

SAFETY DATA SHEET

Version 8.12 Revision Date 06/25/2025 Print Date 06/26/2025

SECTION 1. IDENTIFICATION

1.1 Product identifiers

Product name : Lithium cobalt(III) oxide

Product Number : 442704
Brand : Aldrich
CAS-No. : 12190-79-3

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 number

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-

527-3887 CHEMTREC (International) 24

Hours/day; 7 Days/week

SECTION 2. HAZARDS IDENTIFICATION

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

Carcinogenicity : Category 2

Reproductive toxicity : Category 1B

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Short-term (acute) aquatic hazard

: Category 1

Long-term (chronic) aquatic hazard

: Category 1

Other hazards

None known.

GHS label elements

Hazard pictograms





Signal Word : Danger

Hazard Statements : H351 Suspected of causing cancer.

H360 May damage fertility or the unborn child.

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.

P273 Avoid release to the environment.

P280 Wear protective gloves/ protective clothing/ eye

protection/ face protection.

Response:

P308 + P313 IF exposed or concerned: Get medical

advice/ attention. P391 Collect spillage.

Storage:

P405 Store locked up.

Disposal:

P501 Dispose of contents/ container to an approved

waste disposal plant.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Substance

Components

Chemical name CAS No./Unique ID		Concentration (% w/w)	Trade secret
Lithium cobalt(III) oxide	12190-79-3*	>= 90 - <= 100	-

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* Indicates that the identifier is a CAS No. Actual concentration is withheld as a trade secret

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.

: After eye contact: rinse out with plenty of water. In case of eye contact

> 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

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

Notes to physician No data available

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

: Lithium oxides

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Cobalt/cobalt 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.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures : Advice for non-emergency personnel:

Avoid inhalation of dusts. Avoid substance contact. Ensure adequate ventilation.

Evacuate the danger area, observe emergency

procedures, consult an expert. Advice for emergency responders: 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 carefully. 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.

Keep in a well-ventilated place.

Keep locked up or in an area accessible only to

qualified or authorised persons.

Storage class : 6.1C, Combustible, acute toxic Cat.3 / toxic

compounds or compounds which causing chronic

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Recommended storage temperature

: Recommended storage temperature see product label.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Ingredients with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
Lithium cobalt(III) oxide	12190-79-3	TWA (Inhalable particulate matter)	0.02 mg/m3 (Cobalt)	ACGIH

Biological occupational exposure limits

Components	CAS-No.	Control	Biological	Samplin	Permissibl	Basis
		parameter	specimen	g time	е	
		S			concentrat	
					ion	
Lithium cobalt(III) oxide	12190- 79-3	Cobalt (Cobalt)	Urine	End of shift at end of workwe ek	15 μg/l	ACGIH 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 entrepeneur 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

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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).

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 : protective clothing

Hygiene measures : Immediately change contaminated clothing. Apply

preventive skin protection. Wash hands and face

after working with substance.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : powder

Color : black

Odor : No data available

Odor Threshold : No data available pH : No data available

Melting point/freezing : $> 1112 \, ^{\circ}\text{F} \, / > 600 \, ^{\circ}\text{C}$

point (1,014 hPa)

Method: OECD Test Guideline 102

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Boiling point/boiling range : No data available

Flash point : Not applicable

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

Vapor pressure : No data available

Relative vapour density : No data available

Relative density : No data available

Density : 4.82 g/cm3 (72.5 °F / 22.5 °C)

Method: OECD Test Guideline 109

Solubility(ies)

Water solubility : $0.0003 \text{ g/l} (68 \degree \text{F} / 20 \degree \text{C})$

pH: 7.46

Method: OECD Test Guideline 105

GLP: yes

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

Molecular weight : 97.87 g/mol

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Millipore

Particle characteristics

Particle size : No data available

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 : Avoid moisture.

no information available

Incompatible materials : Strong oxidizing agents

products

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

SECTION 11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - female - > 5,000 mg/kg

(OECD Test Guideline 425)

LC50 Inhalation - Rat - male and female - 4 h - 5.05 mg/l - dust/mist

(OECD Test Guideline 436) Remarks: No data available Dermal: No data available

Skin corrosion/irritation

Skin - In vitro study

Result: No skin irritation - 15 min

(OECD Test Guideline 439)

Serious eye damage/eye irritation

Eyes - Rabbit

Result: No eye irritation (OECD Test Guideline 405)

Respiratory or skin sensitization

Local lymph node assay (LLNA) - Mouse

Result: negative

(OECD Test Guideline 439)

Germ cell mutagenicity

No data available

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AilliPORE

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Carcinogenicity

Suspected of causing cancer.

IARC: No component 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 component 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

May damage fertility.

Suspected of damaging the unborn child.

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 - Gavage - 90 d - No observed adverse effect level - 3 mg/kg

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., May cause irritation of the:, nose, Throat., Rash, Vomiting, Diarrhoea, sensation of heat, Exposure can cause damage to the:, Kidney, Lungs, Thyroid

Stomach - Irregularities - Based on Human Evidence

Stomach - Irregularities - Based on Human Evidence

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Components:

Lithium cobalt(III) oxide:

Toxicity to fish : LC50 (Danio rerio (zebra fish)): 85.3 mg/l

End point: mortality Exposure time: 96 h

Test Type: flow-through test Analytical monitoring: yes

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Remarks: (ECHA)

Toxicity to algae/aquatic

plants

ErC50 (Raphidocelis subcapitata (freshwater green

alga)): 0.144 mg/l Exposure time: 72 h Test Type: static test Analytical monitoring: yes

Remarks: (ECHA)

M-Factor (Acute aquatic

toxicity)

: 1

Toxicity to fish (Chronic

toxicity)

: NOEC (Pimephales promelas (fathead minnow)): 0.21

mg/l

End point: mortality Exposure time: 34 d

Test Type: flow-through test Analytical monitoring: yes

GLP: yes

Remarks: (ECHA)

Toxicity to daphnia and

other aquatic

invertebrates (Chronic

toxicity)

: NOEC (Daphnia magna (Water flea)): 0.0063 mg/l

Exposure time: 21 d

Test Type: semi-static test

Method: OECD Test Guideline 211

GLP: yes

M-Factor (Chronic aquatic: 10

toxicity)

Toxicity to

: EC50 (activated sludge): 120 mg/l

microorganisms Exposure time: 30 min

Test Type: static test Analytical monitoring: yes

Method: OECD Test Guideline 209

GLP: yes

Persistence and degradability

Components:

Lithium cobalt(III) oxide:

Biodegradability : Remarks: The methods for determining

biodegradability are not applicable to inorganic

substances.

Bioaccumulative potential

Components:

Lithium cobalt(III) oxide:

Bioaccumulation : Remarks: No data available

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Partition coefficient: n-

octanol/water

: Remarks: Not applicable for inorganic substances

Mobility in soil

Components:

Lithium cobalt(III) oxide:

Stability in soil : Remarks: 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 cobalt(III) oxide:

Additional ecological

information

: Discharge into the environment must be avoided.

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.

SECTION 14. TRANSPORT INFORMATION

International Regulations

IATA-DGR

UN/ID No. : UN 3077

Proper shipping name : Environmentally hazardous substance, solid, n.o.s.

(Lithium cobalt(III) oxide)

Class : 9 Packing group : III

Labels : Class 9 - Miscellaneous dangerous substances and

articles

Packing instruction (cargo: 956

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aircraft)

Packing instruction : 956

(passenger aircraft)

IMDG-Code

UN number : UN 3077

Proper shipping name : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID,

N.O.S.

(Lithium cobalt(III) oxide)

Class : III Packing group Labels : 9 : F-A, S-F EmS Code

Marine pollutant yes

Transport in bulk according to IMO instruments

Not applicable for product as supplied.

National Regulations

49 CFR Road

Not regulated as a dangerous good

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 packagings containing inner packagings with

Dangerous Goods > 5L for liquids or > 5kg for solids. Packages smaller than or equal to 5 kg / L , not

dangerous goods of Class 9

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.

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.

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

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SARA 313 : The following components are subject to reporting

levels established by SARA Title III, Section 313:

12190-79- >= 90 - <= 100 % Lithium 3

cobalt(III) 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 cobalt(III) 12190-79-3 >= 90 - <= 100 %

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 SOCMI 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 does not contain any toxic pollutants listed under the U.S. Clean Water Act

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 cobalt(III) oxide 12190-79-3

Maine Chemicals of High Concern

Product does not contain any listed chemicals

Vermont Chemicals of High Concern

Lithium cobalt(III) oxide 12190-79-3

Washington Chemicals of High Concern

Lithium cobalt(III) oxide 12190-79-3

The components 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)

ACGIH / 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); 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 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; 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 Organization; ISHL - Industrial Safety and Health Law (Japan); ISO -International Organisation for Standardization; 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 - 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-SARA Superfund Amendments Accelerating Decomposition Temperature; 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 and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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