

# SAFETY DATA SHEET

Version 6.19  
Revision Date 12/18/2024  
Print Date 12/19/2024

## SECTION 1. IDENTIFICATION

### 1.1 Product identifiers

Product name : Hydroquinone  
Product Number : H9003  
Brand : Sigma-Aldrich  
Index-No. : 604-005-00-4  
CAS-No. : 123-31-9

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

Identified uses : Laboratory chemicals, Synthesis of substances  
Uses advised against : The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

### 1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.  
3050 SPRUCE ST  
ST. LOUIS MO 63103  
UNITED STATES  
Telephone : +1 314 771-5765  
Fax : +1 800 325-5052

### 1.4 Emergency telephone

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

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## SECTION 2. HAZARDS IDENTIFICATION

### GHS classification in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200)

Acute toxicity (Oral) : Category 4

Serious eye damage : Category 1  
Skin sensitization : Sub-category 1B  
Germ cell mutagenicity : Category 2  
Carcinogenicity : Category 2  
Short-term (acute) aquatic hazard : Category 1  
Long-term (chronic) aquatic hazard : Category 1

**GHS label elements**

Hazard pictograms :



Signal Word : Danger

Hazard Statements : 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.  
H410 Very toxic to aquatic life with long lasting effects.

Precautionary Statements :

**Prevention:**

P201 Obtain special instructions before use.  
P202 Do not handle until all safety precautions have been read and understood.  
P261 Avoid breathing dust.  
P264 Wash skin thoroughly after handling.  
P270 Do not eat, drink or smoke when using this product.  
P272 Contaminated work clothing must not be allowed out of the workplace.  
P273 Avoid release to the environment.  
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

**Response:**

P301 + P312 + P330 IF SWALLOWED: Call a POISON CENTER/ doctor if you feel unwell. Rinse mouth.  
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.  
P305 + P351 + P338 + P310 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/ doctor.

P308 + P313 IF exposed or concerned: Get medical advice/ attention.  
P333 + P313 If skin irritation or rash occurs: Get medical advice/ attention.  
P363 Wash contaminated clothing before reuse.  
P391 Collect spillage.

**Storage:**

P405 Store locked up.

**Disposal:**

P501 Dispose of contents/ container to an approved waste disposal plant.

**Other hazards**

None known.

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**SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS**

Substance / Mixture : Substance

**Components**

| Chemical name | CAS-No.  | Concentration (% w/w) |
|---------------|----------|-----------------------|
| hydroquinone  | 123-31-9 | >= 90 - <= 100        |

Actual concentration is withheld as a trade secret

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**SECTION 4. FIRST AID MEASURES**

General advice : Show this material safety data sheet to the doctor in attendance.

If inhaled : After inhalation: fresh air. Call in physician.

In case of skin contact : In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Consult a physician.

In case of eye contact : After eye contact: rinse out with plenty of water. Immediately call in ophthalmologist. Remove contact lenses.

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

Most important symptoms and effects, both acute and delayed : The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

Protection of first-aiders : For personal protection see section 8.

Notes to physician : No data available

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## SECTION 5. FIRE-FIGHTING MEASURES

|  |  |
|--|--|
| Suitable extinguishing media                   | : Water<br>Foam<br>Carbon dioxide (CO <sub>2</sub> )<br>Dry powder   |
| Unsuitable extinguishing media                 | : For this substance/mixture no limitations of extinguishing agents are given.   |
| Specific hazards during fire fighting          | : Combustible.<br><br>Vapors are heavier than air and may spread along floors.<br><br>Forms explosive mixtures with air on intense heating.<br><br>Development of hazardous combustion gases or vapours possible in the event of fire. |
| Hazardous combustion products                  | : Carbon oxides  |
| Specific extinguishing methods                 | : No data available  |
| Further information                            | : Prevent fire extinguishing water from contaminating surface water or the ground water system.  |
| 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.  |

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## SECTION 6. ACCIDENTAL RELEASE MEASURES

|   |   |
|---|---|
| Personal precautions, protective equipment and emergency procedures | : Advice for non-emergency personnel:<br>Avoid inhalation of dusts.<br>Avoid substance contact.<br>Ensure adequate ventilation.<br>Evacuate the danger area, observe emergency proce- |
|---|---|

dures, consult an expert.  
 Advice for emergency responders:  
 For personal protection see section 8.

- Environmental precautions : Do not let product enter 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

For precautions see section 2.2.

- Advice on safe handling : Work under hood. Do not inhale substance/mixture.
- Further information on storage conditions : Tightly closed.  
 Dry.
- Storage class : 11, Combustible Solids
- Recommended storage temperature : Recommended storage temperature see product label.
- Further information on storage stability : Air and light sensitive.

## SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### Ingredients with workplace control parameters

| Components   | CAS-No.  | Value type (Form of exposure) | Control parameters / Permissible concentration | Basis     |
|--------------|----------|-------------------------------|--|-----------|
| hydroquinone | 123-31-9 | TWA                           | 1 mg/m <sup>3</sup>                            | ACGIH     |
|              |          | TWA                           | 2 mg/m <sup>3</sup>                            | OSHA Z-1  |
|              |          | C                             | 2 mg/m <sup>3</sup>                            | NIOSH REL |

### Biological occupational exposure limits

| Components   | CAS-No.  | Control parameters | Biological specimen | Sampling time               | Permissible concentration | Basis        |
|--------------|----------|--------------------|---------------------|-----------------------------|---------------------------|--------------|
| hydroquinone | 123-31-9 | Methemoglobin      | In blood            | During or at the end of the | 5 % Hb                    | ACGIH<br>BEI |

|  |  |  |  |       |  |  |
|--|--|--|--|-------|--|--|
|  |  |  |  | shift |  |  |
|--|--|--|--|-------|--|--|

**Engineering measures** : No data available

**Personal protective equipment**

Respiratory protection : required when dusts are generated.  
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Recommended Filter type: : Filter A-(P2)

The entrepreneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.

**Hand protection**

Material : Nitrile rubber  
Break through time : 480 min  
Glove thickness : 0.11 mm  
Protective index : Full contact  
Manufacturer : KCL 741 Dermatril® L

Material : Nitrile rubber  
Break through time : 480 min  
Glove thickness : 0.11 mm  
Protective index : Splash contact  
Manufacturer : KCL 741 Dermatril® L

Remarks : This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: [www.kcl.de](http://www.kcl.de)).

Eye protection : Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).  
Tightly fitting safety goggles

Skin and body protection : protective clothing

Hygiene measures : Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face af-

ter working with substance.

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## SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

|   |  |
|---|--|
| Appearance  | : crystalline  |
| Color   | : colorless  |
| Odor  | : No data available  |
| Odor Threshold                                      | : No data available  |
| pH  | : 3.7<br>Concentration: 70 g/l                             |
| Melting point/ range                                | : 342 - 347 °F / 172 - 175 °C<br>Method: lit.              |
| Boiling point/boiling range                         | : 545 °F / 285 °C<br>Method: lit.                          |
| Flash point   | : 329 °F / 165 °C<br>(ca. 1,013 hPa)<br>Method: closed cup |
| Evaporation rate                                    | : No data available  |
| Burning rate  | : No data available  |
| Self-ignition                                       | : 960.01 °F / 515.56 °C<br>ca. 1,013 hPa                   |
| Upper explosion limit /<br>Upper flammability limit | : No data available  |
| Lower explosion limit /<br>Lower flammability limit | : No data available  |
| Vapor pressure                                      | : 1 hPa (270 °F / 132 °C)                                  |
| Relative vapor density                              | : 3.80<br>(Air = 1.0)                                      |
| Relative density                                    | : No data available  |
| Density   | : 1.332 g/cm <sup>3</sup> (59 °F / 15 °C)<br>(HSDB)        |
| Solubility(ies)<br>Water solubility                 | : 72 g/l completely soluble (77 °F / 25 °C)                |

|  |   |
|--|---|
|  | pH: 4 - 6   |
| Partition coefficient: n-octanol/water | : log Pow: 0.59 (68 - 77 °F / 20 - 25 °C)<br>Bioaccumulation is not expected. |
| Autoignition temperature               | : 930 °F / 499 °C   |
| Decomposition temperature              | : No data available   |
| Viscosity, dynamic                     | : No data available   |
| Viscosity, kinematic                   | : No data available   |
| Flow time                              | : No data available   |
| Explosive properties                   | : Not classified as explosive.  |
| Oxidizing properties                   | : none  |
| Molecular weight                       | : 110.11 g/mol  |
| Particle characteristics               |   |
| Particle size                          | : No data available   |

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## SECTION 10. STABILITY AND REACTIVITY

|                                    |  |
|------------------------------------|--|
| Reactivity                         | : Forms explosive mixtures with air on intense heating.<br><br>A range from approx. 15 Kelvin below the flash point is to be rated as critical.<br><br>The following applies in general to flammable organic substances and mixtures: in correspondingly fine distribution, when whirled up a dust explosion potential may generally be assumed. |
| Chemical stability                 | : The product is chemically stable under standard ambient conditions (room temperature) .  |
| Possibility of hazardous reactions | : increased reactivity with:<br>Aluminum<br>Risk of explosion with:<br>Oxygen<br>Exothermic reaction with:<br>Strong oxidizing agents<br>alkalines<br>Violent reactions possible with:<br>Sodium hydroxide   |



Conditions to avoid : Air  
Light.  
Strong heating.

Incompatible materials : No data available

Hazardous decomposition : In the event of fire: see section 5  
products

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## SECTION 11. TOXICOLOGICAL INFORMATION

### 11.1 Information on toxicological effects

#### Acute toxicity

LD50 Oral - Rat - female - 367.3 mg/kg  
(OECD Test Guideline 401)

Inhalation: No data available

LD50 Dermal - Rabbit - male and female - > 2,000 mg/kg  
(OECD Test Guideline 402)

#### Skin corrosion/irritation

Skin - Rabbit

Result: No skin irritation - 24 h

Remarks: (ECHA)

#### Serious eye damage/eye irritation

Remarks: Causes serious eye damage.

(Regulation (EC) No 1272/2008, Annex VI)

#### Respiratory or skin sensitization

Local lymph node assay (LLNA) - Mouse

Result: positive

(OECD Test Guideline 429)

#### Germ cell mutagenicity

Suspected of causing genetic defects.

Test Type: Ames test

Test system: *S. typhimurium*

Metabolic activation: with and without metabolic activation

Method: OECD Test Guideline 471

Result: negative

Test Type: Chromosome aberration test in vitro

Test system: Human lymphocytes

Metabolic activation: with and without metabolic activation

Method: OECD Test Guideline 473

Result: negative

Test Type: In vitro mammalian cell gene mutation test

Test system: mouse lymphoma cells

Metabolic activation: with and without metabolic activation

Method: OECD Test Guideline 476

Result: positive

Test Type: Chromosome aberration test in vitro

Test system: Chinese hamster ovary cells

Metabolic activation: without metabolic activation

Result: negative  
Remarks: (ECHA)

Test Type: comet assay  
Species: Rat

Application Route: Oral  
Method: OECD Test Guideline 489  
Result: negative

Test Type: Transgenic rodent somatic cell gene mutation assay  
Species: Mouse

Application Route: Oral  
Method: OECD Test Guideline 488  
Result: negative

Test Type: dominant lethal test  
Species: Rat

Application Route: Oral  
Method: OECD Test Guideline 478  
Result: negative

Test Type: Micronucleus test  
Species: Mouse  
Cell type: Red blood cells (erythrocytes)  
Application Route: Intraperitoneal  
Method: OECD Test Guideline 474  
Result: positive

Test Type: Micronucleus test  
Species: Mouse  
Cell type: Red blood cells (erythrocytes)  
Application Route: Intraperitoneal

Result: positive  
Remarks: (ECHA)

### **Carcinogenicity**

Suspected of causing cancer.

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.

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.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

### **Reproductive toxicity**

No data available

### **Specific target organ toxicity - single exposure**

No data available

**Specific target organ toxicity - repeated exposure**

No data available

**Aspiration hazard**

No data available

**11.2 Additional Information**

Repeated dose toxicity - Rat - male and female - Oral - 13 Weeks - NOAEL (No observed adverse effect level) - 50 mg/kg

Remarks: (ECHA)

Repeated dose toxicity - Rat - male and female - Dermal - 13 Weeks - NOAEL (No observed adverse effect level) - 73.9 mg/kg

RTECS: MX3500000

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. To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Liver - Irregularities - Based on Human Evidence

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**SECTION 12. ECOLOGICAL INFORMATION**

**Ecotoxicity**

**Components:**

**hydroquinone:**

|   |   |
|---|---|
| Toxicity to fish                                    | : LC50 (Oncorhynchus mykiss (rainbow trout)): 0.638 mg/l<br>End point: mortality<br>Exposure time: 96 h<br>Test Type: flow-through test<br>Analytical monitoring: yes<br>Method: OECD Test Guideline 203        |
| Toxicity to daphnia and other aquatic invertebrates | : EC50 (Daphnia magna (Water flea)): 0.134 mg/l<br>End point: Immobilization<br>Exposure time: 48 h<br>Test Type: semi-static test<br>Analytical monitoring: yes<br>Method: OECD Test Guideline 202<br>GLP: yes |
| Toxicity to algae/aquatic plants                    | : ErC50 (Pseudokirchneriella subcapitata): 0.33 mg/l<br>Exposure time: 72 h<br>Test Type: static test   |

Analytical monitoring: yes  
Method: OECD Test Guideline 201  
GLP: yes

NOEC (Pseudokirchneriella subcapitata): 0.019 mg/l  
Exposure time: 72 h  
Test Type: static test  
Analytical monitoring: yes  
Method: OECD Test Guideline 201  
GLP: yes

Toxicity to fish (Chronic toxicity) : NOEC (Pimephales promelas (fathead minnow)): >= 0.1 mg/l  
End point: reproduction rate  
Exposure time: 32 d  
Test Type: flow-through test  
Analytical monitoring: yes  
Method: OECD Test Guideline 210  
GLP: yes

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : LC50 (Daphnia magna (Water flea)): 0.061 mg/l  
End point: mortality  
Exposure time: 21 d  
Test Type: semi-static test  
Analytical monitoring: yes  
Method: OECD Test Guideline 211  
GLP: yes

### **Ecotoxicology Assessment**

Acute aquatic toxicity : Very toxic to aquatic life.

Chronic aquatic toxicity : Very toxic to aquatic life with long lasting effects.

### **Persistence and degradability**

#### **Components:**

#### **hydroquinone:**

Biodegradability : aerobic  
Inoculum: activated sludge  
Concentration: 100 mg/l  
Result: Readily biodegradable.  
Biodegradation: 70 %  
Exposure time: 14 d  
Method: OECD Test Guideline 301C

### **Bioaccumulative potential**

#### **Components:**

#### **hydroquinone:**

Partition coefficient: n- : log Pow: 0.59 (68 - 77 °F / 20 - 25 °C)

Sigma-Aldrich- H9003

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The life science business of Merck operates as MilliporeSigma in the US and Canada

**MERCK**

octanol/water

Remarks: Bioaccumulation is not expected.

**Mobility in soil**

No data available

**Other adverse effects**

**Product:**

Ozone-Depletion Potential : Regulation: 40 CFR Protection of Environment; Part 82  
Protection of Stratospheric Ozone - CAA Section 602  
Class I Substances

Remarks: This product neither contains, nor was  
manufactured with a Class I or Class II ODS as de-  
fined by the U.S. Clean Air Act Section 602 (40 CFR  
82, Subpt. A, App.A + B).

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**SECTION 13. DISPOSAL CONSIDERATIONS**

**Disposal methods**

Waste from residues : Waste material must be disposed of in accordance  
with the national and local regulations. Leave chemi-  
cals in original containers. No mixing with other  
waste. Handle uncleaned containers like the product  
itself.

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**SECTION 14. TRANSPORT INFORMATION**

**International Regulations**

**IATA-DGR**

UN/ID No. : UN 3077  
Proper shipping name : Environmentally hazardous substance, solid, n.o.s.  
(hydroquinone)  
Class : 9  
Packing group : III  
Labels : Class 9 - Miscellaneous dangerous substances and  
articles  
Packing instruction (cargo : 956  
aircraft)  
Packing instruction (pas- : 956  
senger aircraft)

**IMDG-Code**

UN number : UN 3077  
Proper shipping name : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID,  
N.O.S.  
(hydroquinone)  
Class : 9  
Packing group : III  
Labels : 9  
EmS Code : F-A, S-F

Marine pollutant : yes

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

Not applicable for product as supplied.

**National regulation**

**49 CFR Road**

UN/ID/NA number : UN 3077  
Proper shipping name : Environmentally hazardous substance, solid, n.o.s.  
(hydroquinone)  
Class : 9  
Packing group : III  
Labels : Class 9 - Miscellaneous dangerous substances and  
articles  
ERG Code : 171  
Marine pollutant : no  
  
Poison Inhalation Hazard : No

**Special precautions for user**

Remarks : EHS-Mark required (ADR 2.2.9.1.10, IMDG code  
2.10.3) for single packagings and combination pack-  
agings containing inner packagings with Dangerous  
Goods > 5L for liquids or > 5kg for solids.

The transport classification(s) provided herein are for informational purposes only,  
and solely based upon the properties of the unpackaged material as it is described  
within this Safety Data Sheet. Transportation classifications may vary by mode of  
transportation, package sizes, and variations in regional or country regulations.

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**SECTION 15. REGULATORY INFORMATION**

**CERCLA Reportable Quantity**

| Components   | CAS-No.  | Component<br>RQ (lbs) | Calculated product<br>RQ (lbs) |
|--------------|----------|-----------------------|--------------------------------|
| hydroquinone | 123-31-9 | 100                   | 100                            |

**SARA 304 Extremely Hazardous Substances Reportable Quantity**

| Components   | CAS-No.  | Component<br>RQ (lbs) | Calculated product<br>RQ (lbs) |
|--------------|----------|-----------------------|--------------------------------|
| hydroquinone | 123-31-9 | 100                   | 100                            |

**SARA 302 Extremely Hazardous Substances Threshold Planning Quantity**

| Components   | CAS-No.  | Component TPQ (lbs) |
|--------------|----------|---------------------|
| hydroquinone | 123-31-9 | 10000               |
| hydroquinone | 123-31-9 | 500*                |

\*: Solid in the molten or powdered form (particles < 100 microns), in solution, or  
meeting the NFPA reactivity criteria

**SARA 311/312 Haz-  
ards** : Acute Health Hazard  
Chronic Health Hazard

**SARA 313**

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

hydroquinone 123-31-9 >= 90 - <= 100 %

**Clean Air Act**

This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B). The following chemical(s) are listed as HAP under the U.S. Clean Air Act, Section 112 (40 CFR 61):

hydroquinone 123-31-9 >= 90 - <= 100 %

This product does not contain any chemicals listed under the U.S. Clean Air Act Section 112(r) for Accidental Release Prevention (40 CFR 68.130, Subpart F).

The following chemical(s) are listed under the U.S. Clean Air Act Section 111 SOCM I Intermediate or Final VOC's (40 CFR 60.489):

hydroquinone 123-31-9 >= 90 - <= 100 %

**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. Clean-Water Act, Section 311, Table 117.3.

This product does not contain any toxic pollutants listed under the U.S. Clean Water Act Section 307

This product does not contain any priority pollutants related to the U.S. Clean Water Act

**US State Regulations****Massachusetts Right To Know**

hydroquinone 123-31-9

**Pennsylvania Right To Know**

hydroquinone 123-31-9

**Maine Chemicals of High Concern**

Product does not contain any listed chemicals

**Vermont Chemicals of High Concern**

Product does not contain any listed chemicals

**Washington Chemicals of High Concern**

Product does not contain any listed chemicals

**The ingredients of this product are reported in the following inventories:**

TSCA : All substances listed as active on the TSCA inventory

**TSCA list**

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

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## SECTION 16. OTHER INFORMATION

### Full text of other abbreviations

|                |   |  |
|----------------|---|--|
| ACGIH          | : | USA. ACGIH Threshold Limit Values (TLV)  |
| ACGIH BEI      | : | ACGIH - Biological Exposure Indices (BEI)  |
| NIOSH REL      | : | USA. NIOSH Recommended Exposure Limits   |
| OSHA Z-1       | : | USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants |
| ACGIH / TWA    | : | 8-hour, time-weighted average  |
| NIOSH REL / C  | : | Ceiling value not be exceeded at any time.                                       |
| OSHA Z-1 / TWA | : | 8-hour time weighted average   |

AIIC - Australian Inventory of Industrial Chemicals; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); EC<sub>x</sub> - Concentration associated with x% response; EHS - Extremely Hazardous Substance; EL<sub>x</sub> - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErC<sub>x</sub> - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; HMIS - Hazardous Materials Identification System; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC<sub>50</sub> - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC<sub>50</sub> - Lethal Concentration to 50 % of a test population; LD<sub>50</sub> - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; MSHA - Mine Safety and Health Administration; n.o.s. - Not Otherwise Specified; NFPA - National Fire Protection Association; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; RCRA - Resource Conservation and Recovery Act; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RQ - Reportable Quantity; SADT - Self-Accelerating Decomposition Temperature; SARA - Superfund Amendments and Reauthorization Act; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TECI - Thailand Existing Chemicals Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative



The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See [www.sigma-aldrich.com](http://www.sigma-aldrich.com) and/or the reverse side of invoice or packing slip for additional terms and conditions of sale. Copyright 2020 Sigma-Aldrich Co. LLC. License granted to make unlimited paper copies for internal use only.

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