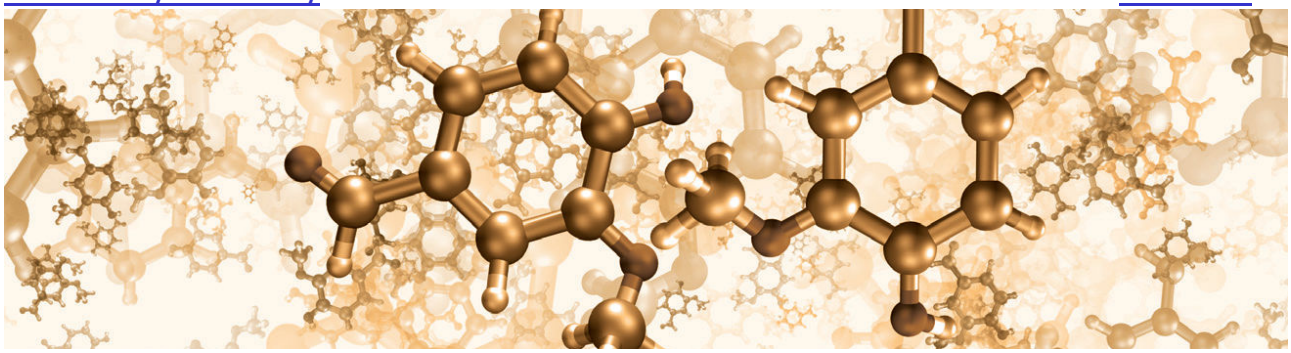


TBC (4-*tert*-butylpyrocatechol)

Chemical Identity

Brand names	**TBC**	*CAS number*	**98-29-3**
Chemical name (IUPAC)	**4-tert-butylbenzene-1,2-diol**	*Molecular formula*	**$C_{10}H_{14}O_2$**
Synonyms	**4-tertiary-butyl catechol, 4-tert-butylpyrocatechol, Paratertiobutyl catechol, tert-butylhydroquinone**	*Molecular weight*	**166.22 g/mol**

Applications

TBC is used in industry, mainly to stabilize monomers, preventing the polymerization process. It is efficient in the monomer production process as well as in monomer storage and transport.

Safety Assessment, Exposure and Risk Management Recommendations

Physical and Chemical properties

Property	Result
Physical state	Crystalline solid
Colour	Creamy white to pinkish beige
Odour	phenol-like
Melting point	55 °C
Boiling point	291°C
Flammability	Non flammable
Water solubility	Soluble
Octanol water partition	Low potential for bioaccumulation

Health effect

TBC is corrosive, harmful if in contact with skin or if swallowed and may cause an allergic skin reaction. Safety measures must be respected for industrial uses, for more details, please refer to the Safety Data Sheet.

Environmental effect

TBC is soluble in water but not readily biodegradable, it is very toxic to aquatic life with long lasting effects. Industrial emissions and disposal, treatment or recycling must comply with applicable regulations to preserve environment.

Regulatory information and certifications

Classification and labelling

EU regulation (EC) 1272/2008 (CLP)

Danger

Skin corrosion, cat.1B
H314 Causes severe skin burns and eye damage
Acute toxicity, oral and dermal, cat.4
H302 Harmful if swallowed
H312 Harmful in contact with skin
Skin sensitization, cat.1
H317 May cause an allergic skin reaction
Acute and chronic aquatic toxicity, cat.1
H400 Very toxic to aquatic life
H410 Very toxic to aquatic life with long lasting effects

Registration and certification

ISO 9001: 2008 certified
EU regulation on chemicals (EC) 1907/2006 (REACH)

TBC
(4-*tert*-butylpyrocatechol)

General Statement

TBC (4-*tert*-Butylcatechol) is an organic compound made by chemical synthesis. It is a derivative of catechol. It is added as a stabilizer during storage and transport or inhibitor of polymerization in the production process of butadiene, styrene, vinyl acetate and other reactive monomer streams. It is also used as a stabilizer in the manufacture of polyurethane foam.

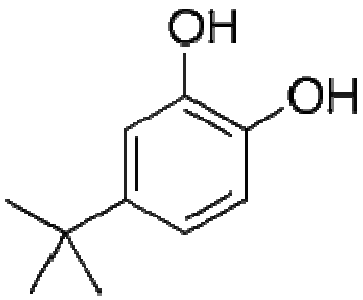
TBC pure substance is harmful to human health, in contact with skin or if swallowed. It is corrosive and causes severe skin burns and eye damage. It may cause an allergic skin reaction.
TBC may have a very toxic effect to aquatic life with long lasting effects.

The pure substance is used only in industry and is handled under stringent safety conditions in accordance with the risk management measures to control the risk of exposure and preserve human health and environment. Consumer exposure to TBC substance is not expected.

Chemical Identity

Name:	TBC
Brand name:	TBC
Chemical name (IUPAC):	4-tert-butylbenzene-1,2-diol
Synonyms:	4-tertiary-butyl catechol, 4-tert-butylpyrocatechol, paratertiobutyl catechol, tert-butylhydroquinone
CAS number:	98-29-3
EC number:	202-653-9
Molecular formula:	$C_{10}H_{14}O_2$

Structure:



Uses and applications

TBC is industrially produced by chemical synthesis in closed vessels.

The substance is well-adapted to stabilize monomers (vinyl acetate, vinyl chloride, unsaturated hydrocarbons …), preventing polymerisation process. It is efficient in the monomer production process as well as in monomer storage and transport.

Physical/Chemical Properties

Phys/Chem Safety Assessment

Property	Value
Physical state	solid at 20°C and atmospheric pressure
Form	Crystalline
Colour	Creamy white to pinkish beige
Odour	Phenol-like
Molecular weight	166.22 g/mol
Melting Point	54.95°C
Boiling Range	290.5°C at atmospheric pressure
Flash point	158°C (closed cup) at atm pressure, value measured on the molten solid
Flammability	Non flammable
Explosive properties	Non explosive
Self-ignition temperature	435°C at atmospheric pressure
Vapour pressure	0.03 Pa at 25°C
Water solubility	4.2 g/l at 20°C, soluble
Octanol Water partition coefficient (log Kow)	1.98 at 25°C, low potential for bioaccumulation

Based on available data, TBC is not classified regarding physical and chemical hazards, according to EU regulation (EC) 1272/2008.

Health Effects

Human Health Safety Assessment

Effect Assessment	Result
Acute Toxicity Oral/inhalation/dermal	Harmful if swallowed or in contact with skin No data available for inhalation route
Irritation / corrosion Skin/eye	Corrosive : causes severe skin burns and irreversible eye damage
Sensitisation	May cause an allergic skin reaction
Toxicity after repeated exposure Oral/inhalation/dermal	Not classified for toxicity after repeated exposure based on oral route data
Genotoxicity / Mutagenicity	Conclusive data and not classified for either mutagenicity or genotoxicity
Carcinogenicity	Not classified for carcinogenicity based on oral route data
Toxicity for reproduction	Not enough data to conclude on reproductive effects

All these results are based on available data and the classification is in accordance with EU regulation (EC) 1272/2008.

Environmental Effects

Environment Safety Assessment

Effect Assessment	**Result**
Aquatic Toxicity	Very toxic for fish or invertebrates and harmful for algae or micro-organisms Very toxic to aquatic life with long lasting effects

Fate and behaviour	**Result**
Biodegradation	Not readily but inherently biodegradable
Bioaccumulation potential	Not potentially bioaccumulative (Log Kow = 1.98)
PBT / vPvB conclusion	Not considered to be either PBT nor vPvB

Based on available data, TBC is considered as very toxic to aquatic organisms and not readily biodegradable, it is classified as dangerous for the environment according to EU regulation (EC) 1272/2008.

Exposure

TBC is used only in industry. Considering its industrial lifecycle, risk of exposure to the pure substance may occur, during the steps of manufacture, use as a stabilizer in formulation and monomers or use in polymerisation/copolymerisation reactions. Processes are in closed systems to minimize human and environment risk of exposure.
Consumer exposure to the TBC substance is not expected.

Human health

On industrial sites, where there is a risk of workers exposure to pure TBC, during (un)loading, sampling, analysis or maintenance operations, it is kept at a safe level (strictly below exposure limits, when applied) and controlled by the use of appropriate risk management measures as suitable collective and personal protective equipment, good industrial hygiene practices and risk communication through appropriate training of workers.

Environment

Based on its physical and chemical properties and environmental data available, TBC is soluble into water and presents a low potential for adsorption and bioaccumulation. Consequently, a significant distribution into the soil compartment is not expected.

There is no water or solid waste coming from the manufacturing and formulation process (dry process), therefore no release to the water compartment and soil compartment is expected. Concerning atmospheric releases, most of the vents from the process are canalised and then the gas are incinerated.
TBC is used as a polymerisation inhibitor on chemical and petrochemical sites where emissions are very limited and controlled to comply with local regulation, no environmental release in atmospheric, aquatic and soil compartment is expected.

Risk Management Recommendations

Recommendations are based on the risk assessment to preserve human health and environment.

Human health

For industrial uses of TBC, workers must be well informed and trained and must refer to the extended Safety Data Sheet (eSDS). If there is a risk of exposure to the substance (during (un)loading, sampling, analysis or maintenance operations), handling must be under an adequate and efficient ventilation, appropriate personal protective equipment (PPE) must be worn (safety goggles, gloves, protective suit) as recommended in the eSDS as TBC is a corrosive substance. In case of splashing, wear a face shield. In case of exposure to dust or vapour, wear a respirator with approved filter. Hygiene measures must be respected (accessible emergency equipment, well-maintained PPE, wash hands and skin following contact, do not eat, drink or smoke on the workplace).

Environment

No release to the water compartment and soil compartment is expected. Concerning atmospheric releases, most of the vents from the process are canalised and then the gas are incinerated.
Disposal, treatment or recycling of industrial waste must comply with applicable regulations to preserve environment.

State Agency Review

4-tert-butylpyrocatechol has been registered under the EU regulation (EC) 1907/2006 (REACH)

Regulatory Information / Classification and Labelling

Substance classification and labelling according to EU regulation (EC) 1272/2008 (CLP) :

Classification

Acute toxicity, Oral, Category 4	H302 Harmful if swallowed
Acute toxicity, Dermal, Category 4	H312 Harmful in contact with skin
Skin corrosion, Category 1B	H314 Causes severe skin burns and eye damage
Skin sensitisation, Category 1	H317 May cause an allergic skin reaction
Acute aquatic toxicity, Category 1	H400 Very toxic to aquatic life
Chronic aquatic toxicity, Category 1	H410 Very toxic to aquatic life with long lasting effects

Labelling

Signal word DANGER

Hazard statements :

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
H400 Very toxic to aquatic life
H410 Very toxic to aquatic life with long lasting effects

Precautionary statements :

P260 Do not breathe dust/fume/gas/mist/vapours/spray
P273 Avoid release in the environment
P280 Wear protective gloves/protective clothing/eye protection/face protection
P309+311: IF exposed or if you feel unwell: call a POISON CENTER or doctor/physician
P305+351+338: IF IN EYES : rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P303+P361+P353: IF ON SKIN (or hair): remove/take off immediately all contaminated clothing. Rinse skin with water/shower.

Contact information within company

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

Rhodia Global Product Strategy: http://www.rhodia.com/en/sustainability/global_product_strategy/index.tcm

Contact: globalproductstrategy@eu.rhodia.com

Additional information

ICCA Global Product Strategy: http://www.icca-chem.org/en/Home/ICCA-initiatives/global-product-strategy/

(extended) Safety Data Sheet available on demand: http://www.rhodia.com/en/contact/contact_form_business.tcm

Glossary of technical terms: http://www.rhodia.com/en/sustainability/global_product_strategy/glossary/index.tcm

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Disclaimer

The information provided in the present Safety Summary is based on European data available in REACH regulatory dossier (EC N°1907/2006) and is correct to the best of our knowledge, information and belief at the date of its publication. Such information is only intended to provide a general overview of the chemical substance in the context of ICCA Global Product Strategy and is not to be considered as a warranty or quality specification. It does not replace the safety data sheet and technical sheets. Thus, the information provided in this Safety Summary only relates to the designated specific product and may not be applicable if such product is used in combination with other materials or in another manufacturing process, unless otherwise specifically indicated. It does not release the user from ensuring he is in conformity with all regulations linked to its activity.