MATERIAL SAFETY DATA SHEET

according to the (US) Hazard Communication Standard (29 CFR 1910.1200)

Date of issue: 03/11/2013 Version 1.0

SECTION 1. Identification

Product identifier

Product number 822333

Product name Hydroquinone for synthesis

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

Identified uses Chemical for synthesis

Details of the supplier of the safety data sheet

Company EMD Millipore Corporation | 290 Concord Road, Billerica, MA 01821, United States of America | SDS Phone Support: +1-978-715-1335 | General Inquiries: +1-978-715-4321 | Monday to Friday, 9:00 AM to 4:00 PM Eastern Time (GMT-5)

e-mail: mm_sds@merckgroup.com

Emergency telephone 800-424-9300 CHEMTREC (USA)
+1-703-527-3887 CHEMTREC (International)
24 Hours/day; 7 Days/week

SECTION 2. Hazards identification

GHS Classification

Carcinogenicity, Category 2, H351
Germ cell mutagenicity, Category 2, H341
Acute toxicity, Category 4, Oral, H302
Serious eye damage, Category 1, H318
Skin sensitization, Category 1, H317
Acute aquatic toxicity, Category 1, H400

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

GHS-Labeling

Hazard pictograms

Signal Word
Danger

Hazard Statements
H302 Harmful if swallowed.
H351 Suspected of causing cancer.
H341 Suspected of causing genetic defects.
H318 Causes serious eye damage.
H317 May cause an allergic skin reaction.
H400 Very toxic to aquatic life.

Precautionary Statements
P273 Avoid release to the environment.
P280 Wear protective gloves/ eye protection/ face protection.
P308 + P313 IF exposed or concerned: 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.
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.

OSHA Hazards
This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Other hazards
None known.

SECTION 3. Composition/information on ingredients

Formula	$C_6H_4(OH)_2$	$C_6H_6O_2$ (Hill)
CAS-No.	123-31-9	
Molar mass	110.11 g/mol	

Hazardous ingredients
Chemical Name (Concentration)
CAS-No.
hydroquinone (>= 90 % - <= 100 %)
123-31-9

SECTION 4. First aid measures

Description of first-aid measures

Inhalation
After inhalation: fresh air. Call in physician.

Skin contact
After skin contact: wash off with plenty of water. Remove contaminated clothing. Consult a physician.

Eye contact
After eye contact: rinse out with plenty of water. Immediately call in ophthalmologist.

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

Never give anything by mouth to an unconscious person.

Most important symptoms and effects, both acute and delayed

Allergic reactions, irritant effects, Cough, Shortness of breath, Cyanosis, Diarrhea, Nausea, Vomiting, collapse
Risk of corneal clouding.
Risk of serious damage to eyes.

Indication of any immediate medical attention and special treatment needed

No information available.

SECTION 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media

Water, Carbon dioxide (CO2), Foam, Dry powder

Unsuitable extinguishing media

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

Special hazards arising from the substance or mixture

Combustible.
Vapors are heavier than air and may spread along floors.
Forms explosive mixtures with air on intense heating.
Risk of dust explosion.
Development of hazardous combustion gases or vapors possible in the event of fire.

Advice for firefighters

Special protective equipment for fire-fighters

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

Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Avoid inhalation of dusts. 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.

Environmental precautions

Do not empty into drains.

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 dry. Dispose of properly. Clean up affected area. Avoid generation of dusts.

SECTION 7. Handling and storage

Precautions for safe handling

Work under hood. Do not inhale substance/mixture.

Observe label precautions.

Conditions for safe storage, including any incompatibilities

Tightly closed. Dry. Protected from light.

Store at +5°C to +30°C (+41°F to +86°F).

SECTION 8. Exposure controls/personal protection

Exposure limit(s)

Ingredients

Basis	Value	Threshold limits	Remarks
hydroquinone 123-31-9			
ACGIH	Time Weighted Average (TWA):	1 mg/m³	
NIOSH/GUIDE	Ceiling Limit Value and Time Period (if specified):	2 mg/m³	Ceiling Limit Value 15-min
OSHA_TRANS	PEL:	2 mg/m³	
Z1A	Time Weighted Average (TWA):	2 mg/m³	

Engineering measures

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

Individual protection measures

Protective clothing should be selected specifically for the workplace, depending on concentration and quantity of the hazardous substances handled. The chemical resistance of the protective equipment should be inquired at the respective supplier.

Hygiene measures

Immediately change contaminated clothing. Apply skin- protective barrier cream. Wash hands and face after working with substance.

Eye/face protection

Tightly fitting safety goggles

Hand protection

Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Other protective equipment:

protective clothing

Respiratory protection

required when dusts are generated.

Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

SECTION 9. Physical and chemical properties

Physical state	solid
Color	off-white
Odor	odorless
Odor Threshold	No information available.
pH	No information available.
Melting point	172 °C (decomposition)
Boiling point/boiling range	549 °F (287 °C) at 1,013 hPa
Flash point	329 °F (165 °C) Method: c.c.
Evaporation rate	No information available.
Flammability (solid, gas)	No information available.
Lower explosion limit	No information available.
Upper explosion limit	No information available.
Vapor pressure	< 0.1 hPa at 77 °F (25 °C)
Relative vapor density	3.81
Relative density	1.358 g/cm³ at 68 °F (20 °C)
Water solubility	70 g/l at 77 °F (25 °C)
Partition coefficient: n-octanol/water	log Pow: 0.59 (experimental) (Lit.) Bioaccumulation is not expected (log Pow <1).
Autoignition temperature	No information available.
Decomposition temperature	> 338 °F (> 170 °C)
Viscosity, dynamic	No information available.

Explosive properties	No information available.
Ignition temperature	959 °F (515 °C) at 1,013 hPa
Bulk density	ca. 600 kg/m³

SECTION 10. Stability and reactivity

Reactivity

Risk of dust explosion.
Forms explosive mixtures with air on intense heating.

Chemical stability

Sensitivity to light
sublimable
Sensitive to air.

Possibility of hazardous reactions

increased reactivity with:

Aluminum

Risk of explosion with:

Oxygen

Exothermic reaction with:

Strong oxidizing agents, alkalines

Violent reactions possible with:

Sodium hydroxide

Conditions to avoid

Strong heating.

Incompatible materials

no information available

Hazardous decomposition products

no information available

SECTION 11. Toxicological information

Information on toxicological effects

Likely route of exposure
Eye contact, Skin contact, Ingestion

Target Organs
Eyes
Skin
Respiratory system
Central nervous system

Acute oral toxicity
LDLO human: 29 mg/kg (RTECS)

LD50 rat: 302 mg/kg (IUCLID)

absorption
Symptoms: Nausea, Vomiting, Diarrhea

Acute inhalation toxicity
The substance has delayed effects.
Symptoms: mucosal irritations, Cough, Shortness of breath, Possible damages:, Lung edema

Acute dermal toxicity
LD50 rat: > 900 mg/kg
(IUCLID)

absorption

Skin irritation
rabbit
Result: No irritation
(IUCLID)

Possible damages: slight irritation

Eye irritation
Risk of corneal clouding.
Causes serious eye damage.

Sensitization
Sensitization test: guinea pig
Result: positive
Method: OECD Test Guideline 406

May cause an allergic skin reaction.

Genotoxicity in vitro
Mutagenicity (mammal cell test): chromosome aberration.
Result: positive
Method: OECD Test Guideline 473

Ames test
Result: negative
Method: OECD Test Guideline 471

CMR effects
Carcinogenicity:
Suspected of causing cancer.
Mutagenicity:
Suspected of causing genetic defects.

Specific target organ systemic toxicity - single exposure
The substance or mixture is not classified as specific target organ toxicant, single exposure.

Specific target organ systemic toxicity - repeated exposure
The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Aspiration hazard
Regarding the available data the classification criteria are not fulfilled.

Carcinogenicity

IARC	No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
OSHA	No ingredient of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.
NTP	No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
ACGIH	Confirmed animal carcinogen with unknown relevance to humans.
	hydroquinone 123-31-9

Further information
After absorption:
Cyanosis, collapse
Handle in accordance with good industrial hygiene and safety practice.

SECTION 12. Ecological information

Ecotoxicity

Toxicity to fish
LC50 Pimephales promelas (fathead minnow): 0.044 mg/l; 96 h (IUCLID)

Toxicity to daphnia and other aquatic invertebrates
EC50 Tetrahymen pyriformis: 95 mg/l; 60 h (IUCLID)

EC50 Daphnia magna (Water flea): 0.29 mg/l; 48 h
OECD Test Guideline 202

Toxicity to algae
IC50 Pseudokirchneriella subcapitata (green algae): 0.335 mg/l; 72 h (IUCLID)

Toxicity to bacteria
microtox test EC50 Photobacterium phosphoreum: 0.038 mg/l; 30 min (IUCLID)

Persistence and degradability

Biodegradability
86 %; 14 d
OECD Test Guideline 301C
Readily biodegradable.

Theoretical oxygen demand (ThOD)
1,890 mg/g
(IUCLID)

Ratio BOD/ThBOD
BOD5 33 %
(Lit.)

Ratio COD/ThBOD
90 - 97 %
(Lit.)

Bioaccumulative potential

Partition coefficient: n-octanol/water
log Pow: 0.59
(experimental)
(Lit.) Bioaccumulation is not expected (log Pow <1).

Mobility in soil

No information available.

Other adverse effects

Additional ecological information
Biological effects:
Formation of health-hazardous mixtures possible with water. Hazard for drinking water supplies.
Further information on ecology
Discharge into the environment must be avoided.

SECTION 13. Disposal considerations

The information presented only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations. Disposal should be in accordance with applicable regional, national and local laws and regulations.

SECTION 14. Transport information

Land transport (DOT)

UN number	UN 3077
Proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (HYDROQUINONE)
Class	9
Packing group	III
Environmentally hazardous	--

Air transport (IATA)

UN number	UN 3077
Proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (HYDROQUINONE)
Class	9
Packing group	III
Environmentally hazardous	--
Special precautions for user	no

Sea transport (IMDG)

UN number	UN 3077
Proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (HYDROQUINONE)
Class	9
Packing group	III
Environmentally hazardous	--
Special precautions for user	yes
EmS	F-A S-F

SECTION 15. Regulatory information

United States of America

OSHA Hazards

Toxic by ingestion
Toxic by skin absorption
Corrosive to eyes
Skin sensitizer
Carcinogen
Mutagen
Target organ effects

This information is based on 29 CFR 1910.1200 criteria prior to adoption of the GHS, and may deviate from the GHS information on the label and in section 2.

SARA 311/312 Hazards

Acute Health Hazard
Chronic Health Hazard

SARA 313

The following components are subject to reporting levels established by SARA Title III, Section 313:

Ingredients

hydroquinone	123-31-9

SARA 302

The following components are subject to reporting levels established by SARA Title III, Section 302:

Ingredients

hydroquinone 123-31-9

Clean Water Act

This product does not contain any Hazardous Substances listed under the U.S. CleanWater Act, Section 311, Table 116.4A.

This product does not contain any Hazardous Chemicals listed under the U.S. CleanWater Act, Section 311, Table 117.3.

DEA List I

Not listed

DEA List II

Not listed

Massachusetts Right To Know

Ingredients

hydroquinone

Pennsylvania Right To Know

Ingredients

hydroquinone

New Jersey Right To Know

Ingredients

hydroquinone

Notification status

TSCA:	On TSCA Inventory
DSL:	All components of this product are on the Canadian DSL.

SECTION 16. Other information

Training advice

Provide adequate information, instruction and training for operators.

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

H302	Harmful if swallowed.
H317	May cause an allergic skin reaction.
H318	Causes serious eye damage.
H341	Suspected of causing genetic defects.
H351	Suspected of causing cancer.
H400	Very toxic to aquatic life.

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.

Date of issue:03/11/2013