

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Revision Date 01.12.2017

Version 11.6

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## SECTION 1. Identification of the substance/mixture and of the company/undertaking

### 1.1 Product identifier

Catalogue No.	818604
Product name	Tributyl phosphate for synthesis
REACH Registration Number	01-2119492859-14-XXXX
CAS-No.	126-73-8

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

Identified uses	Chemical for synthesis In compliance with the conditions described in the annex to this safety data sheet.
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### 1.3 Details of the supplier of the safety data sheet

Company	Merck KGaA * 64271 Darmstadt * Germany * Phone:+49 6151 72-0
Responsible Department	LS-QHC * e-mail: prodsafe@merckgroup.com

1.4 Emergency telephone number	Please contact the regional company representation in your country.
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## SECTION 2. Hazards identification

### 2.1 Classification of the substance or mixture

Classification (REGULATION (EC) No 1272/2008)

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Acute toxicity, Category 4, Oral, H302

Skin irritation, Category 2, H315

Carcinogenicity, Category 2, H351

Chronic aquatic toxicity, Category 3, H412

For the full text of the H-Statements mentioned in this Section, see Section 16.

## 2.2 Label elements

Labelling (REGULATION (EC) No 1272/2008)

*Hazard pictograms*



*Signal word*

Warning

*Hazard statements*

H302 Harmful if swallowed.

H315 Causes skin irritation.

H351 Suspected of causing cancer.

H412 Harmful to aquatic life with long lasting effects.

*Precautionary statements*

Prevention

P273 Avoid release to the environment.

Response

P302 + P352 IF ON SKIN: Wash with plenty of soap and water.

P308 + P313 IF exposed or concerned: Get medical advice/ attention.

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## Reduced labelling (≤125 ml)

*Hazard pictograms*



*Signal word*

Warning

*Hazard statements*

H351 Suspected of causing cancer.

H412 Harmful to aquatic life with long lasting effects.

*Precautionary statements*

P308 + P313 IF exposed or concerned: Get medical advice/ attention.

*Index-No.* 015-014-00-2

## 2.3 Other hazards

None known.

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## SECTION 3. Composition/information on ingredients

### 3.1 Substance

Formula	(C <sub>4</sub> H <sub>9</sub> O) <sub>3</sub> PO	C <sub>12</sub> H <sub>27</sub> O <sub>4</sub> P (Hill)
Index-No.	015-014-00-2	
EC-No.	204-800-2	
Molar mass	266,31 g/mol	

### Hazardous components (REGULATION (EC) No 1272/2008)

*Chemical name (Concentration)*

CAS-No.	Registration number	Classification
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tributyl phosphate (>= 80 % - <= 100 % )

*Substance does not meet the criteria for PBT or vPvB according to Regulation (EC) No 1907/2006, Annex XIII.*

126-73-8	01-2119492859-14-	
	XXXX	Acute toxicity, Category 4, H302

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Skin irritation, Category 2, H315  
Carcinogenicity, Category 2, H351  
Chronic aquatic toxicity, Category 3, H412

For the full text of the H-Statements mentioned in this Section, see Section 16.

## 3.2 Mixture

Not applicable

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## SECTION 4. First aid measures

### 4.1 Description of first aid measures

After inhalation: fresh air. Call in physician.

In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/shower. Consult a physician.

After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.

After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

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

irritant effects, Nausea, Headache, CNS disorders

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

No information available.

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## SECTION 5. Firefighting measures

### 5.1 Extinguishing media

*Suitable extinguishing media*

Carbon dioxide (CO<sub>2</sub>), Foam, Dry powder

*Unsuitable extinguishing media*

For this substance/mixture no limitations of extinguishing agents are given.

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## 5.2 Special hazards arising from the substance or mixture

Combustible.

Forms explosive mixtures with air on intense heating.

Vapours are heavier than air and may spread along floors.

Development of hazardous combustion gases or vapours possible in the event of fire.

Fire may cause evolution of:

Oxides of phosphorus

## 5.3 Advice for firefighters

*Special protective equipment for firefighters*

Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

*Further information*

Suppress (knock down) gases/vapours/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

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## SECTION 6. Accidental release measures

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

Advice for non-emergency personnel: Do not breathe vapours, aerosols. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.

Advice for emergency responders:

Protective equipment see section 8.

### 6.2 Environmental precautions

Do not let product enter drains.

### 6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

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## 6.4 Reference to other sections

Indications about waste treatment see section 13.

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## SECTION 7. Handling and storage

### 7.1 Precautions for safe handling

#### *Advice on safe handling*

Observe label precautions.

Work under hood. Do not inhale substance/mixture. Avoid generation of vapours/aerosols.

#### *Hygiene measures*

Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

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

#### *Storage conditions*

Tightly closed.

Recommended storage temperature see product label.

### 7.3 Specific end use(s)

See exposure scenario in the Annex to this MSDS.

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## SECTION 8. Exposure controls/personal protection

### 8.1 Control parameters

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## Derived No Effect Level (DNEL)

Worker DNEL, longterm	Systemic effects	inhalation	3,08 mg/m <sup>3</sup>
Worker DNEL, longterm	Systemic effects	dermal	0,44 mg/kg Body weight
Worker DNEL, longterm	Local effects	inhalation	3,08 mg/m <sup>3</sup>
Worker DNEL, longterm	Local effects	dermal	0,44 mg/cm <sup>2</sup>
Worker DNEL, acute	Systemic effects	inhalation	12,52 mg/m <sup>3</sup>
Worker DNEL, acute	Systemic effects	dermal	1,78 mg/kg Body weight
Worker DNEL, acute	Local effects	inhalation	12,52 mg/m <sup>3</sup>
Worker DNEL, acute	Local effects	dermal	1,78 mg/cm <sup>2</sup>
Consumer DNEL, longterm	Systemic effects	inhalation	0,77 mg/m <sup>3</sup>
Consumer DNEL, longterm	Systemic effects	dermal	0,22 mg/kg Body weight
Consumer DNEL, longterm	Systemic effects	oral	0,22 mg/kg Body weight
Consumer DNEL, longterm	Local effects	inhalation	0,77 mg/m <sup>3</sup>
Consumer DNEL, longterm	Local effects	dermal	0,22 mg/cm <sup>2</sup>
Consumer DNEL, acute	Systemic effects	inhalation	3,08 mg/m <sup>3</sup>
Consumer DNEL, acute	Systemic effects	dermal	0,88 mg/kg Body weight
Consumer DNEL, acute	Systemic effects	oral	0,88 mg/kg Body weight
Consumer DNEL, acute	Local effects	inhalation	3,08 mg/m <sup>3</sup>
Consumer DNEL, acute	Local effects	dermal	0,88 mg/cm <sup>2</sup>

## Predicted No Effect Concentration (PNEC)

PNEC Fresh water	0,082 mg/l
PNEC Fresh water sediment	18,4 mg/kg

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PNEC Marine water	0,0082 mg/l
PNEC Marine sediment	1,84 mg/kg
PNEC Sewage treatment plant	1 mg/l
PNEC Soil	3,63 mg/kg

## 8.2 Exposure controls

### Engineering measures

Technical measures and appropriate working operations should be given priority over the use of personal protective equipment.

See section 7.1.

### Individual protection measures

Protective clothing needs to be selected specifically for the workplace, depending on concentrations and quantities of the hazardous substances handled. The chemical resistance of the protective equipment should be enquired at the respective supplier.

#### *Eye/face protection*

Safety glasses

#### *Hand protection*

full contact:

Glove material:	butyl-rubber
Glove thickness:	0,7 mm
Break through time:	> 480 min

splash contact:

Glove material:	Viton (R)
Glove thickness:	0,70 mm
Break through time:	> 30 min



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The protective gloves to be used must comply with the specifications of EC Directive 89/686/EEC and the related standard EN374, for example KCL 898 Butoject® (full contact), KCL 890 Vitoject® (splash contact).

The breakthrough times stated above were determined by KCL in laboratory tests acc. to EN374 with samples of the recommended glove types.

This recommendation applies only to the product stated in the safety data sheet(>,<)> supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: [www.kcl.de](http://www.kcl.de)).

#### *Other protective equipment*

protective clothing

#### *Respiratory protection*

required when vapours/aerosols are generated.

Recommended Filter type: Filter A-(P2)

The entrepreneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.

#### **Environmental exposure controls**

Do not let product enter drains.

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## **SECTION 9. Physical and chemical properties**

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

Form	liquid
Colour	colourless
Odour	odourless
Odour Threshold	Not applicable

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pH	No information available.
Melting point	-79 °C
Boiling point/boiling range	289 °C at 1.013 hPa (decomposition)
Flash point	146 °C at 1.013 hPa  Method: closed cup
Evaporation rate	< 0,001 Reference substance: n-butyl acetate
Flammability (solid, gas)	No information available.
Lower explosion limit	No information available.
Upper explosion limit	No information available.
Vapour pressure	0,008 hPa at 20 °C  0,08 hPa at 50 °C
Relative vapour density	9,2
Density	0,97 g/cm <sup>3</sup> at 20 °C
Relative density	No information available.

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Water solubility	ca.6 g/l at 20 °C
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Partition coefficient: n-octanol/water	log Pow: 4,0 US-EPA Potential bioaccumulation
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Auto-ignition temperature	> 482 °C
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Decomposition temperature	177 - 178 °C
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Viscosity, dynamic	3,5 - 4,0 mPa.s at 20 °C
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Explosive properties	Not classified as explosive.
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Oxidizing properties	none
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## 9.2 Other data

Ignition temperature	400 °C
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## SECTION 10. Stability and reactivity

### 10.1 Reactivity

Forms explosive mixtures with air on intense heating.

A range from approx. 15 Kelvin below the flash point is to be rated as critical.

### 10.2 Chemical stability

The product is chemically stable under standard ambient conditions (room temperature) .

### 10.3 Possibility of hazardous reactions

Violent reactions possible with:

Strong oxidizing agents, Bases, Amines, Acids

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## 10.4 Conditions to avoid

Strong heating.

## 10.5 Incompatible materials

various plastics

## 10.6 Hazardous decomposition products

in the event of fire: See section 5.

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## SECTION 11. Toxicological information

### 11.1 Information on toxicological effects

#### *Acute oral toxicity*

LD50 Rat: 1.552 mg/kg

OECD Test Guideline 423

Symptoms: Irritations of mucous membranes in the mouth, pharynx, oesophagus and gastrointestinal tract.

#### *Acute inhalation toxicity*

LC50 Rat: > 4,242 mg/l; 4 h ; dust/mist

OECD Test Guideline 403

(highest concentration to be prepared)

Symptoms: mucosal irritations, Possible damages:, Lung oedema

#### *Acute dermal toxicity*

LD50 Rabbit: > 3.100 mg/kg

(External MSDS)

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## *Skin irritation*

Rabbit

Result: slight irritation

OECD Test Guideline 404

(Regulation (EC) No 1272/2008, Annex VI)

Causes skin irritation.

## *Eye irritation*

This information is not available.

## *Sensitisation*

Sensitisation test: Guinea pig

Result: negative

(Lit.)

Patch test: human

Result: negative

(IUCLID)

## *Germ cell mutagenicity*

### *Genotoxicity in vivo*

Chromosome aberration test

Rat

male and female

Oral

Bone marrow

Result: negative

(External MSDS)

### *Genotoxicity in vitro*

Ames test

Salmonella typhimurium

Result: negative

Method: OECD Test Guideline 471

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Mutagenicity (mammal cell test): chromosome aberration.

Result: negative

Method: OECD Test Guideline 473

#### *Carcinogenicity*

This information is not available.

#### *Reproductive toxicity*

This information is not available.

#### *Teratogenicity*

This information is not available.

#### *CMR effects*

Carcinogenicity:

Suspected of causing cancer.

#### *Specific target organ toxicity - single exposure*

This information is not available.

#### *Specific target organ toxicity - repeated exposure*

This information is not available.

#### *Aspiration hazard*

This information is not available.

## 11.2 Further information

After absorption:

Nausea, Headache, CNS disorders

This substance should be handled with particular care.

Handle in accordance with good industrial hygiene and safety practice.

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## SECTION 12. Ecological information

### 12.1 Toxicity

#### *Toxicity to fish*

LC50 *Oryzias latipes* (Orange-red killifish): 4,5 mg/l; 96 h

OECD Test Guideline 203

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## *Toxicity to daphnia and other aquatic invertebrates*

EC50 *Daphnia magna* (Water flea): 1,8 mg/l; 48 h  
(External MSDS)

## *Toxicity to algae*

IC50 *Desmodesmus subspicatus* (green algae): 1,1 mg/l; 72 h  
(ECOTOX Database)

## *Toxicity to bacteria*

static test EC50 activated sludge: > 100 mg/l; 3 h  
OECD Test Guideline 209

## *Toxicity to fish (Chronic toxicity)*

flow-through test NOEC *Oncorhynchus mykiss* (rainbow trout): 0,82 mg/l; 95 d

Analytical monitoring: yes  
US-EPA

## *Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)*

semi-static test NOEC *Daphnia magna* (Water flea): 1,3 mg/l; 21 d  
Analytical monitoring: yes

(External MSDS)

## **12.2 Persistence and degradability**

### *Biodegradability*

92 %; 28 d; aerobic

OECD Test Guideline 301D

Readily biodegradable

## **12.3 Bioaccumulative potential**

### *Partition coefficient: n-octanol/water*

log Pow: 4,0

US-EPA

Potential bioaccumulation

## **12.4 Mobility in soil**

No information available.

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## 12.5 Results of PBT and vPvB assessment

Substance does not meet the criteria for PBT or vPvB according to Regulation (EC) No 1907/2006, Annex XIII.

## 12.6 Other adverse effects

*Surface tension*

25,1 - 27,55 mN/m

at 20 °C

Discharge into the environment must be avoided.

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## SECTION 13. Disposal considerations

*Waste treatment methods*

See [www.retrologistik.com](http://www.retrologistik.com) for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

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## SECTION 14. Transport information

### Land transport (ADR/RID)

14.1 - 14.6	Not classified as dangerous in the meaning of transport regulations.
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### Inland waterway transport (ADN)

Not relevant

### Air transport (IATA)

14.1 - 14.6	Not classified as dangerous in the meaning of transport regulations.
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### Sea transport (IMDG)

14.1 - 14.6	Not classified as dangerous in the meaning of transport regulations.
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### 14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not relevant



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## SECTION 15. Regulatory information

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

#### *EU regulations*

Major Accident Hazard	SEVESO III
Legislation	Not applicable

Occupational restrictions	Take note of Dir 94/33/EC on the protection of young people at work. Observe work restrictions regarding maternity protection in accordance to Dir 92/85/EEC or stricter national regulations where applicable.
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Regulation (EC) No 1005/2009 on substances that deplete the ozone layer	not regulated
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Regulation (EC) No 850/2004 of the European Parliament and of the Council of 29 April 2004 on persistent organic pollutants and amending Directive 79/117/EEC	not regulated
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Substances of very high concern (SVHC)	This product does not contain substances of very high concern according to Regulation (EC) No 1907/2006 (REACH), Article 57 above the respective regulatory concentration limit of $\geq 0.1$ % (w/w).
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#### *National legislation*

Storage class	10 - 13
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### 15.2 Chemical safety assessment

For this product a chemical safety assessment was not carried out.

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## SECTION 16. Other information

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

H302	Harmful if swallowed.
H315	Causes skin irritation.
H351	Suspected of causing cancer.
H412	Harmful to aquatic life with long lasting effects.

### Training advice

Provide adequate information, instruction and training for operators.

### Labelling

#### *Hazard pictograms*



#### *Signal word*

Warning

#### *Hazard statements*

H302 Harmful if swallowed.  
H315 Causes skin irritation.  
H351 Suspected of causing cancer.  
H412 Harmful to aquatic life with long lasting effects.

#### *Precautionary statements*

##### Prevention

P273 Avoid release to the environment.

##### Response

P302 + P352 IF ON SKIN: Wash with plenty of soap and water.  
P308 + P313 IF exposed or concerned: Get medical advice/ attention.

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## Key or legend to abbreviations and acronyms used in the safety data sheet

Used abbreviations and acronyms can be looked up at [www.wikipedia.org](http://www.wikipedia.org).

## Regional representation

This information is given on the authorised Safety Data Sheet for your country.

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*The information contained herein is based on the present state of our knowledge. It characterises the product with regard to the appropriate safety precautions. It does not represent a guarantee of any properties of the product.*

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## EXPOSURE SCENARIO 1 (Industrial use)

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### 1. Industrial use Chemical for synthesis)

#### Sectors of end-use

<i>SU 3</i>	Industrial uses: Uses of substances as such or in preparations at industrial sites
<i>SU9</i>	Manufacture of fine chemicals
<i>SU 10</i>	Formulation [mixing] of preparations and/ or re-packaging (excluding alloys)

#### Chemical product category

<i>PC19</i>	Intermediate
<i>PC21</i>	Laboratory chemicals

#### Process categories

<i>PROC1</i>	Use in closed process, no likelihood of exposure
<i>PROC2</i>	Use in closed, continuous process with occasional controlled exposure
<i>PROC3</i>	Use in closed batch process (synthesis or formulation)
<i>PROC4</i>	Use in batch and other process (synthesis) where opportunity for exposure arises
<i>PROC5</i>	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)
<i>PROC8a</i>	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities
<i>PROC8b</i>	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities
<i>PROC9</i>	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
<i>PROC15</i>	Use as laboratory reagent

#### Environmental Release Categories

<i>ERC2</i>	Formulation of preparations
<i>ERC4</i>	Industrial use of processing aids in processes and products, not becoming part of articles
<i>ERC6a</i>	Industrial use resulting in manufacture of another substance (use of intermediates)
<i>ERC6b</i>	Industrial use of reactive processing aids

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### 2. Contributing scenarios: Operational conditions and risk management measures

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## 2.1 Contributing scenario controlling environmental exposure for: ERC2

### Amount used

Daily amount per site (Msafe)	729 kg
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### Environment factors not influenced by risk management

Flow rate	18.000 m3/d
Dilution Factor (River)	10
Dilution Factor (Coastal Areas)	100

### Other given operational conditions affecting environmental exposure

Number of emission days per year	225
Emission or Release Factor: Air	2,5 %
Emission or Release Factor: Water	2 %
Emission or Release Factor: Soil	0,01 %

### Technical conditions and measures / Organizational measures

Air	Use of air emission abatement equipments.
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### Conditions and measures related to municipal sewage treatment plant

Type of Sewage Treatment Plant	Municipal sewage treatment plant
Effectiveness (of a measure)	89,1 %

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## 2.2 Contributing scenario controlling environmental exposure for: ERC4, SpERC ESVOC 38

### Amount used

Daily amount per site (Msafe)	710 kg
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### Environment factors not influenced by risk management

Flow rate	18.000 m3/d
Dilution Factor (River)	10
Dilution Factor (Coastal Areas)	100

### Other given operational conditions affecting environmental exposure

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The Safety Data Sheets for catalogue items are available at [www.merckgroup.com](http://www.merckgroup.com)

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Number of emission days per year	20
Emission or Release Factor: Air	2,5 %
Emission or Release Factor: Water	2 %
Emission or Release Factor: Soil	0,01 %

## Conditions and measures related to municipal sewage treatment plant

Type of Sewage Treatment Plant	Municipal sewage treatment plant
Effectiveness (of a measure)	89,1 %

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## 2.3 Contributing scenario controlling environmental exposure for: ERC6a, SpERC ESVOC 3

### Amount used

Daily amount per site (Msafe)	7.524 kg
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### Environment factors not influenced by risk management

Flow rate	18.000 m3/d
Dilution Factor (River)	10
Dilution Factor (Coastal Areas)	100

### Other given operational conditions affecting environmental exposure

Number of emission days per year	300
Emission or Release Factor: Air	0,001 %
Emission or Release Factor: Water	0,001 %
Emission or Release Factor: Soil	0 %

## Conditions and measures related to municipal sewage treatment plant

Type of Sewage Treatment Plant	Municipal sewage treatment plant
Effectiveness (of a measure)	89,1 %

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## 2.4 Contributing scenario controlling environmental exposure for: ERC6b

### Amount used

Daily amount per site (Msafe)	6.000 kg
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## Environment factors not influenced by risk management

Flow rate	18.000 m <sup>3</sup> /d
Dilution Factor (River)	10
Dilution Factor (Coastal Areas)	100

## Other given operational conditions affecting environmental exposure

Number of emission days per year	330
Emission or Release Factor: Air	0,1 %
Emission or Release Factor: Soil	0 %
Emission rate	0,036 kg/day

## Conditions and measures related to municipal sewage treatment plant

Type of Sewage Treatment Plant	Municipal sewage treatment plant
Effectiveness (of a measure)	89,1 %

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## 2.5 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC15

### Product characteristics

Concentration of the Substance in Mixture/Article	Covers the percentage of the substance in the product up to 100 %.
Physical Form (at time of use)	Very low volatile liquid
Process Temperature	< 185 °C

### Frequency and duration of use

Frequency of use	8 hours/day
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### Other operational conditions affecting workers exposure

Outdoor / Indoor	Indoor without local exhaust ventilation (LEV)
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### Organisational measures to prevent /limit releases, dispersion and exposure

Covers daily exposures up to 8 hours.

### Conditions and measures related to personal protection, hygiene and health evaluation

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Wear suitable gloves tested to EN374. Effectiveness (of a measure): 90 %

Use suitable eye protection.

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## 2.6 Contributing scenario controlling worker exposure for: PROC4, PROC5, PROC8a, PROC8b, PROC9

### Product characteristics

Concentration of the Substance in Mixture/Article	Covers the percentage of the substance in the product up to 100 %.
Physical Form (at time of use)	Very low volatile liquid
Process Temperature	< 185 °C

### Frequency and duration of use

Frequency of use	8 hours/day
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### Other operational conditions affecting workers exposure

Outdoor / Indoor	Indoor with local exhaust ventilation (LEV)
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### Organisational measures to prevent /limit releases, dispersion and exposure

Covers daily exposures up to 8 hours.

### Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves tested to EN374. Effectiveness (of a measure): 90 %

Use suitable eye protection.

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## 3. Exposure estimation and reference to its source



# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No. 818604

Product name Tributyl phosphate for synthesis

## Environment

CS	Use descriptor	Msafe	Compartment	RCR	Exposure Assessment Method
2.1	ERC2	729 kg/day	All compartments	< 1	ECETOC TRA
2.2	ERC4	710 kg/day	Fresh water	1	ECETOC TRA
2.3	ERC6a	7525 kg/day	Fresh water	1	ECETOC TRA
2.4	ERC6b	6000 kg/day	All compartments	< 1	ECETOC TRA

## Workers

CS	Use descriptor	Exposure duration, route, effect	RCR	Exposure Assessment Method
2.5	PROC1	longterm, combined, systemic	0,11	ECETOC TRA 3
2.5	PROC2	longterm, combined, systemic	0,67	ECETOC TRA 3
2.5	PROC3	longterm, combined, systemic	0,51	ECETOC TRA 3
2.5	PROC15	longterm, combined, systemic	0,43	ECETOC TRA 3
2.6	PROC4	longterm, combined, systemic	0,19	ECETOC TRA 3
2.6	PROC5	longterm, combined, systemic	0,35	ECETOC TRA 3
2.6	PROC8a	longterm, combined, systemic	0,35	ECETOC TRA 3
2.6	PROC8b	longterm, combined, systemic	0,17	ECETOC TRA 3
2.6	PROC9	longterm, combined, systemic	0,19	ECETOC TRA 3

The default parameters and -efficiencies of the applied exposure assessment model were used for the calculation (unless stated differently).

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No.	818604
Product name	Tributyl phosphate for synthesis

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## 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Please refer to the following documents: ECHA Guidance on information requirements and chemical safety assessment Chapter R.12: Use descriptor system; ECHA Guidance for downstream users; ECHA Guidance on information requirements and chemical safety assessment Part D: Exposure Scenario Building, Part E: Risk Characterisation and Part G: Extending the SDS; VCI/Cefic REACH Practical Guides on Exposure Assessment and Communications in the Supply Chain; CEFIC Guidance Specific Environmental Release Categories (SPERCs).

For scaling of worker exposure assessments performed with ECETOC TRA, please consult the Merck tool SciDeEx® at [www.merckmillipore.com/scideex](http://www.merckmillipore.com/scideex).

# SAFETY DATA SHEET

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## EXPOSURE SCENARIO 2 (Professional use)

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### 1. Professional use Chemical for synthesis)

#### Sectors of end-use

*SU 22* Professional uses: Public domain (administration, education, entertainment, services, craftsmen)

#### Chemical product category

*PC21* Laboratory chemicals

#### Process categories

*PROC15* Use as laboratory reagent

#### Environmental Release Categories

*ERC2* Formulation of preparations

*ERC6a* Industrial use resulting in manufacture of another substance (use of intermediates)

*ERC6b* Industrial use of reactive processing aids

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### 2. Contributing scenarios: Operational conditions and risk management measures

#### 2.1 Contributing scenario controlling environmental exposure for: ERC2

##### Amount used

Daily amount per site (Msafe)	729 kg
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##### Environment factors not influenced by risk management

Flow rate	18.000 m3/d
Dilution Factor (River)	10
Dilution Factor (Coastal Areas)	100

##### Other given operational conditions affecting environmental exposure

Number of emission days per year	225
Emission or Release Factor: Air	2,5 %
Emission or Release Factor: Water	2 %
Emission or Release Factor: Soil	0,01 %

##### Technical conditions and measures / Organizational measures

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Air	Use of air emission abatement equipments.
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## Conditions and measures related to municipal sewage treatment plant

Type of Sewage Treatment Plant	Municipal sewage treatment plant
Effectiveness (of a measure)	89,1 %

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## 2.3 Contributing scenario controlling environmental exposure for: ERC6a, SpERC ESVOC 3

### Amount used

Daily amount per site (Msafe)	7.524 kg
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### Environment factors not influenced by risk management

Flow rate	18.000 m3/d
Dilution Factor (River)	10
Dilution Factor (Coastal Areas)	100

### Other given operational conditions affecting environmental exposure

Number of emission days per year	300
Emission or Release Factor: Air	0,001 %
Emission or Release Factor: Water	0,001 %
Emission or Release Factor: Soil	0 %

## Conditions and measures related to municipal sewage treatment plant

Type of Sewage Treatment Plant	Municipal sewage treatment plant
Effectiveness (of a measure)	89,1 %

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## 2.4 Contributing scenario controlling environmental exposure for: ERC6b

### Amount used

Daily amount per site (Msafe)	6.000 kg
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### Environment factors not influenced by risk management

Flow rate	18.000 m3/d
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# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No.	818604
Product name	Tributyl phosphate for synthesis

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Dilution Factor (River)	10
Dilution Factor (Coastal Areas)	100

## Other given operational conditions affecting environmental exposure

Number of emission days per year	330
Emission or Release Factor: Air	0,1 %
Emission or Release Factor: Soil	0 %
Emission rate	0,036 kg/day

## Conditions and measures related to municipal sewage treatment plant

Type of Sewage Treatment Plant	Municipal sewage treatment plant
Effectiveness (of a measure)	89,1 %

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## 2.5 Contributing scenario controlling worker exposure for: PROC15

### Product characteristics

Concentration of the Substance in Mixture/Article	Covers the percentage of the substance in the product up to 100 %.
Physical Form (at time of use)	Very low volatile liquid
Process Temperature	< 185 °C

### Frequency and duration of use

Frequency of use	8 hours/day
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### Other operational conditions affecting workers exposure

Outdoor / Indoor	Indoor without local exhaust ventilation (LEV)
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### Organisational measures to prevent /limit releases, dispersion and exposure

Covers daily exposures up to 8 hours.

### Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves tested to EN374. Effectiveness (of a measure): 90 %

Use suitable eye protection.

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No. 818604  
Product name Tributyl phosphate for synthesis

## 3. Exposure estimation and reference to its source

### Environment

CS	Use descriptor	Msafe	Compartment	RCR	Exposure Assessment Method
2.1	ERC2	729 kg/day	All compartments	< 1	ECETOC TRA
2.3	ERC6a	7525 kg/day	Fresh water	1	ECETOC TRA
2.4	ERC6b	6000 kg/day	All compartments	< 1	ECETOC TRA

### Workers

CS	Use descriptor	Exposure duration, route, effect	RCR	Exposure Assessment Method
2.5	PROC15	longterm, combined, systemic	0,43	ECETOC TRA 3

The default parameters and -efficiencies of the applied exposure assessment model were used for the calculation (unless stated differently).

## 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Please refer to the following documents: ECHA Guidance on information requirements and chemical safety assessment Chapter R.12: Use descriptor system; ECHA Guidance for downstream users; ECHA Guidance on information requirements and chemical safety assessment Part D: Exposure Scenario Building, Part E: Risk Characterisation and Part G: Extending the SDS; VCI/Cefic REACH Practical Guides on Exposure Assessment and Communications in the Supply Chain; CEFIC Guidance Specific Environmental Release Categories (SPERCs).

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