Section 1 - Product and Company Information

Product Name                       HYDROQUINONE, 99+% 
Product Number                     240125 
Brand                              ALDRICH 
Company                            Sigma-Aldrich 
Street Address                     3050 Spruce Street 
City, State, Zip, Country          SAINT LOUIS MO 63103 US 
Technical Phone:                   314 771 5765 
Emergency Phone:                   414 273 3850 Ext. 5996 
Fax:                               800 325 5052 

Section 2 - Composition/Information on Ingredient

Substance Name                          CAS #                 SARA 313 
HYDROQUINONE                            123-31-9              Yes 

Formula         C6H6O2 
Synonyms        Arctuvin * Benzene, p-dihydroxy- * p-Benzenediol 
                * 1,4-Benzenediol * Benzoxydroquinone * 
                Benzoquinol * Black and white bleaching cream * 
                1,4-Dihydroxy-benzeen (Dutch) * 
                1,4-Dihydroxybenzen (Czech) * Dihydroxybenzene * 
                p-Dihydroxybenzene * 1,4-Dihydroxybenzene * 
                Dihydroxybenzene (OSHA) * 1,4-Dihydroxy-benzol 
                (German) * 1,4-Dilledrobenzene (Italian) * 
                p-Dioxobenzene * p-Dioxybenzene * Eldoquolin * 
                Eldoquin * Hydrochinon (Czech, Polish) * 
                Hydroquinol * Hydroquinole * alpha-Hydroquinone * 
                p-Hydroquinone * Hydroquinone (ACGIH:OSHA) * 
                p-Hydroxyphenol * Idrochinone (Italian) * 
                NCI-C55834 * Phiaquin * Pyrogentistic acid * 
                Quinol * beta-Quinol * Tecquinol * Tenox HQ * 
                Tequinol * USAF EK-356 
RTECS Number:   MX3500000 

Section 3 - Hazards Identification

EMERGENCY OVERVIEW
Toxic (USA) Harmful (EU). Dangerous for the environment. 
Harmful if swallowed. Irritating to skin. Limited evidence of a 
carcinogenic effect. Risk of serious damage to eyes. May cause 
sensitization by skin contact. Very toxic to aquatic organisms. 
Possible Carcinogen (US). Possible mutagen. Target organ(s): 
Blood. Liver. 

HMIS RATING
HEALTH: 3* 
FLAMMABILITY: 0 
REACTIVITY: 1 

NFPA RATING
Section 4 - First Aid Measures

ORAL EXPOSURE
  If swallowed, wash out mouth with water provided person is conscious. Call a physician.

INHALATION EXPOSURE
  If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

DERMAL EXPOSURE
  In case of skin contact, flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. Call a physician.

EYE EXPOSURE
  In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

Section 5 - Fire Fighting Measures

FLASH POINT
  N/A

AUTOIGNITION TEMP
  499 °C

FLAMMABILITY
  N/A

EXTINGUISHING MEDIA
  Suitable: Water spray. Carbon dioxide, dry chemical powder, or appropriate foam.

FIREFIGHTING
  Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes. Specific Hazard(s): Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

PROCEDURE TO BE FOLLOWED IN CASE OF LEAK OR SPILL
  Evacuate area.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)
  Wear respirator, chemical safety goggles, rubber boots, and heavy rubber gloves.

METHODS FOR CLEANING UP
  Sweep up, place in a bag and hold for waste disposal. Avoid raising dust. Ventilate area and wash spill site after material pickup is complete.
Section 7 - Handling and Storage

HANDLING
User Exposure: Do not breathe dust. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

STORAGE
Suitable: Keep tightly closed.

SPECIAL REQUIREMENTS
Air and light sensitive.

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS
Safety shower and eye bath. Mechanical exhaust required.

PERSONAL PROTECTIVE EQUIPMENT

GENERAL HYGIENE MEASURES
Wash thoroughly after handling.

EXPOSURE LIMITS, RTECS
Country      Source     Type       Value
USA          ACGIH      TWA      2 MG/M3
USA          MSHA Standard-air TWA      2 MG/M3
USA          OSHA.      PEL      8H TWA 2 MG/M3
New Zealand OEL
Remarks: check ACGIH TLV
USA          NIOSH      Ceiling co2 MG/M3/15M

EXPOSURE LIMITS
Country     Source     Type       Value
Poland      NDS        2 MG/M3
Poland      NDSCh      4 MG/M3
Poland      NDSP       -

Section 9 - Physical/Chemical Properties

Appearance              Physical State: Solid
Color: Colorless
Form: Fine crystals

Property                          Value                          At Temperature or Pressure
Molecular Weight     110.11 AMU
pH                     3.7                                      Concentration: 70 g/l
BP/BP Range            285 °C                    760 mmHg
MP/MP Range            171 °C
Freezing Point         N/A
Vapor Pressure         1 mmHg                   132 °C
Vapor Density          3.81 g/l
Saturated Vapor Conc.  N/A
SG/Density             1.332 g/cm3
Bulk Density           550 - 650 kg/l
Odor Threshold         N/A
Volatile%              N/A
VOC Content            N/A
Water Content          N/A
Section 10 - Stability and Reactivity

STABILITY
- Stable.
- Conditions to Avoid: Sensitive to air. Sensitive to light.
- Materials to Avoid: Strong bases, Strong oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS
- Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide.

HAZARDOUS POLYMERIZATION
- Hazardous Polymerization: Will not occur

Section 11 - Toxicological Information

ROUTE OF EXPOSURE
- Skin Contact: Causes skin irritation.
- Skin Absorption: May be harmful if absorbed through the skin.
- Eye Contact: Causes severe eye irritation.
- Inhalation: May be harmful if inhaled. Material may be irritating to mucous membranes and upper respiratory tract.
- Ingestion: Harmful if swallowed.

SENSITIZATION
- Skin: May cause allergic skin reaction.

TARGET ORGAN(S) OR SYSTEM(S)

SIGNS AND SYMPTOMS OF EXPOSURE
- Absorption into the body leads to the formation of methemoglobin which in sufficient concentration causes cyanosis. Onset may be delayed 2 to 4 hours or longer.

TOXICITY DATA
- Oral
  - Human
  - 29 mg/kg
  - LDLO
- Oral
  - Rat
  - 302 mg/kg
  - LD50
Intraperitoneal Rat
170 MG/KG LD50

Intravenous Rat
115 MG/KG LD50

Oral Mouse
245 mg/kg LD50

Intraperitoneal Mouse
100 MG/KG LD50

Subcutaneous Mouse
182 MG/KG LD50

Oral Dog
200 mg/kg LD50

Oral Cat
50 mg/kg LD50

Oral Rabbit
200 mg/kg LD50

Intraperitoneal Rabbit
125 MG/KG LD50

Oral Guinea pig
550 mg/kg LD50

Oral Pigeon
300 mg/kg LD50
Remarks: Behavioral:Convulsions or effect on seizure threshold.
Behavioral: Excitement. Gastrointestinal: Nausea or vomiting.

Oral
Mammal
480 mg/kg
LD50
Remarks: Behavioral: Change in motor activity (specific assay).
Behavioral: Muscle contraction or spasticity. Lungs, Thorax, or
Respiration: Dyspnea.

Skin
Mammal
5970 mg/kg
LD50

IRRITATION DATA

Skin
Human
2 %
Remarks: Mild irritation effect

Skin
Human
5 %
Remarks: Severe irritation effect

CHRONIC EXPOSURE - CARCINOGEN
Result: This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

Species: Rat
Route of Application: Oral
Dose: 25750 MG/KG
Exposure Time: 2Y
Frequency: C

Species: Mouse
Route of Application: Oral
Dose: 25750 MG/KG
Exposure Time: 2Y
Frequency: C
Result: Tumorigenic: Neoplastic by RTECS criteria. Liver: Tumors.

Species: Rat
Route of Application: Oral
Dose: 256 GM/KG
Exposure Time: 2Y
Frequency: C

Species: Rat
Route of Application: Oral
Dose: 349 GM/KG
Exposure Time: 2Y
Frequency: C
Species: Mouse  
Route of Application: Oral  
Dose: 699 GM/KG  
Exposure Time: 2Y  
Frequency: C  
Result: Tumorigenic:Neoplastic by RTECS criteria. Liver:Tumors.

Species: Mouse  
Route of Application: Oral  
Dose: 26 GM/KG  
Exposure Time: 2Y  
Frequency: I  
Result: Tumorigenic:Carcinogenic by RTECS criteria. Liver:Tumors.

IARC CARCINOGEN LIST  
Rating: Group 3

NTP CARCINOGEN LIST  
Rating: Some evidence.  
Species: Mouse/rat  
Route: Gavage

CHRONIC EXPOSURE - MUTAGEN  
Result: Laboratory experiments have shown mutagenic effects.

Species: Human  
Dose: 75 UMOL/L  
Cell Type: lymphocyte  
Mutation test: Micronucleus test

Species: Human  
Dose: 500 UMOL/L  
Cell Type: Bone marrow  
Mutation test: DNA

Species: Human  
Dose: 800 UMOL/L  
Cell Type: lung  
Mutation test: DNA damage

Species: Human  
Dose: 100 UMOL/L  
Cell Type: lymphocyte  
Mutation test: DNA damage

Species: Human  
Dose: 100 UMOL/L  
Cell Type: HeLa cell  
Mutation test: DNA inhibition

Species: Human  
Dose: 5 UMOL/L  
Cell Type: lymphocyte  
Mutation test: Other mutation test systems

Species: Human  
Dose: 5 UMOL/L  
Cell Type: lymphocyte  
Mutation test: Sister chromatid exchange
Species: Human  
Dose: 6 MG/L  
Cell Type: lymphocyte  
Mutation test: SLN

Species: Human  
Dose: 75 UMOL/L  
Cell Type: lymphocyte  
Mutation test: SLN

Species: Rat  
Dose: 400 UMOL/L  
Cell Type: liver  
Mutation test: DNA damage

Species: Rat  
Route: Oral  
Dose: 8 GM/KG  
Mutation test: Unscheduled DNA synthesis

Species: Mouse  
Route: Intraperitoneal  
Dose: 20 MG/KG  
Mutation test: Micronucleus test

Species: Mouse  
Route: Subcutaneous  
Dose: 240 MG/KG  
Exposure Time: 6D  
Mutation test: Micronucleus test

Species: Mouse  
Route: Oral  
Dose: 80 MG/KG  
Mutation test: Micronucleus test

Species: Mouse  
Dose: 2500 UG/L (+S9)  
Cell Type: lymphocyte  
Mutation test: Mutation in microorganisms

Species: Mouse  
Route: Oral  
Dose: 120 MG/KG  
Mutation test: Other mutation test systems

Species: Mouse  
Dose: 10 UMOL/L  
Cell Type: lymphocyte  
Mutation test: DNA inhibition

Species: Mouse  
Dose: 10 UMOL/L  
Cell Type: lymphocyte  
Mutation test: Other mutation test systems

Species: Mouse  
Dose: 25 UMOL/L  
Cell Type: Other cell types  
Mutation test: Other mutation test systems
Species: Mouse  
Route: Intraperitoneal  
Dose: 40 MG/KG  
Mutation test: Cytogenetic analysis

Species: Mouse  
Route: Intraperitoneal  
Dose: 80 MG/KG  
Mutation test: SLN

Species: Mouse  
Dose: 1250 UG/L  
Cell Type: lymphocyte  
Mutation test: Mutation in mammalian somatic cells.

Species: Hamster  
Dose: 17500 NMOL/L  
Cell Type: lung  
Mutation test: Micronucleus test

Species: Hamster  
Dose: 3 UMOL/L  
Cell Type: Embryo  
Mutation test: Morphological transformation.

Species: Hamster  
Dose: 1 UMOL/L  
Cell Type: Embryo  
Mutation test: Unscheduled DNA syntheis

Species: Hamster  
Dose: 500 UMOL/L  
Cell Type: lung  
Mutation test: DNA inhibition

Species: Hamster  
Dose: 2 MG/L  
Cell Type: Embryo  
Mutation test: Other mutation test systems

Species: Hamster  
Dose: 20 MG/L  
Cell Type: ovary  
Mutation test: Cytogenetic analysis

Species: Hamster  
Dose: 30 UMOL/L  
Cell Type: Embryo  
Mutation test: Cytogenetic analysis

Species: Hamster  
Dose: 1 UMOL/L  
Cell Type: Embryo  
Mutation test: Sister chromatid exchange

Species: Hamster  
Dose: 500 UG/L  
Cell Type: ovary  
Mutation test: Sister chromatid exchange

Species: Hamster  
Dose: 20 UMOL/L
Cell Type: lung
Mutation test: Sister chromatid exchange

Species: Hamster
Dose: 1250 UG/L
Cell Type: Embryo
Mutation test: SLN

Species: Hamster
Dose: 10 UMOL/L
Cell Type: Embryo
Mutation test: Mutation in mammalian somatic cells.

Species: Rabbit
Dose: 6 UMOL/L
Cell Type: Bone marrow
Mutation test: Other mutation test systems

**CHRONIC EXPOSURE - REPRODUCTIVE HAZARD**

Species: Rat
Dose: 2500 MG/KG
Route of Application: Oral
Exposure Time: (1-22D PREG)
Result: Effects on Fertility: Post-implantation mortality (e.g.,
dead and/or resorbed implants per total number of implants).

Species: Rat
Dose: 667 MG/KG
Route of Application: Oral
Exposure Time: (11D PREG)
Result: Effects on Fertility: Post-implantation mortality (e.g.,
dead and/or resorbed implants per total number of implants).

Species: Rat
Dose: 1 GM/KG
Route of Application: Oral
Exposure Time: (11D PREG)
Result: Effects on Fertility: Litter size (e.g.; # fetuses per litter; measured before birth).

Species: Rat
Dose: 5 MG/KG
Route of Application: Subcutaneous
Exposure Time: (1D PRE)
Result: Maternal Effects: Ovaries, fallopian tubes.

Species: Rat
Dose: 550 MG/KG
Route of Application: Subcutaneous
Exposure Time: (11D PRE)
Result: Maternal Effects: Menstrual cycle changes or disorders.

Species: Rat
Dose: 5100 MG/KG
Route of Application: Subcutaneous
Exposure Time: (51D MALE)
Result: Paternal Effects: Testes, epididymis, sperm duct.
Paternal Effects: Prostate, seminal vesicle, Cowper's gland,
accessory glands. Effects on Fertility: Male fertility index
(e.g., # males impregnating females per # males exposed to
fertile nonpregnant females).
Section 12 - Ecological Information

ACUTE ECOTOXICITY TESTS

Test Type: EC50 Algae
Time: 24 h
Value: 17 mg/l

Test Type: EC50 Daphnia
Species: Daphnia magna
Time: 24 h
Value: 0.12 mg/l

Test Type: LC50 Fish
Species: Leuciscus idus
Time: 48 h
Value: 0.15 mg/l

Test Type: LC50 Fish
Species: Onchorhynchus mykiss (Rainbow trout)
Time: 96 h
Value: 0.04 - 0.1 mg/l

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION
Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT
Proper Shipping Name: Hydroquinone
UN#: 2662
Class: 6.1
Packing Group: Packing Group III
Hazard Label: Keep away from food
PIH: Not PIH

IATA
Proper Shipping Name: Hydroquinone
IATA UN Number: 2662
Hazard Class: 6.1
Packing Group: III

Section 15 - Regulatory Information

EU DIRECTIVES CLASSIFICATION
Symbol of Danger: Xn N
Indication of Danger: Harmful. Dangerous for the environment.
R: 22 40 41 43 50 68
Risk Statements: Harmful if swallowed. Limited evidence of a carcinogenic effect. Risk of serious damage to eyes. May cause sensitization by skin contact. Very toxic to aquatic organisms. Possible risk of irreversible effects.
S: 26 36/37/39 61
Safety Statements: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear
suitable protective clothing, gloves, and eye/face protection.
Avoid release to the environment. Refer to special
instructions/safety data sheets.

US CLASSIFICATION AND LABEL TEXT
Indication of Danger: Toxic (USA) Harmful (EU). Dangerous for
the environment.
Risk Statements: Harmful if swallowed. Irritating to skin.
Limited evidence of a carcinogenic effect. Risk of serious
damage to eyes. May cause sensitization by skin contact. Very
toxic to aquatic organisms.
Safety Statements: In case of contact with eyes, rinse
immediately with plenty of water and seek medical advice. Wear
suitable protective clothing, gloves, and eye/face protection.
Avoid release to the environment. Refer to special
instructions/safety data sheets.
Target organ(s): Blood. Liver.

UNITED STATES REGULATORY INFORMATION
SARA LISTED: Yes
DEMINIMIS: 1 %
NOTES: This product is subject to SARA section 313 reporting
requirements.
TSCA INVENTORY ITEM: Yes

CANADA REGULATORY INFORMATION
WHMIS Classification: This product has been classified in
accordance with the hazard criteria of the CPR, and the MSDS
contains all the information required by the CPR.
DSL: Yes
NDSL: No

Section 16 - Other Information

DISCLAIMER
For R&D use only. Not for drug, household or other uses.

WARRANTY
The above information is believed to be correct but does not
purport to be all inclusive and shall be used only as a guide. The
information in this document is based on the present state of our
knowledge and is applicable to the product with regard to
appropriate safety precautions. It does not represent any
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