

# SAFETY DATA SHEET

according to the OSHA  
Hazard Communication Standard

Version 8.16  
Revision Date 07/10/2026  
Print Date 07/11/2026

## SECTION 1. IDENTIFICATION

### 1.1 Product identifiers

Product name : 1,4-Cyclohexadiene

Product Number : 28910  
Brand : Aldrich  
CAS-No. : 628-41-1

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

Identified uses : Laboratory chemicals, Synthesis of substances

Restrictions on use : Not Available

### 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 number

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)

#### Hazards for the product as supplied

Flammable liquids : Category 2

Germ cell mutagenicity : Category 1B

Carcinogenicity : Category 1A

Specific target organ toxicity - repeated exposure : Category 1 (Blood)

### Other hazards

None known.

### GHS label elements

Hazard pictograms :



Signal word : Danger

Hazard statements : H225 Highly flammable liquid and vapour.  
H340 May cause genetic defects.  
H350 May cause cancer.  
H372 Causes damage to organs (Blood) through prolonged or repeated exposure.

Precautionary statements : **Prevention:**  
P201 Obtain special instructions before use.  
P202 Do not handle until all safety precautions have been read and understood.  
P210 Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.  
P233 Keep container tightly closed.  
P240 Ground/bond container and receiving equipment.  
P241 Use explosion-proof electrical/ ventilating/ lighting equipment.  
P242 Use only non-sparking tools.  
P243 Take precautionary measures against static discharge.  
P260 Do not breathe mist or vapours.  
P264 Wash skin 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:

P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.  
P308 + P313 IF exposed or concerned: Get medical advice/ attention.  
P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.

### Storage:

P403 + P235 Store in a well-ventilated place. Keep cool.  
P405 Store locked up.

**Disposal:**

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

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### SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Substance

CAS-No. : 628-41-1

**Components**

| Chemical name              | CAS No./Unique ID | Concentration (% w/w) | Trade secret |
|----------------------------|-------------------|-----------------------|--------------|
| benzene                    | 71-43-2*          | $\geq 1 - < 5$        | -            |
| butyl hydroxytoluene (BHT) | 128-37-0*         | $\geq 0.1 - < 1$      | -            |

\* Indicates that the identifier is a CAS No.

Actual concentration is withheld as a trade secret

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### SECTION 4. FIRST AID MEASURES

General advice : Show this 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. 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. FIREFIGHTING MEASURES

Suitable extinguishing media : Foam  
Carbon dioxide (CO<sub>2</sub>)  
Dry powder

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

Specific hazards during fire fighting : Combustible.

Pay attention to flashback.

Vapours are heavier than air and may spread along floors.

Development of hazardous combustion gases or vapours possible in the event of fire.

Forms explosive mixtures with air at ambient temperatures.

Hazardous combustion products : Carbon oxides

Carbon oxides

Specific extinguishing methods : No data available

Further information : Remove container from danger zone and cool with water.  
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>Do not breathe vapours, aerosols.<br>Avoid substance contact.<br>Ensure adequate ventilation.<br>Keep away from heat and sources of ignition.<br>Evacuate the danger area, observe emergency procedures, consult an expert.<br>Advice for emergency responders:<br>For personal protection see section 8. |
| Environmental precautions                                           | : Do not let product enter drains.<br>Risk of explosion.                                                                                                                                                                                                                                                                                           |
| Methods and materials for containment and cleaning up               | : Cover drains. Collect, bind, and pump off spills.<br>Observe possible material restrictions (see sections 7 and 10).<br>Take up carefully with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.                                                                                                         |

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## SECTION 7. HANDLING AND STORAGE

For precautions see section 2.2.

|                                                 |                                                                                                                                                                                                         |
|-------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Advice on protection against fire and explosion | : Keep away from open flames, hot surfaces and sources of ignition.<br>Take precautionary measures against static discharge.                                                                            |
| Advice on safe handling                         | : Work under hood. Do not inhale substance/mixture.<br>Avoid generation of vapours/aerosols.                                                                                                            |
| Further information on storage conditions       | : Keep container tightly closed in a dry and well-ventilated place.<br>Keep away from heat and sources of ignition.<br>Keep locked up or in an area accessible only to qualified or authorised persons. |
| Storage class                                   | : 3, Flammable liquids                                                                                                                                                                                  |
| Recommended storage temperature                 | : Recommended storage temperature see product label.                                                                                                                                                    |
| Further information on storage stability        | : Air sensitive.                                                                                                                                                                                        |

## SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### Ingredients with workplace control parameters

| Components                    | CAS-No.  | Value type<br>(Form of exposure)         | Control parameters /<br>Permissible concentration | Basis     |
|-------------------------------|----------|------------------------------------------|---------------------------------------------------|-----------|
| benzene                       | 71-43-2  | TWA                                      | 0.5 ppm                                           | ACGIH     |
|                               |          | STEL                                     | 2.5 ppm                                           | ACGIH     |
|                               |          | TWA                                      | 10 ppm                                            | OSHA Z-2  |
|                               |          | CEIL                                     | 25 ppm                                            | OSHA Z-2  |
|                               |          | Peak                                     | 50 ppm                                            | OSHA Z-2  |
|                               |          | TWA                                      | 0.1 ppm                                           | NIOSH REL |
|                               |          | ST                                       | 1 ppm                                             | NIOSH REL |
| butyl hydroxytoluene<br>(BHT) | 128-37-0 | TWA<br>(Inhalable fraction<br>and vapor) | 2 mg/m3                                           | ACGIH     |
|                               |          | TWA                                      | 10 mg/m3                                          | NIOSH REL |

**Engineering measures** : No data available

### Personal protective equipment

Respiratory protection : required when vapours/aerosols 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 type ABEK

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

Remarks : required

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

Skin and body protection : Flame retardant antistatic protective clothing.

Hygiene measures : Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

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## SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : liquid

Colour : colourless

Odour : No data available

Odour Threshold : No data available  
pH : No data available

Melting point : No data available

Boiling point/boiling range : 190 - 192 °F / 88 - 89 °C

Flash point : 19 °F / -7 °C  
Method: closed cup

Evaporation rate : No data available

Flammability (solid, gas) : No data available

Flammability (liquids) : No data available

Burning rate : No data available

Upper explosion limit /  
Upper flammability limit : No data available

Lower explosion limit /  
Lower flammability limit : No data available

Vapour pressure : No data available

Relative vapour density : No data available

Relative density : No data available

Density : 0.847 g/mL (77 °F / 25 °C)

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|                                        |                     |
|----------------------------------------|---------------------|
| Water solubility                       | : No data available |
| Partition coefficient: n-octanol/water | : No data available |
| Autoignition temperature               | : No data available |
| Decomposition temperature              | : No data available |
| Viscosity, dynamic                     | : No data available |
| Viscosity, kinematic                   | : No data available |
| Flow time                              | : No data available |
| Explosive properties                   | : No data available |
| Oxidizing properties                   | : No data available |
| Molecular weight                       | : 80.13 g/mol       |
| Particle characteristics               |                     |
| Particle size                          | : No data available |

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## SECTION 10. STABILITY AND REACTIVITY

|                                       |                                                                                           |
|---------------------------------------|-------------------------------------------------------------------------------------------|
| Reactivity                            | : Vapours may form explosive mixture with air.                                            |
| Chemical stability                    | : The product is chemically stable under standard ambient conditions (room temperature) . |
| Contains the following stabiliser(s): | : butyl hydroxytoluene (BHT) (0.2 %)                                                      |
| Possibility of hazardous reactions    | : No data available                                                                       |
| Conditions to avoid                   | : Warming.                                                                                |
| Incompatible materials                | : No data available                                                                       |
| Hazardous decomposition products      | : In the event of fire: see section 5                                                     |



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## SECTION 11. TOXICOLOGICAL INFORMATION

### 11.1 Information on toxicological effects

#### Acute toxicity

Acute toxicity estimate Oral - > 5,000 mg/kg  
(Calculation method)  
Oral: No data available  
Inhalation: No data available  
Dermal: No data available  
No data available

#### Skin corrosion/irritation

Remarks: No data available

#### Serious eye damage/eye irritation

Remarks: No data available

#### Respiratory or skin sensitization

No data available

#### Germ cell mutagenicity

No data available

#### Carcinogenicity

IARC: 1 - Group 1: Carcinogenic to humans (benzene)  
NTP: Known - Known to be human carcinogen (benzene)  
OSHA: OSHA specifically regulated carcinogen (benzene)

#### Reproductive toxicity

No data available  
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

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

Stomach - Irregularities - Based on Human Evidence

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## SECTION 12. ECOLOGICAL INFORMATION

### Ecotoxicity

#### Components:

##### **benzene:**

|                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Toxicity to fish                                    | : LC50 ( <i>Oryzias latipes</i> (Orange-red killifish)): > 100 mg/l<br>End point: mortality<br>Exposure time: 96 h<br>Test Type: semi-static test<br>Analytical monitoring: yes<br>Method: OECD Test Guideline 203<br>GLP: yes                                                                                                                                                                                                                           |
| Toxicity to daphnia and other aquatic invertebrates | : EC50 ( <i>Daphnia magna</i> (Water flea)): > 1,000 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<br><br>NOEC ( <i>Daphnia magna</i> (Water flea)): > 1,000 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 ( <i>Pseudokirchneriella subcapitata</i> (green algae)): > 1,000 mg/l<br>Exposure time: 72 h<br>Test Type: static test<br>Analytical monitoring: yes<br>Method: OECD Test Guideline 201<br>GLP: yes<br><br>NOEC ( <i>Pseudokirchneriella subcapitata</i> (green algae)): >= 1,000 mg/l<br>Exposure time: 72 h<br>Test Type: static test<br>Analytical monitoring: yes<br>Method: OECD Test Guideline 201<br>GLP: yes                             |
| Toxicity to fish (Chronic toxicity)                 | : NOEC ( <i>Pimephales promelas</i> (fathead minnow)): 0.8 mg/l<br>Exposure time: 32 d<br>Test Type: flow-through test                                                                                                                                                                                                                                                                                                                                   |

Analytical monitoring: yes  
Remarks: (ECHA)

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : LC50 (Daphnia magna (Water flea)): > 100 mg/l  
End point: mortality  
Exposure time: 21 d  
Test Type: semi-static test  
Analytical monitoring: yes  
Method: OECD Test Guideline 211  
GLP: yes

Toxicity to microorganisms : EC50 (activated sludge): > 1,000 mg/l  
Exposure time: 3 h  
Test Type: static test  
Method: OECD Test Guideline 209  
GLP: yes

### **Ecotoxicology Assessment**

Chronic aquatic toxicity : Harmful to aquatic life with long lasting effects.

### **butyl hydroxytoluene (BHT):**

Toxicity to fish : LC50 (Danio rerio (zebra fish)): > 0.57 mg/l  
End point: mortality  
Exposure time: 96 h  
Test Type: semi-static test  
Analytical monitoring: yes  
Method: Directive 67/548/EEC, Annex V, C.1.  
GLP: yes

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 0.48 mg/l  
End point: Immobilization  
Exposure time: 48 h  
Test Type: static test  
Analytical monitoring: yes  
Method: OECD Test Guideline 202  
GLP: yes

Toxicity to algae/aquatic plants : ErC50 (Desmodesmus subspicatus (green algae)): > 0.4 mg/l  
Exposure time: 72 h  
Test Type: static test  
Analytical monitoring: yes  
Method: Regulation (EC) No. 440/2008, Annex, C.3  
GLP: yes

Toxicity to fish (Chronic toxicity) : NOEC (Oryzias latipes): 0.053 mg/l  
Exposure time: 30 d  
Method: OECD Test Guideline 210  
GLP: yes

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : EC50 (Daphnia magna (Water flea)): 0.096 mg/l  
End point: reproduction rate  
Exposure time: 21 d  
Method: OECD Test Guideline 211  
GLP: yes

Toxicity to microorganisms : EC50 (activated sludge): > 10,000 mg/l  
Exposure time: 3 h  
Test Type: static test  
Method: OECD Test Guideline 209  
GLP: yes

### **Ecotoxicology Assessment**

Acute aquatic toxicity : no acute aquatic toxicity

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

### **Persistence and degradability**

#### **Components:**

##### **benzene:**

Biodegradability : aerobic  
Inoculum: activated sludge, non-adapted  
Concentration: 17 mg/l  
Result: Readily biodegradable.  
Biodegradation: 96 %  
Exposure time: 28 d  
Method: OECD Test Guideline 301F  
GLP: yes

### **Bioaccumulative potential**

#### **Components:**

##### **benzene:**

Bioaccumulation : Species: Leuciscus idus (Golden orfe)  
Bioconcentration factor (BCF): 10  
Exposure time: 3 d  
Concentration: 0.05 mg/l

Partition coefficient: n-octanol/water : log Pow: 2.13 (77 °F / 25 °C)  
pH: 7  
Remarks: Bioaccumulation is not expected.  
(ECHA)

##### **butyl hydroxytoluene (BHT):**

Partition coefficient: n-octanol/water : log Pow: 5.1  
GLP: yes  
Remarks: Potential bioaccumulation  
(ECHA)

**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 defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).

**Components:****benzene:**

Additional ecological information : Endangers drinking-water supplies if allowed to enter soil or water.

Discharge into the environment must be avoided.

**butyl hydroxytoluene (BHT):**

Results of PBT and vPvB assessment : Substance does not meet the criteria for PBT or vPvB according to Regulation (EC) No 1907/2006, Annex XIII.

Additional ecological information : Discharge into the environment must be avoided.

**Endocrine disrupting properties**

No data available

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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 chemicals 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 3295  
Proper shipping name : Hydrocarbons, liquid, n.o.s.

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Class : 3  
Packing group : II  
Labels : Class 3 - Flammable liquids  
Packing instruction (cargo aircraft) : 364  
Packing instruction (passenger aircraft) : 353

#### **IMDG-Code**

UN number : UN 3295  
Proper shipping name : HYDROCARBONS, LIQUID, N.O.S.

Class : 3  
Packing group : II  
Labels : 3  
EmS Code : F-E, S-D  
Marine pollutant : no

#### **Transport in bulk according to IMO instruments**

Not applicable for product as supplied.

#### **National Regulations**

##### **49 CFR**

UN/ID/NA number : UN 3295  
Proper shipping name : Hydrocarbons, liquid, n.o.s.

Class : 3

Packing group : II  
Labels : Class 3 - Flammable liquids  
ERG Code : 128  
Marine pollutant : no  
Poison Inhalation Hazard : No

#### **Special precautions for user**

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 RQ (lbs) | Calculated product RQ (lbs) |
|------------|---------|--------------------|-----------------------------|
| benzene    | 71-43-2 | 10                 | 333                         |
| benzene    | 71-43-2 | 10                 | 10 (D018)                   |

#### **SARA 304 Extremely Hazardous Substances Reportable Quantity**

This material does not contain any components with a section 304 EHS RQ.

## SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

This material does not contain any components with a section 302 EHS TPQ.

**SARA 311/312 Hazards** : Fire Hazard  
Acute Health Hazard  
Chronic Health Hazard

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

|         |         |              |
|---------|---------|--------------|
| benzene | 71-43-2 | >= 1 - < 5 % |
|---------|---------|--------------|

### 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):

|         |         |              |
|---------|---------|--------------|
| benzene | 71-43-2 | >= 1 - < 5 % |
|---------|---------|--------------|

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):

|         |         |              |
|---------|---------|--------------|
| benzene | 71-43-2 | >= 1 - < 5 % |
|---------|---------|--------------|

### Clean Water Act

The following Hazardous Substances are listed under the U.S. CleanWater Act, Section 311, Table 116.4A:

|         |         |              |
|---------|---------|--------------|
| benzene | 71-43-2 | >= 1 - < 5 % |
|---------|---------|--------------|

The following Hazardous Chemicals are listed under the U.S. CleanWater Act, Section 311, Table 117.3:

|         |         |              |
|---------|---------|--------------|
| benzene | 71-43-2 | >= 1 - < 5 % |
|---------|---------|--------------|

This product contains the following toxic pollutants listed under the U.S. Clean Water Act Section 307

|         |         |              |
|---------|---------|--------------|
| benzene | 71-43-2 | >= 1 - < 5 % |
|---------|---------|--------------|

This product contains the following priority pollutants related to the U.S. Clean Water Act:

|         |         |              |
|---------|---------|--------------|
| benzene | 71-43-2 | >= 1 - < 5 % |
|---------|---------|--------------|

### US State Regulations

#### Massachusetts Right To Know

|         |         |
|---------|---------|
| benzene | 71-43-2 |
|---------|---------|

#### Pennsylvania Right To Know

|         |         |
|---------|---------|
| benzene | 71-43-2 |
|---------|---------|

#### Maine Chemicals of High Concern

|         |         |
|---------|---------|
| benzene | 71-43-2 |
|---------|---------|

#### Vermont Chemicals of High Concern

|         |         |
|---------|---------|
| benzene | 71-43-2 |
|---------|---------|

#### Washington Chemicals of High Concern

|         |         |
|---------|---------|
| benzene | 71-43-2 |
|---------|---------|

## California Prop. 65

WARNING: This product can expose you to chemicals including benzene, which is/are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov). **The components of this product are reported in the following inventories:**

US 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)                                                   |
| NIOSH REL       | : USA. NIOSH Recommended Exposure Limits                                                    |
| OSHA Z-2        | : USA. Occupational Exposure Limits (OSHA) - Table Z-2                                      |
| ACGIH / TWA     | : 8-hour, time-weighted average                                                             |
| ACGIH / STEL    | : Short-term exposure limit                                                                 |
| NIOSH REL / TWA | : Time-weighted average concentration for up to a 10-hour workday during a 40-hour workweek |
| NIOSH REL / ST  | : STEL - 15-minute TWA exposure that should not be exceeded at any time during a workday    |
| OSHA Z-2 / TWA  | : 8-hour time weighted average                                                              |
| OSHA Z-2 / CEIL | : Acceptable ceiling concentration                                                          |
| OSHA Z-2 / Peak | : Acceptable maximum peak above the acceptable ceiling concentration for an 8-hr shift      |

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); ECx - Concentration associated with x% response; EHS - Extremely Hazardous Substance; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonised 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; IC50 - 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 Organisation; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardisation; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - 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

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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 - Organisation 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.

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US / EN