SAFETY DATA SHEETS

According to Globally Harmonized System of Classification and Labelling of Chemicals (GHS) - Sixth revised edition

Version: 1.0

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1. Identification

1.1 GHS Product identifier

Product name	catechol

1.2 Other means of identification

Product number	-
Other names	1,2-dihydroxybenzene

1.3 Recommended use of the chemical and restrictions on use

Identified uses	For industry use only. Catechol is used as a photographic developer, a developer for fur dyes, as an intermediate for antioxidants in rubber and lubricating oils, in polymerization inhibitors, and in pharmaceuticals.
Uses advised against	no data available

2. Hazard identification

2.1 Classification of the substance or mixture

Acute toxicity - Oral, Category 4

Acute toxicity - Dermal, Category 4

Skin irritation, Category 2

Eye irritation, Category 2

2.2 GHS label elements, including precautionary statements

Pictogram(s)	
Signal word	Warning
Hazard statement(s)	H302 Harmful if swallowed H312 Harmful in contact with skin H315 Causes skin irritation H319 Causes serious eye irritation
Precautionary statement(s)	
Prevention	P264 Wash ... thoroughly after handling. P270 Do not eat, drink or smoke when using this product. P280 Wear protective gloves/protective clothing/eye protection/face protection.
Response	P301+P312 IF SWALLOWED: Call a POISON CENTER/doctor/⋯if you feel unwell. P330 Rinse mouth. P302+P352 IF ON SKIN: Wash with plenty of water/... P312 Call a POISON CENTER/doctor/⋯if you feel unwell. P321 Specific treatment (see ... on this label). P362+P364 Take off contaminated clothing and wash it before reuse. P332+P313 If skin irritation occurs: Get medical advice/attention. P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

	P337+P313 If eye irritation persists: Get medical advice/attention.
Storage	none
Disposal	P501 Dispose of contents/container to ...

2.3 Other hazards which do not result in classification

none

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3. Composition/information on ingredients

3.1 Substances

Chemical name	Common names and synonyms	CAS number	EC number	Concentration
catechol	catechol	120-80-9	none	100%

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4. First-aid measures

4.1 Description of necessary first-aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

Fresh air, rest. Artificial respiration may be needed. Refer for medical attention.

In case of skin contact

Remove contaminated clothes. Rinse skin with plenty of water or shower. Refer for medical attention .

In case of eye contact

Rinse with plenty of water (remove contact lenses if easily possible). Refer immediately for medical attention.

If swallowed

Rinse mouth. Give one or two glasses of water to drink. Refer immediately for medical attention.

4.2 Most important symptoms/effects, acute and delayed

DUST: Irritating to eyes, nose and throat. If inhaled will cause coughing or difficult breathing. SOLID: Will burn skin and eyes. Harmful if swallowed. (USCG, 1999)

4.3 Indication of immediate medical attention and special treatment needed, if necessary

Immediate first aid: Ensure that adequate decontamination has been carried out. If patient is not breathing, start artificial respiration, preferably with a demand-valve resuscitator, bag-valve-mask device, or pocket mask, as trained. Perform CPR as necessary. Immediately flush contaminated eyes with gently flowing water. Do not induce vomiting. If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain an open airway and prevent aspiration. Keep patient quiet and maintain normal body temperature. Obtain medical attention. /Phenols and related compounds/

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5. Fire-fighting measures

5.1 Extinguishing media

Suitable extinguishing media

To fight fire, use water, carbon dioxide, dry chemical

5.2 Specific hazards arising from the chemical

Combustible. POISONOUS GASES MAY BE PRODUCED WHEN HEATED. May form toxic fumes at high temperatures. (USCG, 1999)

5.3 Special protective actions for fire-fighters

Wear self-contained breathing apparatus for firefighting if necessary.

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6. Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust. For personal protection see section 8.

6.2 Environmental precautions

Personal protection: particulate filter respirator adapted to the airborne

concentration of the substance. Do NOT let this chemical enter the environment. Sweep spilled substance into covered containers. If appropriate, moisten first to prevent dusting. Carefully collect remainder. Then store and dispose of according to local regulations.

6.3 Methods and materials for containment and cleaning up

Sweep spilled substance into containers; if appropriate, moisten first to prevent dusting, then remove to safe place. Do NOT let this chemical enter the environment. Personal protection: P2 filter respirator for harmful particles.

7. Handling and storage

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Avoid exposure - obtain special instructions before use.Provide appropriate exhaust ventilation at places where dust is formed. For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Well closed. Separated from oxidants and food and feedstuffs. Keep in the dark. Ventilation along the floor. Store in an area without drain or sewer access.Separated from strong oxidants, food and feedstuffs. Keep in the dark. Ventilation along the floor.

8. Exposure controls/personal protection

8.1 Control parameters

Occupational Exposure limit values

Recommended Exposure Limit: 10 Hr Time-Weighted Avg: 5 ppm (20 mg/cu m), skin.

Biological limit values

no data available

8.2 Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

8.3 Individual protection measures, such as personal protective

equipment (PPE)

Eye/face protection

Safety glasses with side-shields conforming to EN166. Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Wear impervious clothing. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace. Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique(without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands. The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Respiratory protection

Wear dust mask when handling large quantities.

Thermal hazards

no data available

9. Physical and chemical properties

Physical state	Light grey to light brown flake
Colour	Monoclinic tablets, prisms from toluene ... its aqueous solutions soon turn brown
Odour	Faint characteristic odor
Melting point/ freezing point	128°C(lit.)
Boiling point or initial boiling point and boiling range	245°C(lit.)
Flammability	Combustible SolidCombustible. Gives off irritating or toxic fumes (or gases) in a fire.
Lower and upper explosion limit / flammability limit	Flammability lower limit (vapor in air): 1.97%
Flash point	127°C
Auto-ignition	510°C

temperature	
Decomposition temperature	no data available
pH	no data available
Kinematic viscosity	no data available
Solubility	In water:430 g/L (20 ºC)
Partition coefficient n-octanol/water (log value)	no data available
Vapour pressure	1 mm Hg (75 °C)
Density and/or relative density	1.371
Relative vapour density	3.8 (vs air)
Particle characteristics	no data available

10. Stability and reactivity

10.1 Reactivity

no data available

10.2 Chemical stability

Discolors in air and light ... its aqueous solution soon turns brown.

10.3 Possibility of hazardous reactions

Combustible when exposed to heat or flame.POISONOUS GASES MAY BE PRODUCED WHEN HEATED. CATECHOL may form toxic fumes at high temperatures. (USCG, 1999). This compound can react with acid chlorides, acid anhydrides, bases and oxidizing agents. It reacts violently on contact with concentrated nitric acid. It acts as a reducing agent .

10.4 Conditions to avoid

no data available

10.5 Incompatible materials

Can react vigorously with oxidizing materials

10.6 Hazardous decomposition products

Decomposition compounds: phenol derivatives, carbon oxides, irritating smokes.

11. Toxicological information

Acute toxicity

- Oral: LD50 Rat oral 300 mg/kg
- Inhalation: no data available
- Dermal: no data available

Skin corrosion/irritation

no data available

Serious eye damage/irritation

no data available

Respiratory or skin sensitization

no data available

Germ cell mutagenicity

no data available

Carcinogenicity

Evaluation: No epidemiological data relevant to the carcinogenicity of catechol were available. There is sufficient evidence in experimental animals for the carcinogenicity of catechol. OVERALL EVALUATION: Catechol is possibly carcinogenic to humans (Group 2B).

Reproductive toxicity

No information is available on the reproductive or developmental effects of catechol in humans or animals.

STOT-single exposure

no data available

STOT-repeated exposure

no data available

Aspiration hazard

no data available

12. Ecological information

12.1 Toxicity

- Toxicity to fish: EC50; Species: Pimephales promelas (Fathead minnow); Conditions: flow through bioassay with measured concentrations, 25.6°C, dissolved oxygen 6.4 mg/L, hardness 46.0 mg/L calcium carbonate, alkalinity 40.2 mg/L calcium carbonate, and pH 7.7; Concentration: 9.00 mg/L for 96 hr (confidence limit: 8.47-9.65 mg/L); Effect: loss of equilibrium
- Toxicity to daphnia and other aquatic invertebrates: no data available
- Toxicity to algae: EC50; Species: Chlorella vulgaris (Algae); Concentration: >50 mg/L for 10 day; Effect: decreased biomass /Conditions of bioassay not specified in source examined
- Toxicity to microorganisms: no data available

12.2 Persistence and degradability

AEROBIC: Catechol is moderately to readily biodegraded in soils based on a residence time of 1 day for 500 mg of catechol in chernozem soil on hard carbonaceous woody loam (pH 7.1-7.5, 19°C)(1). The percent biodegradation (measured as percentage of recovered 14CO2 activity) after 6 months at 23°C in Steinbeck loam (pH 5.0), Fallbrook sandy loam (pH 5.5), Greenfield sandy loam (pH 7.0), and Sorrento loam (pH 7.4) were 24, 50, 28, and 26%, respectively(2). The soil bacteria Agrobacterium radiobacter was shown to biodegrade catechol(3).

12.3 Bioaccumulative potential

An estimated BCF of 3 was calculated for catechol(SRC), using a log Kow of 0.88(1) and a regression-derived equation(2). According to a classification scheme(3), this BCF suggests the potential for bioconcentration in aquatic organisms is low(SRC).

12.4 Mobility in soil

The Koc of catechol in Brookston clay loam has been reported to be 118(1). According to a classification scheme(2), this Koc value suggests that catechol is expected to have high mobility in soil.

12.5 Other adverse effects

no data available

13. Disposal considerations

13.1 Disposal methods

Product

The material can be disposed of by removal to a licensed chemical destruction plant or by controlled incineration with flue gas scrubbing. Do not contaminate water, foodstuffs, feed or seed by storage or disposal. Do not discharge to sewer systems.

Contaminated packaging

Containers can be triply rinsed (or equivalent) and offered for recycling or reconditioning. Alternatively, the packaging can be punctured to make it unusable for other purposes and then be disposed of in a sanitary landfill. Controlled incineration with flue gas scrubbing is possible for combustible packaging materials.

14. Transport information

14.1 UN Number

ADR/RID: UN2811 IMDG: UN2811 IATA: UN2811

14.2 UN Proper Shipping Name

ADR/RID: TOXIC SOLID, ORGANIC, N.O.S.
IMDG: TOXIC SOLID, ORGANIC, N.O.S.
IATA: TOXIC SOLID, ORGANIC, N.O.S.

14.3 Transport hazard class(es)

ADR/RID: 6.1 IMDG: 6.1 IATA: 6.1

14.4 Packing group, if applicable

ADR/RID: III IMDG: III IATA: III

14.5 Environmental hazards

ADR/RID: no IMDG: no IATA: no

14.6 Special precautions for user

no data available

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

no data available

15. Regulatory information

15.1 Safety, health and environmental regulations specific for the product in question

Chemical name	Common names and synonyms	CAS number	EC number
catechol	catechol	120-80-9	none
European Inventory of Existing Commercial Chemical Substances (EINECS)			Listed.
EC Inventory			Listed.
United States Toxic Substances Control Act (TSCA) Inventory			Listed.
China Catalog of Hazardous chemicals 2015			Listed.
New Zealand Inventory of Chemicals (NZIoC)			Listed.
Philippines Inventory of Chemicals and Chemical Substances (PICCS)			Listed.
Vietnam National Chemical Inventory			Listed.
Chinese Chemical Inventory of Existing Chemical Substances (China IECSC)			Listed.

16. Other information

Information on revision

Creation Date	Aug 10, 2017
Revision Date	Aug 10, 2017

Abbreviations and acronyms

- CAS: Chemical Abstracts Service
- ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road
- RID: Regulation concerning the International Carriage of Dangerous Goods by Rail
- IMDG: International Maritime Dangerous Goods

- IATA: International Air Transportation Association
- TWA: Time Weighted Average
- STEL: Short term exposure limit
- LC50: Lethal Concentration 50%
- LD50: Lethal Dose 50%
- EC50: Effective Concentration 50%

References

- IPCS - The International Chemical Safety Cards (ICSC), website: http://www.ilo.org/dyn/icsc/showcard.home
- HSDB - Hazardous Substances Data Bank, website: https://toxnet.nlm.nih.gov/newtoxnet/hsdb.htm
- IARC - International Agency for Research on Cancer, website: http://www.iarc.fr/
- eChemPortal - The Global Portal to Information on Chemical Substances by OECD, website: http://www.echemportal.org/echemportal/index?pageID=0&request_locale=en
- CAMEO Chemicals, website: http://cameochemicals.noaa.gov/search/simple
- ChemIDplus, website: http://chem.sis.nlm.nih.gov/chemidplus/chemidlite.jsp
- ERG - Emergency Response Guidebook by U.S. Department of Transportation, website: http://www.phmsa.dot.gov/hazmat/library/erg
- Germany GESTIS-database on hazard substance, website: http://www.dguv.de/ifa/gestis/gestis-stoffdatenbank/index-2.jsp
- ECHA - European Chemicals Agency, website: https://echa.europa.eu/
