SECTION 1. IDENTIFICATION

1.1 Product identifiers

Product name : Cadmium, powder, Cd, max. particle size 60micron, weight 200 g, purity 99.9%

Product Number : GF17659873
Brand : Aldrich
Index-No. : 048-002-00-0
CAS-No. : 7440-43-9

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.
SPRUCE ST 3050
63103 St. Louis

Telephone :(314) 771-5765
Telefax: (800) 325-5052

1.4 Emergency telephone number

Emergency Phone # : 800 424 9300 (CHEMTREC) 24/7
+1 703 527 3887 (CHEMTREC) 24/7

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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

Acute toxicity (Inhalation)	:	Category 2
Germ cell mutagenicity	:	Category 2
Carcinogenicity	:	Category 1B
Reproductive toxicity	:	Category 2
Specific target organ toxicity - repeated exposure	:	Category 1
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 :
H330 Fatal if inhaled.
H341 Suspected of causing genetic defects.
H350 May cause cancer.
H361 Suspected of damaging fertility or the unborn child.
H372 Causes damage to organs through prolonged or repeated exposure.
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.
P260 Do not breathe dust.

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P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.
P273 Avoid release to the environment.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
P284 Wear respiratory protection.

Response:

P304 + P340 + P310 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P391 Collect spillage.

Storage:

P403 + P233 Store in a well-ventilated place. Keep container tightly closed.
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

CAS-No. : 7440-43-9

Components

Chemical name	CAS No./Unique ID	Concentration (% w/w)	Trade secret
Cadmium	7440-43-9*	>= 90 - <= 100	-

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

SECTION 4. FIRST AID MEASURES

General advice : First aiders need to protect themselves.
Show this safety data sheet to the doctor in attendance.

If inhaled : After inhalation: fresh air. Immediately call in physician.

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		If breathing stops: immediately apply artificial respiration, if necessary also oxygen.
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

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media	:	Sand Special powder against metal fire Cement
Unsuitable extinguishing media	:	For this substance/mixture no limitations of extinguishing agents are given.
Specific hazards during fire fighting	:	Combustible. Development of hazardous combustion gases or vapours possible in the event of fire.
Hazardous combustion products	:	Cadmium/cadmium oxides
Specific extinguishing methods	:	No data available
Further information	:	Prevent fire extinguishing water from contaminating surface water or the ground water system.

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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 generation and inhalation of dusts in all circumstances. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert. Advice for emergency responders: 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. 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 GHS label elements

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	:	6.1B, Non-combustible, acute toxic Cat. 1 and 2 / very toxic hazardous materials
Recommended storage	:	Recommended storage temperature see product label.

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temperature

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Ingredients with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
Cadmium	7440-43-9	TWA (Fumes)	0.1 mg/m3	OSHA Z-2
		TWA (Dust)	0.2 mg/m3	OSHA Z-2
		CEIL (Fumes)	0.3 mg/m3	OSHA Z-2
		CEIL (Dust)	0.6 mg/m3	OSHA Z-2
		TWA	0.01 mg/m3 (cadmium)	ACGIH
		TWA (Respirable particulate matter)	0.02 mg/m3 (cadmium)	ACGIH
		PEL	0.005 mg/m3 (cadmium)	OSHA CARC

Biological occupational exposure limits

Components	CAS-No.	Control parameters	Biological specimen	Sampling time	Permissible concentration	Basis
Cadmium	7440-43-9	cadmium (cadmium)	In blood	Not critical	5 µg/l	ACGIH BEI
		cadmium (cadmium)	Urine	Not critical	5 µg/g creatinine	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.

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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

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).

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
Colour	:	metallic

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Odour	:	odourless
Odour Threshold	:	No data available
pH	:	No data available
Melting point/ range	:	610 °F / 321 °C Method: Regulation (EC) No. 440/2008, Annex, A.1
Boiling point/boiling range	:	1413 °F / 767 °C (1,013 hPa)
		1409 °F / 765 °C
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 / Upper flammability limit	:	No data available
Lower explosion limit / Lower flammability limit	:	No data available
Vapour pressure	:	1.3 hPa (741 °F / 394 °C)
Relative vapour density	:	No data available
Relative density	:	8.6 (72 °F / 22 °C) Method: Regulation (EC) No. 440/2008, Annex, A.3
Density	:	8.65 g/cm3 (77 °F / 25 °C)
Solubility(ies)		
Water solubility	:	2.3 g/l slightly soluble (68 °F / 20 °C) Method: OECD Test Guideline 105
Partition coefficient: n-octanol/water	:	Not applicable for inorganic substances
Autoignition temperature	:	No data available
Decomposition	:	No data available

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temperature

Viscosity		
Viscosity, dynamic	:	> 500 mPa.s (604 °F / 318 °C)
Viscosity, kinematic	:	No data available
Flow time	:	No data available
Explosive properties	:	No data available
Oxidizing properties	:	none
Molecular weight	:	112.41 g/mol
Particle characteristics		
Particle size	:	No data available

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	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	:	Risk of ignition or formation of inflammable gases or vapours with: in powder form with Air in powder form with Ammonia Risk of explosion with: nitrile halides Exothermic reaction with: hexafluorobenzene Hydrazoic acid ammonium nitrate with heat Zinc in powder form with Heat Acid

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(generation of hydrogen)
Alkali metals
chlorates
Strong oxidizing agents
selenium
in powder form
Tellurium
in powder form

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

SECTION 11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
Oral: No data available
Acute toxicity estimate Inhalation - 4 h - 0.051 mg/l - dust/mist

(Expert judgement)
Dermal: No data available
No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
Suspected of causing genetic defects.

Carcinogenicity
Presumed to have carcinogenic potential for humans

IARC:	1 - Group 1: Carcinogenic to humans (Cadmium)
NTP:	Known - Known to be human carcinogenThe reference note has been added by TD based on the background information of the NTP. (Cadmium)
OSHA:	OSHA specifically regulated carcinogen (Cadmium)

Reproductive toxicity
Suspected of damaging the unborn child.
Suspected of damaging fertility.

Specific target organ toxicity - single exposure
No data available

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Specific target organ toxicity - repeated exposure
Inhalation - Causes damage to organs through prolonged or repeated exposure.
- Kidney, Bone, Lungs

Aspiration hazard
No data available

11.2 Additional Information

Damage to the lungs., Kidney injury may occur., prolonged or repeated exposure can cause:, Vomiting, Diarrhoea, Lung irritation
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Stomach - Irregularities - Based on Human Evidence

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Components:

Cadmium:

Toxicity to fish	:	LC50 (Pimephales promelas (fathead minnow)): 1.5 mg/l End point: mortality Exposure time: 96 h Test Type: flow-through test Analytical monitoring: yes Remarks: (ECHA)
Toxicity to daphnia and other aquatic invertebrates	:	LC50 (Daphnia magna (Water flea)): 0.11 mg/l Exposure time: 48 h Test Type: static test Analytical monitoring: yes Method: OECD Test Guideline 202 GLP: yes
Toxicity to microorganisms	:	NOEC (activated sludge): 0.0002 mg/l Exposure time: 3 h Test Type: static test Analytical monitoring: yes Method: OECD Test Guideline 209 GLP: yes

Ecotoxicology Assessment

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

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Persistence and degradability

Components:

Cadmium:

Biodegradability	:	Remarks: The methods for determining the biological degradability are not applicable to inorganic substances.

Bioaccumulative potential

Components:

Cadmium:

Bioaccumulation	:	Species: Oncorhynchus mykiss (rainbow trout) Bioconcentration factor (BCF): 55 Exposure time: 72 d Concentration: 1.27 µg/l
Partition coefficient: n-octanol/water	:	Remarks: Not applicable for inorganic substances

Mobility in soil

No data available

Other adverse effects

No data available

Endocrine disrupting properties

No data available

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 3288
Proper shipping name	:	Toxic solid, inorganic, n.o.s. (Cadmium)
Class	:	6.1
Packing group	:	II
Labels	:	Division 6.1 - Toxic substances

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Packing instruction (cargo aircraft)	:	676
Packing instruction (passenger aircraft)	:	669

IMDG-Code

UN number	:	UN 3288
Proper shipping name	:	TOXIC SOLID, INORGANIC, N.O.S. (Cadmium)
Class	:	6.1
Packing group	:	II
Labels	:	6.1
EmS Code	:	F-A, S-A
Marine pollutant	:	yes

Transport in bulk according to IMO instruments

Not applicable for product as supplied.

National Regulations

49 CFR

UN/ID/NA number	:	UN 3288
Proper shipping name	:	Toxic solid, inorganic, n.o.s. (Cadmium)
Class	:	6.1
Packing group	:	II
Labels	:	Division 6.1 - Toxic substances
ERG Code	:	151
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.

SECTION 15. REGULATORY INFORMATION

CERCLA Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
Cadmium	7440-43-9	10	10
Cadmium	7440-43-9	10	10 (D006)

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.

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

Cadmium	7440-43-9	>= 90 - <= 100 %

US State Regulations

Massachusetts Right To Know

Cadmium	7440-43-9

Pennsylvania Right To Know

Cadmium	7440-43-9

Maine Chemicals of High Concern

Product does not contain any listed chemicals

Vermont Chemicals of High Concern

Cadmium	7440-43-9

Washington Chemicals of High Concern

Cadmium	7440-43-9

California Prop. 65

WARNING: This product can expose you to chemicals including Cadmium, 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. **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.

SECTION 16. OTHER INFORMATION

Full text of other abbreviations

ACGIH	:	USA. ACGIH Threshold Limit Values (TLV)
ACGIH BEI	:	ACGIH - Biological Exposure Indices (BEI)
OSHA CARC	:	OSHA Specifically Regulated Chemicals/Carcinogens
OSHA Z-2	:	USA. Occupational Exposure Limits (OSHA) - Table Z-2
ACGIH / TWA	:	8-hour, time-weighted average
OSHA CARC / PEL	:	Permissible exposure limit (PEL)
OSHA Z-2 / TWA	:	8-hour time weighted average
OSHA Z-2 / CEIL	:	Acceptable ceiling concentration

AIIC - Australian Inventory of Industrial Chemicals; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response,

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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); LSPN - List of Hazardous Notified Substances (Chile); 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 and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.
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