

## SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

### 1.1. Product identifier

<b>Product Description:</b>	<b>Isoprene</b>
<b>Cat No. :</b>	<b>L14619</b>
<b>Synonyms</b>	2-Methyl-1,3-butadiene; 1,3-Butadiene, 2-Methyl-; 2-Methylbutadiene; 3-Methyl-1,3-Butadiene, Methylbiviny; Beta-Methylbiviny; Hemiterpene
<b>Index No</b>	601-014-00-5
<b>CAS No</b>	78-79-5
<b>EC No</b>	201-143-3
<b>Molecular Formula</b>	C5 H8
<b>REACH registration number</b>	-

### 1.2. Relevant identified uses of the substance or mixture and uses advised against

<b>Recommended Use</b>	Laboratory chemicals.
<b>Uses advised against</b>	No Information available

### 1.3. Details of the supplier of the safety data sheet

<b>Company</b>	Avocado Research Chemicals Ltd. (Part of Thermo Fisher Scientific) Shore Road, Heysham Lancashire, LA3 2XY, United Kingdom Office Tel: +44 (0) 1524 850506 Office Fax: +44 (0) 1524 850608
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<b>E-mail address</b>	begel.sdsdesk@thermofisher.com
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### 1.4. Emergency telephone number

For information **US** call: 001-800-227-6701 / **Europe** call: +32 14 57 52 11  
Emergency Number **US**:001-201-796-7100 / **Europe**: +32 14 57 52 99  
**CHEMTREC** Tel. No. **US**:001-800-424-9300 / **Europe**:001-703-527-3887

## SECTION 2: HAZARDS IDENTIFICATION

### 2.1. Classification of the substance or mixture

**CLP Classification - According to GB-CLP Regulations UK SI 2019/720 and UK SI 2020/1567**

#### **Physical hazards**

Flammable liquids

Category 1 (H224)

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<b>Health hazards</b>	
Germ Cell Mutagenicity Carcinogenicity	Category 2 (H341) Category 1B (H350)
<b>Environmental hazards</b>	
Chronic aquatic toxicity	Category 2 (H411)

Full text of Hazard Statements: see section 16

## 2.2. Label elements



Signal Word

Danger

## Hazard Statements

- H224 - Extremely flammable liquid and vapor
- H341 - Suspected of causing genetic defects
- H350 - May cause cancer
- H411 - Toxic to aquatic life with long lasting effects

## Precautionary Statements

- P201 - Obtain special instructions before use
- P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking
- P280 - Wear protective gloves/protective clothing/eye protection/face protection
- P303 + P361 + P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower
- P308 + P313 - IF exposed or concerned: Get medical advice/attention

## Additional EU labelling

Restricted to professional users

## 2.3. Other hazards

Substance is not considered persistent, bioaccumulative and toxic (PBT) / very persistent and very bioaccumulative (vPvB)

Contains a known or suspected endocrine disruptor

Contains a substance on the National Authorities Endocrine Disruptor Lists

## SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

### 3.1. Substances

Component	CAS No	EC No	Weight %	CLP Classification - According to GB-CLP Regulations UK SI 2019/720 and UK SI 2020/1567
Isoprene	78-79-5	EEC No. 201-143-3	>95	Muta. 2 (H341) Carc. 1B (H350) Aquatic Chronic 2 (H411)

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4-tert-Butyl catechol	98-29-3	202-653-9	0.01	Flam. Liq. 1 (H224) Acute Tox. 4 (H302) Acute Tox. 4 (H312) Skin Corr. 1B (H314) Skin Sens. 1 (H317) Eye Dam. 1 (H318) Aquatic Acute 1 (H400) Aquatic Chronic 2 (H411)
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Component	Specific concentration limits (SCL's)	M-Factor	Component notes
4-tert-Butyl catechol	-	1	-

REACH registration number	-
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Full text of Hazard Statements: see section 16

## SECTION 4: FIRST AID MEASURES

### 4.1. Description of first aid measures

<b>General Advice</b>	Show this safety data sheet to the doctor in attendance. Immediate medical attention is required.
<b>Eye Contact</b>	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
<b>Skin Contact</b>	Wash off immediately with plenty of water for at least 15 minutes. Immediate medical attention is required.
<b>Ingestion</b>	Do NOT induce vomiting. Call a physician or poison control center immediately.
<b>Inhalation</b>	Remove to fresh air. If not breathing, give artificial respiration. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Immediate medical attention is required.
<b>Self-Protection of the First Aider</b>	Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination.

### 4.2. Most important symptoms and effects, both acute and delayed

Difficulty in breathing. Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting

### 4.3. Indication of any immediate medical attention and special treatment needed

**Notes to Physician** Treat symptomatically.

## SECTION 5: FIREFIGHTING MEASURES

### 5.1. Extinguishing media

#### Suitable Extinguishing Media

Water spray, carbon dioxide (CO<sub>2</sub>), dry chemical, alcohol-resistant foam. Water mist may be used to cool closed containers.

#### Extinguishing media which must not be used for safety reasons

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No information available.

## **5.2. Special hazards arising from the substance or mixture**

Extremely flammable. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back. Containers may explode when heated. Vapors may form explosive mixtures with air.

### **Hazardous Combustion Products**

Carbon monoxide (CO), Carbon dioxide (CO<sub>2</sub>).

## **5.3. Advice for firefighters**

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

## **SECTION 6: ACCIDENTAL RELEASE MEASURES**

### **6.1. Personal precautions, protective equipment and emergency procedures**

Ensure adequate ventilation. Use personal protective equipment as required. Keep people away from and upwind of spill/leak. Evacuate personnel to safe areas. Remove all sources of ignition. Take precautionary measures against static discharges.

### **6.2. Environmental precautions**

Do not flush into surface water or sanitary sewer system.

### **6.3. Methods and material for containment and cleaning up**

Keep in suitable, closed containers for disposal. Soak up with inert absorbent material. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment.

### **6.4. Reference to other sections**

Refer to protective measures listed in Sections 8 and 13.

## **SECTION 7: HANDLING AND STORAGE**

### **7.1. Precautions for safe handling**

Wear personal protective equipment/face protection. Do not get in eyes, on skin, or on clothing. Use only under a chemical fume hood. Do not breathe mist/vapors/spray. Do not ingest. If swallowed then seek immediate medical assistance. Keep away from open flames, hot surfaces and sources of ignition. Use spark-proof tools and explosion-proof equipment. Use only non-sparking tools. To avoid ignition of vapors by static electricity discharge, all metal parts of the equipment must be grounded. Take precautionary measures against static discharges.

### **Hygiene Measures**

Handle in accordance with good industrial hygiene and safety practice. Keep away from food, drink and animal feeding stuffs. Do not eat, drink or smoke when using this product. Remove and wash contaminated clothing and gloves, including the inside, before re-use. Wash hands before breaks and after work.

### **7.2. Conditions for safe storage, including any incompatibilities**

Refrigerator/flammables. Store under an inert atmosphere. Keep container tightly closed. Protect from direct sunlight. Keep away from heat, sparks and flame.

**Technical Rules for Hazardous Substances (TRGS) 510**      Class 3  
**Storage Class (LGK) (Germany)**

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### 7.3. Specific end use(s)

Use in laboratories

## SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

### 8.1. Control parameters

#### Exposure limits

List source(s):

#### Biological limit values

This product, as supplied, does not contain any hazardous materials with biological limits established by the region specific regulatory bodies

#### Derived No Effect Level (DNEL) / Derived Minimum Effect Level (DMEL)

Workers; See table for values

Component	Acute effects local (Dermal)	Acute effects systemic (Dermal)	Chronic effects local (Dermal)	Chronic effects systemic (Dermal)
Isoprene 78-79-5 ( >95 )				DNEL = 23.7mg/kg bw/day

Component	Acute effects local (Inhalation)	Acute effects systemic (Inhalation)	Chronic effects local (Inhalation)	Chronic effects systemic (Inhalation)
Isoprene 78-79-5 ( >95 )				DNEL = 8.4mg/m <sup>3</sup>
4-tert-Butyl catechol 98-29-3 ( 0.01 )				DNEL = 1.6mg/m <sup>3</sup>

#### Predicted No Effect Concentration (PNEC)

See values below.

Component	Fresh water	Fresh water sediment	Water Intermittent	Microorganisms in sewage treatment	Soil (Agriculture)
Isoprene 78-79-5 ( >95 )	PNEC = 0.93mg/L	PNEC = 14mg/kg sediment dw	PNEC = 0.93mg/L	PNEC = 14.55mg/L	PNEC = 2.4mg/kg soil dw
4-tert-Butyl catechol 98-29-3 ( 0.01 )	PNEC = 1.2µg/L	PNEC = 6.9µg/kg sediment dw	PNEC = 1.2µg/L	PNEC = 0.16mg/L	PNEC = 0.68µg/kg soil dw

Component	Marine water	Marine water sediment	Marine water intermittent	Food chain	Air
Isoprene 78-79-5 ( >95 )	PNEC = 0.93mg/L	PNEC = 14mg/kg sediment dw			
4-tert-Butyl catechol 98-29-3 ( 0.01 )	PNEC = 0.12µg/L	PNEC = 0.69µg/kg sediment dw			

### 8.2. Exposure controls

#### Engineering Measures

Ensure adequate ventilation, especially in confined areas. Use explosion-proof electrical/ventilating/lighting equipment. Ensure that

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eyewash stations and safety showers are close to the workstation location.

Wherever possible, engineering control measures such as the isolation or enclosure of the process, the introduction of process or equipment changes to minimise release or contact, and the use of properly designed ventilation systems, should be adopted to control hazardous materials at source

## Personal protective equipment

**Eye Protection** Goggles (European standard - EN 166)

**Hand Protection** Protective gloves

Glove material	Breakthrough time	Glove thickness	EU standard	Glove comments
Natural rubber	See manufacturers recommendations	-	EN 374	(minimum requirement)
Nitrile rubber				
Neoprene				
PVC				

**Skin and body protection** Long sleeved clothing.

Inspect gloves before use.

Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. (Refer to manufacturer/supplier for information)

Ensure gloves are suitable for the task: Chemical compatability, Dexterity, Operational conditions, User susceptibility, e.g. sensitisation effects, also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion.

Remove gloves with care avoiding skin contamination.

**Respiratory Protection** When workers are facing concentrations above the exposure limit they must use appropriate certified respirators. To protect the wearer, respiratory protective equipment must be the correct fit and be used and maintained properly

**Large scale/emergency use** Use a NIOSH/MSHA or European Standard EN 136 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced  
**Recommended Filter type:** Organic gases and vapours filter Type A Brown conforming to EN14387

**Small scale/Laboratory use** Use a NIOSH/MSHA or European Standard EN 149:2001 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.  
**Recommended half mask:-** Valve filtering: EN405; or; Half mask: EN140; plus filter, EN 141  
When RPE is used a face piece Fit Test should be conducted

**Environmental exposure controls** Prevent product from entering drains. Do not allow material to contaminate ground water system.

## SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

### 9.1. Information on basic physical and chemical properties

<b>Physical State</b>	Liquid
<b>Appearance</b>	Light yellow
<b>Odor</b>	mild aromatic
<b>Odor Threshold</b>	No data available
<b>Melting Point/Range</b>	-146 °C / -230.8 °F
<b>Softening Point</b>	No data available
<b>Boiling Point/Range</b>	34 °C / 93.2 °F @ 760 mmHg
<b>Flammability (liquid)</b>	Extremely flammable On basis of test data
<b>Flammability (solid,gas)</b>	Not applicable Liquid
<b>Explosion Limits</b>	<b>Lower</b> 1 <b>Upper</b> 9.7
<b>Flash Point</b>	-48 °C / -54.4 °F

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<b>Autoignition Temperature</b>	220 °C / 428 °F	<b>Method</b> - No information available
<b>Decomposition Temperature</b>	No data available	
<b>pH</b>	No information available	
<b>Viscosity</b>	0.225 cP at 15 °C	
<b>Water Solubility</b>	0.7 mg/L (25°C)	practically insoluble
<b>Solubility in other solvents</b>	No information available	
<b>Partition Coefficient (n-octanol/water)</b>		
<b>Component</b>	<b>log Pow</b>	
Isoprene	2.42	
4-tert-Butyl catechol	1.98	
<b>Vapor Pressure</b>	532 hPa @ 20 °C	
<b>Density / Specific Gravity</b>	0.680	
<b>Bulk Density</b>	Not applicable	Liquid
<b>Vapor Density</b>	2.35	(Air = 1.0)
<b>Particle characteristics</b>	Not applicable (liquid)	

## 9.2. Other information

<b>Molecular Formula</b>	C5 H8
<b>Molecular Weight</b>	68.11
<b>Explosive Properties</b>	Vapors may form explosive mixtures with air
<b>Self-accelerating polymerisation temperature (SAPT)</b>	>76°C (Drum) (40 ppm) >78°C (Drum) (200 ppm) ≥65°C(20ft Iso tank) >45°C(1000m3 Tank)

## SECTION 10: STABILITY AND REACTIVITY

### 10.1. Reactivity

None known, based on information available

### 10.2. Chemical stability

Sensitivity to light. Air sensitive.

### 10.3. Possibility of hazardous reactions

**Hazardous Polymerization** Hazardous polymerization may occur upon depletion of inhibitor.  
**Hazardous Reactions** No information available.

### 10.4. Conditions to avoid

Keep away from open flames, hot surfaces and sources of ignition. Excess heat. Incompatible products. Exposure to light. Exposure to air.

### 10.5. Incompatible materials

Strong bases. Acids. Alcohols. Ammonia. Halogens. oxygen. Acid chlorides. Metals. Strong oxidizing agents. Reducing Agent.

### 10.6. Hazardous decomposition products

Carbon monoxide (CO). Carbon dioxide (CO<sub>2</sub>).

## SECTION 11: TOXICOLOGICAL INFORMATION

### 11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

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**(a) acute toxicity;**

Oral

Based on available data, the classification criteria are not met

Dermal

Based on available data, the classification criteria are not met

Inhalation

Based on available data, the classification criteria are not met

**Toxicology data for the components**

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Isoprene	2043-2210 mg/kg ( Rat )	>1 mL/kg ( Rat )	LC50 = 180 mg/L ( Rat ) 4 h
4-tert-Butyl catechol	815 mg/kg ( Rat )	1331 mg/kg ( Rat )	-

**(b) skin corrosion/irritation;** No data available

**(c) serious eye damage/irritation;** No data available

**(d) respiratory or skin sensitization;**

Respiratory

No data available

Skin

No data available

**(e) germ cell mutagenicity;**

Category 2

Animal experiments showed mutagenic and teratogenic effects

**(f) carcinogenicity;**

Category 1B

Limited evidence of a carcinogenic effect The table below indicates whether each agency has listed any ingredient as a carcinogen

Component	EU	UK	Germany	IARC
Isoprene	Carc Cat. 1B			Group 2B

**(g) reproductive toxicity;** No data available

**(h) STOT-single exposure;** No data available

**(i) STOT-repeated exposure;** No data available

Target Organs

No information available.

**(j) aspiration hazard;** No data available

**Symptoms / effects,both acute and delayed**

Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting.

**11.2. Information on other hazards**

**Endocrine Disrupting Properties**

Assess endocrine disrupting properties for human health

Contains a substance on the National Authorities Endocrine Disruptor Lists

## SECTION 12: ECOLOGICAL INFORMATION



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## 12.1. Toxicity

### Ecotoxicity effects

Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. The product contains following substances which are hazardous for the environment.

Component	Freshwater Fish	Water Flea	Freshwater Algae
Isoprene	LC50: 32.5 - 50.15 mg/L, 96h static (Lepomis macrochirus) LC50: 188.77 - 305.14 mg/L, 96h static (Poecilia reticulata) LC50: 58.75 - 95.32 mg/L, 96h static (Pimephales promelas)	EC50: = 140 mg/L, 48h (Daphnia magna)	EC50: > 1000 mg/L, 96h (Scenedesmus quadricauda)
4-tert-Butyl catechol	LC50 = 0.12 mg/L 96h	EC50=0.48 mg/L 48h	

Component	Microtox	M-Factor
4-tert-Butyl catechol		1

## 12.2. Persistence and degradability

### Persistence

Not readily biodegradable

Persistence is unlikely, based on information available.

### Degradation in sewage treatment plant

Contains substances known to be hazardous to the environment or not degradable in waste water treatment plants.

## 12.3. Bioaccumulative potential

Bioaccumulation is unlikely

Component	log Pow	Bioconcentration factor (BCF)
Isoprene	2.42	No data available
4-tert-Butyl catechol	1.98	No data available

## 12.4. Mobility in soil

The product contains volatile organic compounds (VOC) which will evaporate easily from all surfaces. Will likely be mobile in the environment due to its volatility. Disperses rapidly in air.

## 12.5. Results of PBT and vPvB assessment

Substance is not considered persistent, bioaccumulative and toxic (PBT) / very persistent and very bioaccumulative (vPvB).

## 12.6. Endocrine disrupting properties

### Endocrine Disruptor Information Assess endocrine disrupting properties for the environment

This product does not contain any known or suspected endocrine disruptors. Contains a substance on the National Authorities Endocrine Disruptor Lists.

## 12.7. Other adverse effects

### Persistent Organic Pollutant Ozone Depletion Potential

This product does not contain any known or suspected substance.  
This product does not contain any known or suspected substance.

## SECTION 13: DISPOSAL CONSIDERATIONS

### 13.1. Waste treatment methods

#### Waste from Residues/Unused Products

Waste is classified as hazardous. Dispose of in accordance with the European Directives on waste and hazardous waste. Dispose of in accordance with local regulations.

#### Contaminated Packaging

Dispose of this container to hazardous or special waste collection point. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep product and

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empty container away from heat and sources of ignition.

**European Waste Catalogue (EWC)** According to the European Waste Catalog, Waste Codes are not product specific, but application specific.

**Other Information** Do not flush to sewer. Waste codes should be assigned by the user based on the application for which the product was used. Can be landfilled or incinerated, when in compliance with local regulations. Do not let this chemical enter the environment. Do not empty into drains.

## SECTION 14: TRANSPORT INFORMATION

### IMDG/IMO

**14.1. UN number** UN1218  
**14.2. UN proper shipping name** ISOPRENE, STABILIZED  
**14.3. Transport hazard class(es)** 3  
**14.4. Packing group** I

### ADR

**14.1. UN number** UN1218  
**14.2. UN proper shipping name** ISOPRENE, STABILIZED  
**14.3. Transport hazard class(es)** 3  
**14.4. Packing group** I

### IATA

**14.1. UN number** UN1218  
**14.2. UN proper shipping name** ISOPRENE, STABILIZED  
**14.3. Transport hazard class(es)** 3  
**14.4. Packing group** I

**14.5. Environmental hazards** Dangerous for the environment  
Product is a marine pollutant according to the criteria set by IMDG/IMO

**14.6. Special precautions for user** Inhibitors have been added to stabilize this product. Inhibitor levels should be maintained.  
Hazardous polymerization may occur upon depletion of inhibitor.

**14.7. Maritime transport in bulk according to IMO instruments** Not applicable, packaged goods

## SECTION 15: REGULATORY INFORMATION

### 15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

#### **International Inventories**

Europe (EINECS/ELINCS/NLP), China (IECSC), Taiwan (TCSI), Korea (KECL), Japan (ENCS), Japan (ISHL), Canada (DSL/NDSL), Australia (AICS), New Zealand (NZIoC), Philippines (PICCS). US EPA (TSCA) - Toxic Substances Control Act, (40 CFR Part 710)

Component	CAS No	EINECS	ELINCS	NLP	IECSC	TCSI	KECL	ENCS	ISHL
Isoprene	78-79-5	201-143-3	-	-	X	X	KE-23526	X	X
4-tert-Butyl catechol	98-29-3	202-653-9	-	-	X	X	KE-11368	X	X

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Component	CAS No	TSCA	TSCA Inventory notification - Active-Inactive	DSL	NDSL	AICS	NZIoC	PICCS
Isoprene	78-79-5	X	ACTIVE	X	-	X	X	X
4-tert-Butyl catechol	98-29-3	X	ACTIVE	X	-	X	X	X

**Legend:** X - Listed '-' - Not Listed

**KECL** - NIER number or KE number (<http://ncis.nier.go.kr/en/main.do>)

## Authorisation/Restrictions according to EU REACH

Component	CAS No	REACH (1907/2006) - Annex XIV - Substances Subject to Authorization	REACH (1907/2006) - Annex XVII - Restrictions on Certain Dangerous Substances	REACH Regulation (EC 1907/2006) article 59 - Candidate List of Substances of Very High Concern (SVHC)
Isoprene	78-79-5	-	Use restricted. See item 28. (see link for restriction details) Use restricted. See item 75. (see link for restriction details)	-
4-tert-Butyl catechol	98-29-3	-	Use restricted. See item 75. (see link for restriction details)	-

### REACH links

<https://echa.europa.eu/substances-restricted-under-reach>

## Seveso III Directive (2012/18/EC)

Component	CAS No	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Major Accident Notification	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Safety Report Requirements
Isoprene	78-79-5	Not applicable	Not applicable
4-tert-Butyl catechol	98-29-3	Not applicable	Not applicable

## Regulation (EC) No 649/2012 of the European Parliament and of the Council of 4 July 2012 concerning the export and import of dangerous chemicals

Not applicable

## Contains component(s) that meet a 'definition' of per & poly fluoroalkyl substance (PFAS)?

Not applicable

Take note of Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work .

Take note of Dir 76/769/EEC relating to restrictions on the marketing and use of certain dangerous substances and preparations

## National Regulations

**UK** - Take note of Control of Substances Hazardous to Health Regulations (COSHH) 2002 and 2005 Amendment

## WGK Classification

See table for values

Component	Germany - Water Classification (AwSV)	Germany - TA-Luft Class
Isoprene	WGK3	
4-tert-Butyl catechol	WGK3	

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Component	Switzerland - Ordinance on the Reduction of Risk from handling of hazardous substances preparation (SR 814.81)	Switzerland - Ordinance on Incentive Taxes on Volatile Organic Compounds (OVOC)	Switzerland - Ordinance of the Rotterdam Convention on the Prior Informed Consent Procedure
Isoprene 78-79-5 ( >95 )	Prohibited and Restricted Substances		
4-tert-Butyl catechol 98-29-3 ( 0.01 )	Prohibited and Restricted Substances		

## 15.2. Chemical safety assessment

Chemical Safety Assessment/Reports (CSA/CSR) are not required for mixtures

## SECTION 16: OTHER INFORMATION

### Full text of H-Statements referred to under sections 2 and 3

H224 - Extremely flammable liquid and vapor  
H302 - Harmful if swallowed  
H312 - Harmful in contact with skin  
H314 - Causes severe skin burns and eye damage  
H317 - May cause an allergic skin reaction  
H318 - Causes serious eye damage  
H341 - Suspected of causing genetic defects  
H350 - May cause cancer  
H400 - Very toxic to aquatic life  
H410 - Very toxic to aquatic life with long lasting effects  
H411 - Toxic to aquatic life with long lasting effects

### Legend

**CAS** - Chemical Abstracts Service

**EINECS/ELINCS** - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances

**PICCS** - Philippines Inventory of Chemicals and Chemical Substances

**IECSC** - Chinese Inventory of Existing Chemical Substances

**KECL** - Korean Existing and Evaluated Chemical Substances

**WEL** - Workplace Exposure Limit

**ACGIH** - American Conference of Governmental Industrial Hygienists

**DNEL** - Derived No Effect Level

**RPE** - Respiratory Protective Equipment

**LC50** - Lethal Concentration 50%

**NOEC** - No Observed Effect Concentration

**PBT** - Persistent, Bioaccumulative, Toxic

**TSCA** - United States Toxic Substances Control Act Section 8(b) Inventory

**DSL/NDL** - Canadian Domestic Substances List/Non-Domestic Substances List

**ENCS** - Japanese Existing and New Chemical Substances

**AICS** - Australian Inventory of Chemical Substances

**NZIoC** - New Zealand Inventory of Chemicals

**TWA** - Time Weighted Average

**IARC** - International Agency for Research on Cancer Predicted No Effect Concentration (PNEC)

**LD50** - Lethal Dose 50%

**EC50** - Effective Concentration 50%

**POW** - Partition coefficient Octanol:Water

**vPvB** - very Persistent, very Bioaccumulative

**ADR** - European Agreement Concerning the International Carriage of Dangerous Goods by Road

**IMO/IMDG** - International Maritime Organization/International Maritime Dangerous Goods Code

**OECD** - Organisation for Economic Co-operation and Development

**BCF** - Bioconcentration factor

### **Key literature references and sources for data**

<https://echa.europa.eu/information-on-chemicals>

Suppliers safety data sheet, Chemadvisor - LOLI, Merck index, RTECS

**ICAO/IATA** - International Civil Aviation Organization/International Air Transport Association

**MARPOL** - International Convention for the Prevention of Pollution from Ships

**ATE** - Acute Toxicity Estimate

**VOC** - (Volatile Organic Compound)

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Classification and procedure used to derive the classification for mixtures according to Regulation (EC) 1272/2008 [CLP]:

Physical hazards	On basis of test data
Health Hazards	Calculation method
Environmental hazards	Calculation method

## Training Advice

Chemical incident response training.

Prepared By	Health, Safety and Environmental Department
Creation Date	09-Feb-2012
Revision Date	09-Feb-2024
Revision Summary	New emergency telephone response service provider.

**This safety data sheet complies with Regulation UK SI 2019/758 and UK SI 2020/1577 as amended.**

## Disclaimer

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**End of Safety Data Sheet**