

# SAFETY DATA SHEET

according to the OSHA  
Hazard Communication Standard

Version 8.16  
Revision Date 07/20/2026  
Print Date 07/21/2026

## SECTION 1. IDENTIFICATION

### 1.1 Product identifiers

Product name : Lithium nickel manganese cobalt oxide

Product Number : 761001  
Brand : Aldrich  
CAS-No. : 346417-97-8

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

Identified uses : Laboratory chemicals, Synthesis of substances

Restrictions on use : 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 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**

Skin sensitisation : Category 1

Carcinogenicity : Category 2

### Other hazards

None known.

### GHS label elements

Hazard pictograms :



Signal word : Warning

Hazard statements : H317 May cause an allergic skin reaction.  
H351 Suspected of causing cancer.

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.  
P272 Contaminated work clothing must not be allowed out of the workplace.  
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

#### **Response:**

P302 + P352 IF ON SKIN: Wash with plenty of soap and water.  
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.

#### **Storage:**

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. : 346417-97-8

### Components

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| Chemical name                         | CAS No./Unique ID | Concentration (% w/w) | Trade secret |
|---------------------------------------|-------------------|-----------------------|--------------|
| Lithium nickel manganese cobalt oxide | 346417-97-8*      | >= 90 - <= 100        | -            |

\* 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 GHS label elements) 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          | : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. |
| Unsuitable extinguishing media        | : For this substance/mixture no limitations of extinguishing agents are given.                            |
| Specific hazards during fire fighting | : Not combustible.                                                                                        |

Ambient fire may liberate hazardous vapours.

|                                                |                                                                                                                                                                      |
|------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Hazardous combustion products                  | : Nickel/nickel oxides<br><br>Lithium oxides<br><br>Cobalt/cobalt oxides<br><br>Manganese/manganese oxides                                                           |
| Specific extinguishing methods                 | : No data available                                                                                                                                                  |
| Further information                            | : Suppress (knock down) gases/vapours/mists with a water spray jet.<br>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 procedures, consult an expert.<br>Advice for emergency responders:<br>Wear appropriate personal protective equipment, as indicated in 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.<br>Observe possible material restrictions (see sections 7 and 10).<br>Take up dry. Dispose of properly. Clean up affected area. Avoid generation of dusts.                                                                                                                  |

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## SECTION 7. HANDLING AND STORAGE

For precautions see section 2 GHS label elements

Advice on safe handling : Work under hood. Do not inhale substance/mixture.

Further information on storage conditions : Tightly closed.  
Dry.

Storage class : 13, Non Combustible Solids

Recommended storage temperature : Recommended storage temperature see product label.

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## 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     |
|---------------------------------------|-------------|---------------------------------------|---------------------------------------------------|-----------|
| Lithium nickel manganese cobalt oxide | 346417-97-8 | C                                     | 5 mg/m <sup>3</sup><br>(Manganese)                | OSHA Z-1  |
|                                       |             | TWA<br>(Inhalable particulate matter) | 0.02 mg/m <sup>3</sup><br>(Cobalt)                | ACGIH     |
|                                       |             | TWA                                   | 1 mg/m <sup>3</sup><br>(Manganese)                | NIOSH REL |
|                                       |             | ST                                    | 3 mg/m <sup>3</sup><br>(Manganese)                | NIOSH REL |
|                                       |             | TWA                                   | 0.015 mg/m <sup>3</sup><br>(Nickel)               | NIOSH REL |

### Biological occupational exposure limits

| Components                            | CAS-No.     | Control parameters | Biological specimen | Sampling time                   | Permissible concentration | Basis     |
|---------------------------------------|-------------|--------------------|---------------------|---------------------------------|---------------------------|-----------|
| Lithium nickel manganese cobalt oxide | 346417-97-8 | Nickel (Nickel)    | Urine               | End of shift at end of workweek | 5 µg/l                    | ACGIH BEI |
|                                       |             | Nickel (Nickel)    | Urine               | End of shift at end of workweek | 30 µg/l                   | ACGIH BEI |

|  |  |                    |       |                                              |         |              |
|--|--|--------------------|-------|----------------------------------------------|---------|--------------|
|  |  | Cobalt<br>(Cobalt) | Urine | End of<br>shift at<br>end of<br>workwe<br>ek | 15 µg/l | ACGIH<br>BEI |
|--|--|--------------------|-------|----------------------------------------------|---------|--------------|

**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 type P3

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 : Handle with impervious gloves.  
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).<br>Safety glasses |
| Skin and body protection | : 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                                          | : powder                              |
| Colour                                              | : black                               |
| Odour                                               | : No data available                   |
| Odour Threshold                                     | : No data available                   |
| pH                                                  | : No data available                   |
| Melting point/ range                                | : > 554 °F / > 290 °C<br>Method: lit. |
| Boiling point/boiling range                         | : No data available                   |
| Flash point                                         | : Not applicable                      |
| Evaporation rate                                    | : No data available                   |
| Flammability (solid, gas)                           | : The product is not flammable.       |
| Flammability (liquids)                              | : No data available                   |
| Burning rate                                        | : No data available                   |
| Upper explosion limit /<br>Upper flammability limit | : No data available                   |
| Lower explosion limit /<br>Lower flammability limit | : No data available                   |
| Vapour pressure                                     | : No data available                   |
| Relative vapour density                             | : No data available                   |
| Relative density                                    | : No data available                   |

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|                                        |                                           |
|----------------------------------------|-------------------------------------------|
| Density                                | : 2.11 g/cm <sup>3</sup>                  |
| Water solubility                       | : No data available                       |
| Partition coefficient: n-octanol/water | : Not applicable for inorganic substances |
| 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                   | : Not classified as explosive.            |
| Oxidizing properties                   | : none                                    |
| Particle characteristics               |                                           |
| Particle size                          | : No data available                       |

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## SECTION 10. STABILITY AND REACTIVITY

|                                    |                                                                                           |
|------------------------------------|-------------------------------------------------------------------------------------------|
| Reactivity                         | : No data available                                                                       |
| Chemical stability                 | : The product is chemically stable under standard ambient conditions (room temperature) . |
| Possibility of hazardous reactions | : No data available                                                                       |
| Conditions to avoid                | : no information available                                                                |
| Incompatible materials             | : No data available                                                                       |
| Hazardous decomposition products   | : For Hazardous combustion 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

Oral: No data available

Inhalation: No data available

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Dermal: No data available

**Skin corrosion/irritation**

No data available

**Serious eye damage/eye irritation**

No data available

**Respiratory or skin sensitization**

May cause allergic skin reaction.

**Germ cell mutagenicity**

No data available

**Carcinogenicity**

Suspected of causing cancer.

IARC: 1 - Group 1: Carcinogenic to humans (Lithium nickel manganese cobalt oxide)

NTP: Known - Known to be human carcinogen (Lithium nickel manganese cobalt oxide)

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**

Large doses of lithium ion have caused dizziness and prostration, and can cause kidney damage if sodium intake is limited. Dehydration, weight loss, dermatological effects, and thyroid disturbances have been reported. Central nervous system effects that include slurred speech, blurred vision, sensory loss, ataxia, and convulsions may occur. Diarrhea, vomiting, and neuromuscular effects such as tremor, clonus, and hyperactive reflexes may occur as a result of repeated exposure to lithium ion.

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

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**SECTION 12. ECOLOGICAL INFORMATION**

**Ecotoxicity**

No data available

**Persistence and degradability**

**Components:**

**Lithium nickel manganese cobalt oxide:**

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Biodegradability : Remarks: The methods for determining biodegradability are not applicable to inorganic substances.

### **Bioaccumulative potential**

#### **Components:**

##### **Lithium nickel manganese cobalt oxide:**

Partition coefficient: n-octanol/water : Remarks: Not applicable for inorganic substances

#### **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:**

##### **Lithium nickel manganese cobalt oxide:**

Results of PBT and vPvB assessment : PBT/vPvB: Not applicable for inorganic substances

#### **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**

Not regulated as a dangerous good

**IMDG-Code**

Not regulated as a dangerous good

**Transport in bulk according to IMO instruments**

Not applicable for product as supplied.

**National Regulations****49 CFR**

Not regulated as a dangerous good

Poison Inhalation Hazard : No

**Special precautions for user**

Remarks : Not classified as dangerous in the meaning of transport regulations.

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**SECTION 15. REGULATORY INFORMATION****CERCLA Reportable Quantity**

This material does not contain any components with a CERCLA RQ.

**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** : Acute Health Hazard  
Chronic Health Hazard

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

|                |         |                  |
|----------------|---------|------------------|
| Lithium nickel | 346417- | >= 90 - <= 100 % |
| manganese      | 97-8    |                  |
| cobalt oxide   |         |                  |

**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):

|                  |             |                  |
|------------------|-------------|------------------|
| Lithium nickel   | 346417-97-8 | >= 90 - <= 100 % |
| manganese cobalt |             |                  |
| oxide            |             |                  |

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).

This product does not contain any chemicals listed under the U.S. Clean Air Act Section 111 SOCM I Intermediate or Final VOC's (40 CFR 60.489).

## 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.

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

|                  |             |                  |
|------------------|-------------|------------------|
| Lithium nickel   | 346417-97-8 | >= 90 - <= 100 % |
| manganese cobalt |             |                  |
| oxide            |             |                  |

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

## US State Regulations

### Massachusetts Right To Know

No components are subject to the Massachusetts Right to Know Act.

### Pennsylvania Right To Know

|                                       |             |
|---------------------------------------|-------------|
| Lithium nickel manganese cobalt oxide | 346417-97-8 |
|---------------------------------------|-------------|

### Maine Chemicals of High Concern

|                                       |             |
|---------------------------------------|-------------|
| Lithium nickel manganese cobalt oxide | 346417-97-8 |
|---------------------------------------|-------------|

### Vermont Chemicals of High Concern

|                                       |             |
|---------------------------------------|-------------|
| Lithium nickel manganese cobalt oxide | 346417-97-8 |
|---------------------------------------|-------------|

### Washington Chemicals of High Concern

|                                       |             |
|---------------------------------------|-------------|
| Lithium nickel manganese cobalt oxide | 346417-97-8 |
|---------------------------------------|-------------|

### California Prop. 65

WARNING: This product can expose you to chemicals including Lithium nickel manganese cobalt oxide, which is/are known to the State of California to cause cancer. 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 | : Product contains substance(s) not listed on 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                                                    |

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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-1 / C : Ceiling

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 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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