



Catechol

Chemical Identity

| | | | |
|------------------------------|---|--------------------------|--|
| <i>Brand names</i> | Catechol | <i>CAS number</i> | 120-80-9 |
| <i>Chemical name (IUPAC)</i> | Benzene 1,2-diol | <i>Molecular formula</i> | C₆H₆O₂ |
| <i>Synonyms</i> | Pyrocatechol 1,2-benzene diol, 2-hydroxyphenol, 1,2-dihydroxybenzene | <i>Molecular weight</i> | 110.1 g/mol |

Applications

Catechol is used in a wide range of applications such as:

- Major intermediate for synthesis of molecules for agrochemicals use
- Intermediates for perfumes, cosmetics, aromas
- Therapeutic agent
- Tanning agent, synthetic tannins
- Anticorrosion agent
- Antioxidant for rubber, olefins and polyofins, polyurethanes
- Bonding agents
- Catalysts

Safety Assessment, Exposure and Risk Management Recommendations

Physical and Chemical properties

| Property | Result |
|-------------------------|-----------------------------------|
| Physical state | Crystalline solid |
| Colour | White to beige brown |
| Odour | Slight phenol-like |
| Melting point | 105°C |
| Boiling point | 245.5°C |
| Flammability | Non flammable |
| Water solubility | Very soluble |
| Octanol water partition | Low potential for bioaccumulation |

Health effect



Catechol is toxic by dermal and oral routes of exposure and harmful if inhaled, causes skin irritation and serious eye damage, may cause an allergic skin reaction and is suspected of causing genetic defects. Stringent safety measures must be respected for industrial uses, for more details, please refer to the Safety Data Sheet.

Environmental effect



Catechol is very soluble in water and readily biodegradable. It has a low potential for bioaccumulation. It is not classified as dangerous for the environment.

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)



- H301 + H311 Toxic if swallowed or in contact with skin.
 H332 Harmful if inhaled
 H315 Causes skin irritation
 H317 May cause an allergic skin reaction
 H318 Causes serious eye damage
 H341 Suspected of causing genetic defects

Danger

Registration and certification

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

GPS Safety Summary

This Product Safety Summary is intended to provide a general overview of the chemical substance in the context of ICCA Global Product Strategy. The information on the Summary is basic information and is not intended to provide emergency response information, medical information or treatment information. The summary should not be used to provide in-depth safety and health information. In-depth safety and health information can be found on the (extended) Safety Data Sheet (e)SDS for the chemical substance.

Catechol

General Statement

Catechol occurs naturally in trace amount in fruit and vegetable. It is an organic solid substance, colourless with a weak odour of phenol.

Synthetic catechol is made by hydroxylation of phenol. It is only used in industry as an intermediate for chemical synthesis, mainly for aroma products, agrochemicals and pharmaceuticals or in formulation.

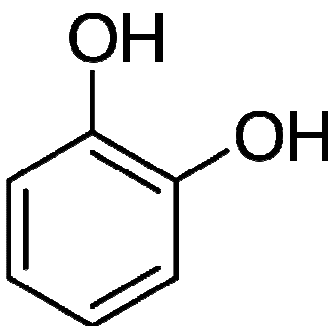
The pure substance has antioxidant properties that may cause damage to human health. It is toxic by oral and dermal routes and harmful by inhalation, causes skin irritation and serious eye damage, may cause an allergic skin reaction and is suspected of causing genetic defects.

The pure substance is only used 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 is not expected.

Chemical Identity

| | |
|-------------------------------|---|
| Name: | Pyrocatechol |
| Brand name: | Catechol |
| Chemical name (IUPAC): | Benzene 1,2-diol |
| Synonyms: | 1,2-benzene diol, 2-hydroxyphenol, 1,2-dihydroxybenzene |
| CAS number: | 120-80-9 |
| EC number: | 204-427-5 |
| Molecular formula: | C ₆ H ₆ O ₂ |

Structure:



Uses and applications

Synthetic catechol is an organic aromatic compound, appearing under the form of colourless solid flakes which darken upon exposure to air and light.

Catechol is mainly used as an intermediate for the synthesis of pharmaceuticals, agrochemicals and in formulation.

Catechol is a precursor to various flavourings such as vanillin or eugenol (synthetic “vanilla” aroma and flavour), used in food industry, perfumery, home and personal care products.

The Catechol route of vanillin synthesis is far more environmentally friendly than the o-nitrochlorobenzene route. The production is performed using conventional closed vessels. The process is widely acknowledged as the Best Available Technology in terms of reduced water and energy consumption.

Physical/Chemical Properties

Phys/Chem Safety Assessment

| Property | Value |
|---|---|
| Physical state | Crystalline solid flakes at 20°C and atmospheric pressure |
| Colour | White to beige-brown |
| Odour | Slight phenol-like |
| Molecular weight | 110.1 g/mol |
| Melting Point | 105°C at atmospheric pressure |
| Boiling Range | 245.5 °C at atmospheric pressure |
| Flash point | 127°C (closed cup) at atmospheric pressure (value measured on the molten solid) |
| Flammability | Non flammable |
| Explosive properties | Non explosive |
| Self-ignition temperature | 510°C at atmospheric pressure |
| Vapour pressure | 0.05 hPa at 25°C, low volatility |
| Water solubility | 517.5 g/l at 20°C, very soluble in water |
| Octanol Water partition coefficient (log Kow) | 0.93 at room temperature low potential for bioaccumulation |

Based on available data, Catechol 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 | Toxic if swallowed or in contact with skin Harmful by inhalation |
| Irritation / corrosion Skin/eye | Causes serious eye damage Causes skin irritation |
| Sensitisation | May cause an allergic skin reaction |
| Toxicity after repeated exposure Oral /inhalation /dermal | Not classified for toxicity after repeated exposure |
| Genotoxicity / Mutagenicity | Suspected of causing genetic defects |
| Carcinogenicity | Conclusive data and not classified for carcinogenicity |
| Toxicity for reproduction | Not classified for reproductive effects |

Catechol is subject to harmonised classification and labelling in accordance with annex VI table 3.1., EU regulation (EC) 1272/2008. According to annex VI it is classified as irritating to the eyes, however, animal experiments showed serious eye damage with symptoms not reversible. Therefore catechol should be reclassified as causing serious eye damage, according to EU regulation (EC) 1272/2008 criteria.

Environmental Effects

Environment Safety Assessment

| Effect Assessment | Result |
|-------------------|--|
| Aquatic Toxicity | Toxic to fish and to invertebrates Harmful to algae and to some aquatic micro-organisms |

| Fate and behaviour | Result |
|---------------------------|--|
| Biodegradation | Readily biodegradable |
| Bioaccumulation potential | Not potentially bioaccumulative (Log Kow = 0.93) |
| PBT / vPvB conclusion | Not considered to be either PBT nor vPvB |

Based on available data, Catechol is considered to be toxic to fish and to aquatic invertebrates and harmful to algae and to some micro-organisms, but as it is readily biodegradable and not potentially bioaccumulative, it is not classified as dangerous for the environment, according to EU regulation (EC) 1272/2008.

Exposure

The substance is mainly manufactured in a closed, continuous and automated process which ensures that the risk is controlled and it is handled under Strictly Controlled Conditions in accordance with REACH regulation for on-site isolated and transported intermediates.

For a sole use of catechol in formulation, the process is a multi-stage mixing of substances in batch, worker and environmental risk of exposure is controlled by following risk management measures.

Human health

Where there is a risk of workers exposure to the pure or formulated substance, during (un)loading and mixing, it is kept at a safe level (strictly below exposure limits) 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, if catechol was released in the environment, it would be mainly distributed in the water. Catechol being very soluble, it is not susceptible to deposit onto sediments. In addition, catechol is readily biodegradable, thus not persistent in the environment, and has a low potential for adsorption and bioaccumulation, so no significant distribution into soil and sediment compartments is expected. As a result, the exposure of sedimentary and terrestrial organisms is judged to be very low.

All industrial aqueous releases that may contain the substance are directed to a waste water treatment plant.

The potential of distribution in the atmosphere is very low and if catechol was released into the air, it would be readily photodegraded, so no significant air exposure is expected.

Human risk of exposure via the environment is expected to be low since catechol is readily biodegradable and non bioaccumulative.

Risk Management Recommendations

On the manufacturing site, catechol is handled under Strictly Controlled Conditions in accordance with REACH regulation for on-site isolated and transported intermediates.

For the industrial sole use of catechol in formulation, recommendations are based on the risk assessment for human health and environment.

Human health

For industrial uses of catechol including manufacture, purification, cleaning and maintenance of equipment, sampling, analysis, (un)loading, waste disposal or purification and storage, the substance must be rigorously contained by technical measures to prevent workers from being exposed to the substance. Procedural and control technologies shall be used that minimise emission and any resulting exposure.

For the sole use of catechol in formulation, workers must be well informed and trained and must refer to the extended Safety Data Sheet (eSDS). Risk management measures have to be strictly observed at the workplaces in order to keep workers' risk of exposure at a safe level.

In order to control possible risks during (un)loading and mixing of the substance, handling must be under an effective exhaust ventilation system, appropriate personal protective equipment must be worn (safety goggles, face shield, gloves, protective suit adapted to the exposure to the substance in flakes or molten, respirator with approved filter in case of dust or vapour release) as recommended in the eSDS and in the risk assessment. Hygiene measures must be respected (accessible emergency equipment, well-maintained PPE, avoid splashing or dust formation, wash hands and skin following contact, do not eat, drink or smoke on the workplace).

Environment

Catechol is mainly distributed in water. The substance must be rigorously contained by technical measures to prevent it from being released to the environment. All effluent releases that may contain the substance must be directed to a sewage treatment plant. In order to ensure an adequate control of the risk for the aquatic compartment, the concentration of catechol before and after treatment must respect stringent limit values to comply with applicable regulation.

State Agency Review

Substance registered under EU regulation (EC) 1907/2006 (REACH)
reviewed in High Production Volume chemicals program, published by UNEP in 2003

Regulatory Information / Classification and Labelling

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

Adjusted classification*

| | | |
|--|------|---------------------------------------|
| Acute toxicity, Oral, Category 3 | H301 | Toxic if swallowed. |
| Acute toxicity, Dermal, Category 3 | H311 | Toxic in contact with skin. |
| Acute toxicity, Inhalation, Category 4 | H332 | Harmful if inhaled. |
| Skin irritation, Category 2 | H315 | Causes skin irritation. |
| Skin sensitization, Category 1 | H317 | May cause an allergic skin reaction. |
| Serious eye damage, Category 1 | H318 | Causes serious eye damage. |
| Germ cell mutagenicity, Category 2 | H341 | Suspected of causing genetic defects. |

Adjusted Labelling*

Pictogram :



Signal word :

Danger

Hazard statements

H301 + H311 Toxic if swallowed or in contact with skin.
 H332 Harmful if inhaled.
 H315 Causes skin irritation.
 H317 May cause an allergic skin reaction.
 H318 Causes serious eye damage.
 H341 Suspected of causing genetic defects.

Precautionary statements :

P260 Do not breathe dust.
 P280 Wear protective gloves/eye protection/face protection.
 P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
 P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

*Classification and labelling adjusted by Rhodia based on available data

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.