

Section 1. Identification

Product Identity	Red Dog Zinc Concentrate
Product Use	Zinc metal and alloy production.
Restrictions on Use	None
Manufacturer/Supplier Name	Teck Alaska Incorporated Red Dog Mine P.O. Box 1230 Kotzebue, Alaska 99752
24-hour Emergency Telephone No.	+1 250-364-4214

Section 2. Hazard(s) identification

Classification of the substance or mixture under US OSHA's Hazard Communication Standard (1910.1200) revised 2024 and Canadian Hazardous Products Regulations (SOR/2015-17) (GHS revision 7)

Carcinogen, category 1A;H350	May cause cancer.
Reproductive toxicity, category 1A;H360	May damage fertility or the unborn child.
Specific target organ toxicity, repeated exposure category 2;H373	May cause damage to organs through prolonged or repeated exposure. Specific Target Organs: (lungs)
Aquatic toxicity (acute), category 2;H401	Toxic to aquatic life.
Aquatic toxicity (chronic), category 3;H412	Toxic to aquatic life with long lasting effects.

Label elements



Danger

H350 May cause cancer.
H360 May damage fertility or the unborn child.
H373 May cause damage to organs through prolonged or repeated exposure.
H401 Toxic to aquatic life.
H412 Toxic to aquatic life with long lasting effects.

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, fume, mist, vapors or spray.
P280 Wear protective gloves, eye protection, and face protection.



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P273 Avoid release to the environment.

Response

P308 IF exposed or concerned: Get medical advice or attention.

P313 Get Medical advice or attention if you feel unwell.

P391 Collect spillage.

Storage

P405 Store locked up.

Disposal

P501 Dispose of contents or container in accordance with local and national regulations.

Other hazards

This product contains no PBT/vPvB chemicals.

This product contains no endocrine disrupting chemicals.

Emergency Overview: This product is not flammable or combustible under normal conditions of transport and storage. However, when heated strongly in air it will burn, releasing toxic and irritating sulfur dioxide gas, as well as possible lead and zinc oxide fumes. Contact with strong acids will generate flammable and highly toxic hydrogen sulfide gas (H₂S).

Potential Health Effects: Concentrate dust may be irritating to the nose, throat and respiratory tract. Inhalation or ingestion of concentrate dust may result in lead and cadmium absorption and possible lead intoxication. Prolonged exposure may also cause central nervous system damage, gastrointestinal disturbances, anemia, kidney dysfunction and possible reproductive effects. Pregnant women should be protected from excessive exposure to prevent lead crossing the placental barrier and causing infant neurological disorders.

Potential Environmental Effects: Zinc concentrate will likely have minimal direct environmental effects, since its constituent metals have low solubility, and are therefore not highly bioavailable. However, when the product is processed or resides in the environment for extended periods, lead and zinc compounds may form which may be toxic to aquatic and terrestrial organisms.

Section 3. Composition/information on ingredients

Ingredient	Synonym	CAS Number	Weight %
Zinc sulfide (SZn)	Sphalerite	1314-98-3	79 – 90
Iron sulfide (FeS)	Pyrite	1317-37-9	5 – 13
Lead sulfide (PbS)	Galena	1314-87-0	1 – 3
Crystalline silica (Quartz) (respirable)	Quartz	14808-60-7	3 – 5
Cadmium sulfide	Hawleyite	1306-23-6	0.3 - 0.6

Section 4. First aid measures

General

In all cases of doubt, or when symptoms persist, seek medical attention.
Never give anything by mouth to an unconscious person.

Inhalation	Remove to fresh air, keep patient warm and at rest. If breathing is irregular or stopped, give artificial respiration. If unconscious, place in the recovery position and obtain immediate medical attention. Give nothing by mouth.
Eyes	Irrigate copiously with clean water for at least 15 minutes, holding the eyelids apart and seek medical attention.
Skin	Remove contaminated clothing. Wash skin thoroughly with soap and water or use a recognized skin cleanser.
Ingestion	If swallowed obtain immediate medical attention. Keep at rest. Do NOT induce vomiting.

Most important symptoms and effects, both acute and delayed Overview

No specific symptom data is available.
Possible cancer hazard. Contains an ingredient which may cause cancer based on animal data (See Section 3 and Section 15 for each ingredient). Risk of cancer depends on duration and level of exposure.
Treat symptomatically. See section 2 for further details.

Ingestion

Harmful if swallowed.

Section 5. Fire-fighting measures

Extinguishing media

Use any means of extinction appropriate for surrounding fire conditions such as water spray, carbon dioxide, dry chemical, or foam.

Special hazards arising from the substance or mixture

The handling, shipment, storage and processing of this material requires appropriate controls and care to prevent spillage or gradual accumulation in the terrestrial and aquatic environments. Spilled material should be promptly cleaned up.

Do not breathe dust, fume, mist, vapours or spray.

Hazardous decomposition

May release highly toxic and flammable hydrogen sulfide gas on contact with strong acids. This material can decompose at high temperatures forming toxic and irritating sulfur dioxide gas as well as lead, zinc and cadmium oxides.

Advice for fire-fighters

As with all fires, wear positive pressure, self-contained breathing apparatus, (SCBA) with a full-face piece and protective clothing. Persons without respiratory protection should leave area. Wear SCBA during clean-up immediately after fire. No smoking.

Toxic fumes of sulfur dioxide will result from combustion. Fire fighters must be fully trained and wear full protective clothing including an approved, self-contained breathing apparatus which supplies a positive air pressure within a full-face piece mask.

Product is not considered a fire or explosion hazard. However, concentrate will burn if heated strongly in a fire situation, releasing toxic and irritating sulfur dioxide gas (SO₂). Contact with strong acids will generate flammable and highly toxic hydrogen sulfide gas (H₂S). The ignition temperature of zinc concentrate is approximately 700 – 800°C.

ERG Guide No. 171

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Put on appropriate personal protective equipment (see section 8).

Environmental precautions

The handling, shipment, storage and processing of this material requires appropriate controls and care to prevent spillage or gradual accumulation in the terrestrial and aquatic environments. Spilled material should be promptly cleaned up.

Do not allow spills to enter drains or waterways.

Use good personal hygiene practices. Wash hands before eating, drinking, smoking, or using toilet. Promptly remove soiled clothing and wash thoroughly before reuse.

Methods for Containment

Control source of spillage, if possible, to do so safely. Restrict access to the area until completion of clean-up. Clean up spilled material immediately, observing precautions in Section 8, Personal Protection and using methods that will minimize dust generation (e.g., vacuum solids, dampen material and shovel or wet sweep). Return uncontaminated spilled material to the process if possible. Place contaminated material in suitable labeled containers for recovery or disposal. Treat or dispose of waste material in accordance with all local, regional, and national requirements.

Section 7. Handling and storage

Precautions for safe handling

Handle containers carefully to prevent damage and spillage.

Some sulfide concentrates may slowly oxidize in storage and generate sulfur dioxide as well as deplete the oxygen content of a confined space. The atmosphere within confined spaces containing concentrate must be tested before entry and the area thoroughly ventilated or self-contained breathing apparatus used, if conditions warrant. Avoid excessive heat. Avoid contact with acids, oxidizers and combustible materials. Minimize dust generation and accumulation.

See section 2 for further details. - [Prevention]

Conditions for safe storage, including any incompatibilities

Store in a cool, dry area. Some sulfide concentrates may oxidize and generate heat which accumulates in storage piles. If material is to be stored for an extended period, the temperature of piles should be monitored. If heating of the concentrate is detected, the material should be sealed from air or oxygen

Incompatible materials: Reacts violently with iodine pentachloride. Incompatible with iodine monochloride, hydrogen peroxide, strong oxidizers, and strong acids.

See Section 8 for information on Personal Protective Equipment.

Specific end use(s)

No data available.

Section 8. Exposure controls / personal protection

Control parameters

Exposure Limits

CAS No.	Ingredient	Source	Value
1306-23-6	Cadmium sulfide	OSHA	5 µg/m ³ as Cadmium [2.5 µg/m ³ Action Level]
		ACGIH	0.002 µg/m ³ as Cadmium
		NIOSH	No Established Limit
1314-87-0	Lead sulfide (PbS)	OSHA	0.05 mg/m ³ as Lead [0.03 µg/m ³ Action Level]
		ACGIH	0.05 mg/m ³ as Lead
		NIOSH	0.05 mg/m ³ as Lead
1314-98-3	Zinc Sulfide	OSHA	No Established Limit
		ACGIH	No Established Limit
		NIOSH	No Established Limit
1317-37-9	Iron sulfide (FeS)	OSHA	1 mg/m ³ as Iron Salts (Construction and Maritime Industries ONLY)
		ACGIH	1 mg/m ³ as Iron Salts
		NIOSH	1 mg/m ³ as Iron Salts, soluble
14808-60-7	Crystalline silica (Quartz) (respirable)	OSHA	PEL 50 µg/m ³
		ACGIH	TWA: 0.025 mg/m ³
		NIOSH	0.05 mg/m ³ TWA (respirable)

Exposure controls



Respiratory

If workers are exposed to dust at concentrations above the exposure limit, they must use the appropriate, certified respirators use appropriate NIOSH-approved respiratory protection equipment (Class N, R or P-100 particulate filter cartridge).

Eyes

Protective safety glasses recommended. Close-fitting safety goggles should be worn to prevent eye contact if excessive dust is generated.

Skin

Coveralls or other work clothing and gloves are recommended. Wash exposed skin immediately when contaminated and at the end of each work shift.

Engineering Controls

Provide adequate ventilation. Where reasonably practicable this should be achieved by the use of local exhaust ventilation and good general extraction. If these are not sufficient to maintain concentrations of particulates and any vapor below occupational exposure limits suitable respiratory protection must be worn.

Other Work Practices

Avoid breathing dust. Use good personal hygiene practices. Wash hands before eating, drinking, smoking, or using toilet. Promptly remove soiled clothing and wash thoroughly before reuse.

Section 9. Physical and chemical properties

Information on basic physical and chemical properties

Physical State	Solid
Color	Dark grey, fine powder
Odor	Weak organic odour from entrained flotation reagents
Melting point / freezing point	Will burn first unless in an inert atmosphere
Initial boiling point and boiling range	Not Available
Flammability (solid, gas)	Non-combustible solid
Lower Explosive Limit:	Not Available
Upper Explosive Limit:	Not Available
Flash Point	Not Available
Auto-ignition temperature	Not Available
Decomposition temperature	>1000°C
pH	Not Available
Viscosity (cSt)	Not Available
Solubility in Water	Insoluble
Partition coefficient n-octanol/water (Log Kow)	Not Available
Vapor pressure (Pa)	Negligible at 20°C
Relative Density	2.0 (Bulk Sp. Gr., Water = 1):
Vapor Density	Not Available
Evaporation rate (Ether = 1)	Not Available
VOC Content	Not Available
Percent Volatile	8.4% @ 100°C (moisture)
Particle Size	<40 µm, with 80% <20 µm
Other information	No other relevant information.

Section 10. Stability and reactivity

Chemical stability

Stable under normal circumstances.

Possibility of hazardous reactions

No data available.

Conditions to avoid

No data available.

Incompatible materials

Reacts violently with iodine pentachloride. Incompatible with iodine monochloride, hydrogen peroxide, strong oxidizers, and strong acids.

Hazardous decomposition products

May release highly toxic and flammable hydrogen sulfide gas on contact with strong acids. This material can decompose at high temperatures forming toxic and irritating sulfur dioxide gas as well as lead, zinc and cadmium oxides.



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Section 11. Toxicological information

Acute toxicity

Note: When no route specific LD50 data is available for an acute toxin, the converted acute toxicity point estimate was used in the calculation of the product's ATE (Acute Toxicity Estimate).

Ingredient	Oral LD50, mg/kg	Skin LD50, mg/kg	Inhalation vapour LC50, mg/L/4hr	Inhalation Dust/Mist LC50, mg/L/4hr	Inhalation Gas LC50, ppm
Lead sulfide (PbS) - (1314-87-0)	No data available.	No data available.	No data available.	No data available.	No data available.
Zinc Sulfide - (1314-98-3)	>2,000.00, Rat - Category: 5	No data available.	No data available.	No data available.	No data available.
Iron sulfide (FeS) - (1317-37-9)	No data available.	No data available.	No data available.	No data available.	No data available.
Crystalline silica (Quartz) (respirable) - (14808-60-7)	No data available.	100,000.00 - Category: NA	No data available.	No data available.	No data available.
Cadmium sulfide - (1306-23-6)	2,330.00, Rat - Category: 5	No data available.	No data available.	No data available.	No data available.

Carcinogen Data

CAS No.	Ingredient	Source	Value
1306-23-6	Cadmium sulfide	IARC	Group 1: Yes; Group 2a: No; Group 2b: No; Group 3: No; Group 4: No;
		ACGIH	No Established Limit
1314-87-0	Lead sulfide (PbS)	IARC	Group 1: No; Group 2a: Yes; Group 2b: No; Group 3: No; Group 4: No;
		ACGIH	No Established Limit
1314-98-3	Zinc Sulfide	IARC	Group 1: No; Group 2a: No; Group 2b: No; Group 3: No; Group 4: No;
		ACGIH	No Established Limit
1317-37-9	Iron sulfide (FeS)	IARC	Group 1: No; Group 2a: No; Group 2b: No; Group 3: No; Group 4: No;
		ACGIH	No Established Limit
14808-60-7	Crystalline silica (Quartz) (respirable)	IARC	Group 1: Yes; Group 2a: No; Group 2b: No; Group 3: No; Group 4: No;
		ACGIH	A2

Classification	Category	Hazard Description
Acute toxicity (oral)	---	Harmful if swallowed.
Acute toxicity (dermal)	---	Not Applicable
Acute toxicity (inhalation)	---	Harmful if inhaled.
Skin corrosion/irritation	---	Not Applicable
Serious eye damage/irritation	---	Not Applicable
Respiratory sensitization	---	Not Applicable
Skin sensitization	---	Not Applicable
Germ cell mutagenicity	---	Not Applicable
Carcinogenicity	1A	May cause cancer.
Reproductive toxicity	1A	May damage fertility or the unborn child.
STOT-single exposure	---	Not Applicable
STOT-repeated exposure	2	May cause damage to organs through prolonged or repeated exposure.
Aspiration hazard	---	Not Applicable

Possible routes of entry: Skin contact, inhalation, ingestion.

Symptoms and effects, both acute and delayed:

No specific symptom data available. Possible cancer hazard. Contains an ingredient which may cause cancer based on animal data (See Section 3 and Section 15 for each ingredient). Risk of cancer depends on duration and level of exposure. Treat symptomatically.

Section 12. Ecological information

Toxicity

Toxic to aquatic life with long lasting effects. Concern of heavy metal accumulation.

Aquatic Ecotoxicity

Ingredient	96 hr LC50 fish, mg/L	48 hr EC50 crustacea, mg/L	ErC50 algae, mg/L
Lead sulfide (PbS) - (1314-87-0)	No data available.	No data available.	No data available.
Zinc sulfide - (1314-98-3)	No data available.	No data available.	No data available.
Iron sulfide (FeS) - (1317-37-9)	No data available.	No data available.	No data available.
Crystalline silica (Quartz) (respirable) - (14808-60-7)	No data available.	No data available.	No data available.
Cadmium sulfide - (1306-23-6)	748.00, Carassius auratus	1,820.00, Daphnia magna	120.00, Pseudokirchneriella subcapitata

Persistence and degradability

There is no data available on the preparation itself.

Bioaccumulative potential

Not Available.

Mobility in soil

No data available.

PBT and vPvB assessment

This product contains no PBT/vPvB chemicals.

Other adverse effects

No data available.

Section 13. Disposal considerations

Waste treatment methods

Waste should not be released to sewers. Observe all federal, provincial, and local regulations when disposing of this substance.

Section 14. Transport information

This material has been tested under the United Nations Transport of Dangerous Goods, Manual of Tests and Criteria, Fifth Revised Edition (2009). Test results indicate that the concentrate qualifies neither as a flammable solid under Class 4.1 nor a self-heating substance under Class 4.2.

Canada Transportation of Dangerous Goods Regulation (TDGR)

Not Regulated



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U.S. Department of Transportation (DOT) 49CFR

UN number	UN3077
UN proper shipping name	RQ, Environmentally Hazardous Substance, Solid, n.o.s. (lead sulfide)
Transport hazard class(es)	9
Packing group	III
Marine Pollutant	No
Inhalation Hazard	No
U.S. DOT Reportable Quantity (RQ)	Lead sulfide 10 lbs (4.54 kg)

International Air Transport Association (IATA)

Not Regulated

International Marine Organization/International Maritime Dangerous Goods Code (IMO/IMDG)

Not Regulated

International Marine Solid Bulk Cargo Code (IMSBC)

IMO MARPOL V	MHB - Materials Hazardous Only in Bulk, Group A and B
Oxygen Depleting	Oxidation during transport has potential to produce an oxygen-deficient atmosphere.
Liquefaction	This material may liquefy if shipped at moisture content in excess of its transportable moisture limit (TML).
Special precautions for user	It may also present chemical hazards. Recommendations set out in Appendix 1 of the International Marine Solid Bulk Cargo Code should be observed.

Section 15. Regulatory information

Regulatory Overview The regulatory data in Section 15 is not intended to be all-inclusive, only selected regulations are represented.

Toxic Substance Control Act (TSCA)

Cadmium sulfide
Crystalline silica (Quartz) (respirable)
Iron sulfide
Lead sulfide
Zinc sulfide

CERCLA SECTION 103 Hazardous Substances

Cadmium sulfide RQ: None assigned
Lead sulfide RQ: 10 lbs. (4.54 kg)

Zinc sulfide RQ: None assigned

EPCRA 302 Extremely Hazardous:

To the best of our knowledge, there are no chemicals at levels which require reporting under this statute.

EPCRA SECTION 311/312 Hazard Categories

Delayed (Chronic) Health Hazard – Carcinogen, Reproductive toxicity, Specific target organ toxicity, repeated exposure.

EPCRA 313 Toxic Chemicals:

Crystalline silica
Lead sulfide
Zinc sulfide

Canadian Domestic Substance List (DSL):

Cadmium sulfide
Crystalline silica
Iron sulfide
Lead sulfide
Zinc sulfide

Canadian Non-Domestic Substance List (NDSL):

To the best of our knowledge, there are no chemicals at levels which require reporting under this statute.

New Jersey RTK Substances (>1%):

Cadmium sulfide
Crystalline silica
Lead sulfide

Pennsylvania RTK Substances (>1%):

Cadmium sulfide
Crystalline silica
Lead sulfide

Proposition 65 - Carcinogens (>0.0%):

Cadmium sulfide
Crystalline silica
Lead sulfide

Proposition 65 - Developmental Toxins (>0.0%), Female Repro Toxins (>0.0%), Male Repro Toxins (>0.0%):

To the best of our knowledge, there are no chemicals at levels which require reporting under this statute.

Proposition 65 Label Warning:



WARNING: This product can expose you to chemicals including [Cadmium sulfide, Crystalline silica (Quartz) (respirable), Lead sulfide], which are known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

Section 16. Other information

ACGIH	American Conference of Governmental Industrial Hygienists
C	Celsius, F: Fahrenheit
CAS	Chemical Abstracts Service
CEPA	Canadian Environmental Protection Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
DOT	Department of Transport
EHS	Extremely Hazardous Substances
EPCRA	Emergency Planning and Community Right-to-Know Act
IARC	International Agency for Research on Cancer
ICAO/IATA	International Civil Aviation Organizations/ International Air Transport Association
IMO/IMDG	International Maritime Organization/ International Maritime Dangerous Goods Code
LD50 LC50	Lethal Dose 50%, Lethal Concentration 50%
NIOSH	National Institute for Occupational Safety and Health
NTP	National Institute for Occupational Safety and Health
MSHA	Mine Safety and Health Administration
OSHA	Occupational Safety and Health Administration
RCRA	Resource Conservation and Recovery Act
SARA	Superfund Amendments and Reauthorization Act
TSCA	Toxic Substances Control Act
WHMIS	Workplace Hazardous Materials Information System
mg	Milligram

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extends no warranty and assumes no responsibility for the accuracy of the content and expressly disclaims all liability for reliance thereon. This safety data sheet provides guidelines for the safe handling and processing of this product; it does not and cannot advise on all possible situations. Therefore, your specific use of this product should be evaluated to determine if additional precautions are required. Individuals exposed to this product should read and understand this information and be provided pertinent training prior to working with this product.

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