1. PRODUCT AND COMPANY IDENTIFICATION

Trade Name: Iron Cobalt Sulfide

Chemical Formula: $Fe_xCo_{1-x}S_2$, where $0 < x < 1$.

Manufacturer Item Number: IR-2330

Manufacturer:
Lorad Chemical Corporation
1200 19th Street North
Saint Petersburg, Florida, 33713
United States of America

Telephone: +1 (727) 826–5511

Fax: +1 (727) 826–5510

Emergency Contact:
(800) 255–3924 (US & Canada)
+1 (813) 248–0573 (International)

2. HAZARD IDENTIFICATION

Hazard Classification
Skin Sensitization (Category 1)
Long-term Aquatic Hazard (Chronic 1)

Signal Word: Warning

Pictograms:



Hazard Statements:

H317 May cause an allergic skin reaction.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary Statements:

Prevention

P261 Avoid breathing dust / fumes / gas / mist / vapors / spray.
P272 Contaminated work clothing should not be allowed out of the workplace.
P273 Avoid release to the environment.
P280 Wear protective gloves.

Response

P302+352 IF ON SKIN: Wash with plenty of soap and water.
P333+313 If skin irritation or rash occurs, get medical advice / attention.
P363 Wash contaminated clothing before reuse.
P391 Collect spillage.

Storage

P402+404 Store in a dry place. Stored in a closed container.
P405 Store locked up.

Disposal

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

Other Hazards No data available.

3. COMPOSITION

Additional Names: Iron Cobalt Disulfide, Mixed Iron Cobalt Sulfide

Percentage:

Component	Classification	Concentration
Iron Cobalt Sulfide	Skin Sens. 1, H317; Aquatic Chronic 1, H410	100% wt

CAS #: No CAS Registry number assigned.

EC #: Not assigned.

Note: Mixed Iron Cobalt Sulfide with the general formula $Fe_xCo_{1-x}S_2$, where $0 \leq x \leq 1$. No unique CAS Registry Number has been identified for this variable composition material.

4. FIRST AID PROCEDURES

General Treatment If exposure occurs or symptoms develop, seek medical advice or attention. Show this SDS to the physician if medical attention is required.

Special Treatment: Treat symptomatically.

Important Symptoms: May cause an allergic skin reaction. Dust may cause mechanical irritation to the eyes and respiratory tract.

Inhalation: Remove person to fresh air. If breathing is difficult, seek medical attention. If not breathing, provide artificial respiration by trained personnel and obtain immediate medical attention.

Ingestion: Rinse mouth with water. Never give anything by mouth to an unconscious person. Do not induce vomiting unless directed by medical personnel. Seek medical attention if symptoms develop or if a large quantity has been swallowed.

Skin: Wash thoroughly with soap and water. Remove contaminated clothing and wash before reuse. If skin irritation or an allergic skin reaction develops, seek medical attention.

Eyes: Immediately flush eyes with water for at least 15 minutes while holding the eyelids open. Remove contact lenses if present and easy to do. Continue rinsing. Seek medical attention if irritation persists.

5. FIREFIGHTING MEASURES

Special Hazards from Substance: This material is not combustible. Fire or high temperatures may produce hazardous decomposition products, including sulfur oxides, hydrogen sulfide under oxygen deficient conditions, and iron and cobalt oxide fumes.

Extinguishing Media: Use extinguishing media appropriate for the surrounding fire. Water spray, alcohol resistant foam, dry chemical, or carbon dioxide may be used.

Special Fire Fighting Procedures: Wear self contained breathing apparatus and full protective clothing. Avoid breathing combustion or decomposition products. Cool exposed containers with water spray if safe to do so.

6. ACCIDENTAL RELEASE MEASURES

If Material is Released / Spilled: Wear appropriate personal protective equipment. Avoid generating dust. Avoid breathing dust. Ensure adequate ventilation. Collect spilled material using methods that minimize dust generation, such as vacuuming with a HEPA filtered vacuum or carefully sweeping. Place material into suitable, tightly closed containers for recovery or disposal.

Environmental Precautions: Avoid release to the environment. Prevent material from entering drains, sewers, surface waters, or soil. Collect all spilled material and dispose of in accordance with applicable regulations.

7. HANDLING AND STORAGE

Handling Conditions: Handle in accordance with good industrial hygiene and safety practices. Avoid generating and breathing dust. Avoid contact with eyes, skin, and clothing. Do not eat, drink, or smoke while handling this material. Wear appropriate personal protective equipment.

Storage Conditions: Store in a tightly closed container in a cool, dry, and well ventilated area. Protect from moisture and contamination. Keep away from incompatible materials, including strong oxidizing agents.

Work / Hygienic Maintenance: Wash thoroughly after handling and before eating, drinking, or smoking. Remove contaminated clothing and wash before reuse. Contaminated work clothing should not be allowed out of the workplace.

Ventilation: Provide adequate general ventilation. Use local exhaust ventilation where dust is generated to minimize airborne dust concentrations.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure Limits:

Authority	Basis	Limit	Remarks
OSHA	PEL	0.1 mg/m^3	8-hour time weighted average. Cobalt metal dust and fumes (as Co)
ACGIH	TLV	0.02 mg/m^3	8-hour time weighted average. Cobalt and inorganic compounds (as Co), inhalable fraction
NIOSH	REL	0.05 mg/m^3	10-hour time weighted average. Cobalt metal, dust, and fumes (as Co)
OSHA	PEL	5.0 mg/m^3	Particulates Not Otherwise Regulated (PNOR), Respirable Fraction. Applicable to respirable nuisance dust.
OSHA	PEL	15.0 mg/m^3	Particulates Not Otherwise Regulated (PNOR), Total Dust. Applicable to nuisance dust where no substance specific PEL exists.

Notes: No occupational exposure limits have been established specifically for Iron Cobalt Sulfide ($Fe_xCo_{1-x}S_2$). The exposure limits above are provided as guidance based on structurally related iron pyrite and cobalt containing compounds. Where multiple exposure limits are applicable, the more protective limit should be followed.

References:

PEL	Permissible Exposure Limit
REL	Recommended Exposure Limit
TWA	Time Weighted Average
IDLH	Immediately Dangerous to Life or Health
TLV	Threshold Limit Value

Engineering Controls: Handle in accordance with good industrial hygiene and safety practices. Provide adequate general ventilation. Use local exhaust ventilation where necessary to minimize airborne dust concentrations.

Respiratory Protection: Where engineering controls are not sufficient to maintain airborne concentrations below applicable exposure limits, use NIOSH approved respiratory protection. For routine particulate exposure, use a P100 particulate respirator (US) or P3 particulate filter (EN 143). An N95 or P95 respirator may be suitable for brief, low concentration exposures. For prolonged exposure or significant dust generating operations, use a half face or full face respirator equipped with P100 particulate filters.

Protective Gloves: Wear appropriate chemical resistant protective gloves to minimize skin contact. Remove and wash contaminated clothing before reuse. Wash hands thoroughly after handling.

Eye Protection: Wear safety glasses with side shields or chemical safety goggles where dust generation may occur. Eye protection should comply with ANSI Z87.1 or equivalent.

Body Protection: Wear appropriate protective clothing to minimize skin contact. Protective equipment should be selected based on the concentration of airborne dust and the conditions of use in the workplace.

9. PHYSICAL AND CHEMICAL CHARACTERISTICS

Color:	Dark gray / black	**Molecular Weight:**	119.98 to 122.92 g/mol depending on Fe:Co ratio
Forms:	Powder	**Theoretical Density:**	Approximately 4.9 to 5.1 g/cm^3
Odor:	Odorless	**pH:**	Not applicable.
Water Solubility:	Insoluble	**Auto-Ignition Temperature:**	Not applicable.
Boiling Point:	Not applicable.	**Evaporation Rate:**	Not applicable.
Melting Point / Freezing Point:	>1,000ºC (>1,832ºF) (decomposes)	**Flammability or Explosive Limits:**	Not flammable or explosive.
Vapor Pressure:	Not applicable.	**Partition Coefficient: n-octanol/ water**	Not applicable.
Vapor Density:	Not applicable.	**Decomposition Temperature:**	No data available.
Flash Point:	Not applicable.	**Viscosity:**	Not applicable.

10. REACTIVITY

Stability:	Stable under recommended storage and handling conditions.
Reacts with:	Strong oxidizing agents, strong acids.
Incompatible Conditions:	Excessive heat, moisture, and contact with incompatible materials. Avoid conditions that generate airborne dust.
Hazardous Decomposition Products:	Sulfur oxides, hydrogen sulfide under oxygen deficient conditions, iron oxides, and cobalt oxides.

11. TOXICOLOGICAL INFORMATION

Acute Toxicity	Eyes:	Dust may cause mechanical irritation.
	Skin:	May cause skin irritation or allergic skin reaction.
	Ingestion:	May be harmful if swallowed. Ingestion may cause gastrointestinal discomfort.
	Inhalation:	Dust may cause respiratory tract irritation. Avoid breathing dust.
Chronic Toxicity	Skin Corrosion / Irritation:	Not expected to be corrosive. May cause mechanical irritation.
	Serious Eye Damage / Irritation:	Not expected to cause serious eye damage. Dust may cause temporary mechanical irritation.
	Respiratory / Skin Sensitization:	May cause an allergic skin reaction. Respiratory sensitization data are not available.
	Mutagenic Effects:	No data available.
	Reproductive / Teratogenic Effects:	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.
	Other Adverse Effects:	To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.
Carcinogenicity:	IARC:	No component of this product present at levels greater than or equal to 0.1% is identified as probable or confirmed human carcinogen by IARC.
	ACGIH:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
	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 identified as a carcinogen or potential carcinogen by OSHA.
	EU:	No component of this product present at levels greater than or equal to 0.1% is classified as a carcinogen under Regulation (EC) No. 1272/2008 (CLP).

Additional Information: No data available.

12. ECOLOGICAL INFORMATION

Aquatic Toxicity: Very toxic to aquatic life with long lasting effects. Avoid release to the environment.

Persistence and degradability: No applicable to inorganic substances.

Bioaccumulative potential: Bioaccumulation is not expected to be significant due to the low solubility of the material.

Notes: Prevent release to the environment. Collect spills and dispose of in accordance with applicable regulations.

13. DISPOSAL CONSIDERATIONS

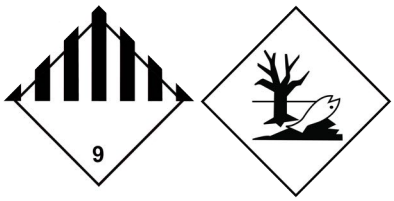
Disposal: Dispose of contents and container in accordance with applicable local, state, and federal regulations. Waste characterization is the responsibility of the waste generator. Do not discharge to drains, sewers, waterways, or the environment. Dispose of material through an approved waste disposal facility.

14. TRANSPORTATION DATA

Hazardous:

DoT: Not Dangerous Goods.
IMDG: Environmentally hazardous substance
IATA: Environmentally hazardous substance

Pictogram:



Hazard Class: 9

Packing Group: III

UN Number: 3077

US DoT **Proper Name:** Not Dangerous Goods

	Marine Pollutant:	Yes
IMDG	**Proper Name:**	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Iron Cobalt Sulfide)
	EMS-No:	F-A, S-F
	Marine Pollutant:	Yes
IATA	**Proper Name:**	Environmentally hazardous substance, solid n.o.s. (Iron Cobalt Sulfide)

Note: The environmentally hazardous substance (EHS) mark is required for single packagings and combination packagings containing dangerous goods in quantities exceeding 5 L per inner packaging for liquids or 5 kg per inner packaging for solids (ADR 2.2.9.1.10, IMDG Code 2.10.3).

15. REGULATORY INFORMATION

Toxic Substance Control Act	Listed (analogizing to CoS_2)
SARA 302 Components	No chemicals in this material are subject to the reporting requirements of SARA title III, Section 302.
SARA 313 Components	This material contains chemical components with known CAS numbers that exceed the threshold (de minimis) reporting levels established by SARA Title III, Section 313: - Cobalt Compounds
SARA 311/312 Hazards	Chronic Health Hazard
Massachusetts Right to Know Components	Components are subject to the Massachusetts Right to Know Act: - Cobalt compounds
Pennsylvania Right to Know Components	Components are listed in Appendix A of the Pennsylvania Worker and Community Right to Know Act: - Cobalt Compounds
New Jersey Right to Know Components	Components are listed on the New Jersey Right to Know Hazardous Substance List: - Cobalt Compounds
California Prop. 65 Components	This product does not contain any chemicals known to the State of California to cause cancer, birth defects, or any other reproductive harm.
EU Regulations	This substance is classified under Regulation (EC) No. 1272/2008 (CLP) as Skin Sensitization, Category 1 and Hazardous to the Aquatic Environment, Chronic Category 1. This substance is not listed in REACH Annex XIV (Authorization), REACH Annex XVII (Restrictions), or on the REACH Candidate List of Substances of Very High Concern (SVHC).

16. OTHER INFORMATION

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