and is almost totally consumed during the process. Therefore the release to environment is very low and the substance is readily biodegradable. 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: 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 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.

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 below 10°C (to prevent crystallization/separation), and temperatures above 30 °C (prevention of fire/explosion). 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

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 TBPEH 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
>77%-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

>52-77%	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.
≤52%	solid	UN 3106	OP Type D, Solid, 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.

## 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.

Classification	
According to REGULATION (EC) no 1272/2008: <ul style="list-style-type: none"> <li>– Organic peroxide; type C; Heating may cause a fire.</li> <li>– Inhalation: Acute toxicity; Category 4; Harmful if inhaled (gas, vapour, dust, mist).</li> <li>– Skin irritation; Category 2; Causes skin irritation.</li> <li>– Skin sensitization; Category 1B; May cause an allergic skin reaction.</li> <li>– Acute aquatic toxicity; Category 1; Very toxic to aquatic life.</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>– H332: Harmful if inhaled (gas, vapour, dust, mist).</li> <li>– H315: Causes skin irritation.</li> <li>– H317: May cause an allergic skin reaction.</li> <li>– H400: Very toxic to aquatic life.</li> </ul>
Alternative classification according to Globally Harmonized System (GHS)
<ul style="list-style-type: none"> <li>– Oral: Acute toxicity; Category 5; May be harmful if swallowed.</li> </ul>

## 10. Contact Information within Company

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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

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- Date of issue: 2013/11/30
- 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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