

GPS Safety Summary

Substance Name:

1,3(4)-bis(tert-butylperoxyisopropyl)benzene

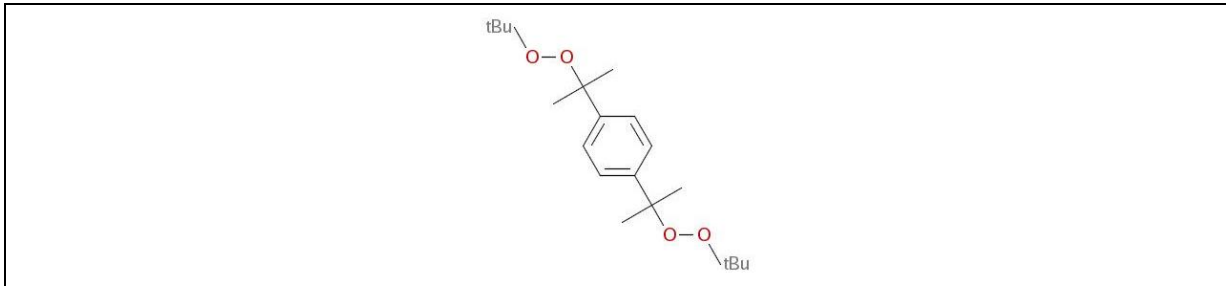
1. General Statement

1,3(4)-bis(tert-butylperoxyisopropyl)benzene is primarily used in the manufacture of polymers and elastomers.

2. Chemical Identity

Name: 1,3(4)-bis(tert-butylperoxyisopropyl)benzene, bisperoxide
Brand names: Luperox F, Luperox F40
Chemical name (IUPAC): 1,3(4)-bis[1-(tert-butylperoxy)-1-methylethyl]benzene
CAS number: 25155-25-3
EC number: 246-678-3
Molecular formula: C₂₀H₃₄O₄

Structure:



3. Use and applications

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

Bisperoxide is also used as modifier of polypropylene rheology.

4. Physical / Chemical properties

Property	Value
Physical state	Solid at 20°C and 1013 hPa
Form	Blocks, flakes, powder, pellets
Particle size	The pure substance consists of big blocks and powder. The particular fraction is <10% (and approx. 90% of the particles have a size >100µm) Median size of particles higher than 100µm: 193 µm Median size of particles lower than 100µm: 91 µm

Colour	White to yellowish
Odour	Slightly aromatic
Molecular weight	338.49 g/mol
Relative Density	0.97 at 20°C
Vapour pressure	0.00012 hPa at 20°C
Melting range	37-54°C at 1013 hPa
Self-Accelerating Decomposition Temperature (SADT)	70°C
Oxidising properties	Not relevant, as the substance is an organic peroxide
Explosive properties	Non explosive
Water solubility	0.04 mg/L at 20°C
Octanol-water partition coefficient (Log K _{ow})	7,3 at 20°C

5. Health Effects

Based on the available data, 1,3(4)-bis[1-(tert-butylperoxy)-1-methylethyl]benzene is not of toxicological concern.

Effect Assessment	Result
Acute Toxicity Oral / inhalation / dermal	Based on available data, low oral or dermal acute toxicity.
Irritation / corrosion Skin / eye/ respiratory tract	Based on the available test data, not irritant for skin or eye.
Sensitisation	Based on the available test data, did not 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 repeated exposure.
Genotoxicity / Mutagenicity	Based on the available test data, not expected to cause adverse genetic effects.
Carcinogenicity	Based on the available test data, not expected to cause cancer under normal use conditions.
Reproductive / Developmental Toxicology	Based on the available test data, did not cause significant adverse effects on reproduction.

6. Environmental Effects

Acute toxicity tests performed on aquatic organisms have shown no toxicity up to the limit of water solubility, bisperoxide is thus not classified on short-term for this compartment, but may cause long lasting harmful effects to aquatic life considering its physico-chemical properties.

Due to its insolubility in water and its high value of K_{ow}, Bisperoxide will be found mainly into the sediment compartment when emitted to any environmental compartment: the substance was found to be not readily biodegradable in an aquatic system, nevertheless, a half-life of 29 days was measured in a water/sediment sediment system under anaerobic conditions, which indicates that Bisperoxide is not PBT nor vPvB.

Effect Assessment	Result
Aquatic Toxicity	No acute toxicity up to the limit of water solubility. May cause long lasting harmful effects to aquatic life.

Fate and behaviour	Result
Biodegradation	Not readily biodegradable. Half-life = 29 days in a water/sediment system (anaerobic conditions).
Bioaccumulation potential	Has the potential to bioaccumulate.
PBT / vPvB conclusion	Not considered as PBT nor vPvB.

7. Exposure

7.1 Human health

The manufacture of bisperoxide 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 bisperoxide are skin contact and inhalation.

In addition, general population is not expected to be exposed to bisperoxide 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 bisperoxide 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

Bisperoxide is used in cross-linking processes, which can be either dry or wet processes. In case of wet processes, releases to water have to be directed to wastewater treatment plant.

Due to the high value of K_{ow}, the environmental risk is driven by the sediment (due to a high potential of adsorption), and human exposure via environment (due to the bioaccumulation). 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).

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: nitrile rubber, 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.
Environmental measures	
<p>Can be disposed of as 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>	

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 bisperoxide 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
>42%-100%	as 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
≤42%	as solid	Exempt	Not subject to requirements of class 5.2	