



# MATERIAL SAFETY DATA SHEET

Cobalt Concentrate

*Tronox LLC*

For more detailed information on the hazards of this product, contact Chemical Safety, Health and Environmental Department or Medical Services Department at the address below. Technical Information Bulletin is also available.

## 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

### PRODUCT IDENTIFICATION

Brand Name..... Cobalt Concentrate  
 Chemical Name ..... Cobalt and nickel concentrate in calcium sulfate from cell feed clarification  
 Common Name..... Cobalt Concentrate  
 Formula..... N/A  
 Molecular Weight ..... N/A  
 Product Use..... Cobalt production feedstock  
 Product Identification Number..... N/A  
 Solids Content (Cobalt and nickel sulfides, calcium sulfate, manganese oxides & inert minerals) .....50-85% by weight

### MANUFACTURER

Tronox LLC  
 One Leadership Square, 211 N. Robinson Ave.  
 Oklahoma City, OK 73102-7109

### EMERGENCY TELEPHONE NUMBER

1-866-775-5009 (24 hours)

## 2. COMPOSITION/INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS NUMBER	WEIGHT %
Manganese sulfate	7785-87-7	4.3
Sulfuric acid	7664-93-9	<0.43
Manganese oxides	1334-43-0/1313-13-9	13
Calcium sulfate	7778-18-9	53
Cobalt Sulfide	12013-10-4	10
Nickel Sulfide	11113-75-0	5.3
Water	7732-18-5	Balance

Typical composition at 85% solids; will vary with solids content. Not to be interpreted as specification.

## 3. HAZARDS IDENTIFICATION

### EMERGENCY OVERVIEW

Black, semi wet cake with slight sulfurous smell. Contact causes irritation to the skin and eyes, which may be severe. Inhaling dusts can cause irritation of the upper respiratory tract, and may lead to “metal fume fever,” a flu-like condition. Long term exposure by inhaling or swallowing can affect the central nervous system.

Will not burn in a fire. Use extinguishing media suitable for the materials that are burning.

**CAUTION:** Do not allow to come into contact with acidic materials. This may cause a release of H<sub>2</sub>S gas. See an MSDS for Hydrogen Sulfide for specific information on its hazards.

## POTENTIAL HEALTH EFFECTS

### PRIMARY ROUTE(S) OF ENTRY

Eye and skin contact

**WARNING!** This product causes irritation of the eyes, nose, throat, and lungs. Inhaling can cause irritation of the upper respiratory tract, and may lead to “metal fume fever,” a flu-like condition. Long term exposure by inhaling or swallowing can affect the central nervous system or lungs.

### SYMPTOMS OF EXPOSURE

- Inhalation: Flu-like symptoms - fever, chills, nausea and vomiting, muscular aches, and weakness; coughing, sneezing, bronchitis - can result from breathing high concentrations of mist or fume. Chronic exposure by breathing low levels of mist over a long time can result in “manganism,” a disease of the central nervous system similar to Parkinsonism.
- Eye Contact: Irritation which may be severe, redness, tearing, burning sensation.
- Skin Contact: Irritation which may be severe, redness, itching, burning sensation.
- Ingestion: Similar to those for inhalation but at much larger exposure quantities since only about 5% of manganese would be absorbed through the gut.

### MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE

Eye, skin, and respiratory diseases or disorders would be aggravated by repeated or prolonged exposure to this mixture. Iron deficiency may increase susceptibility to manganese poisoning.

### REPORTED AS CARCINOGEN OR POTENTIAL CARCINOGEN

Cobalt and Nickel compounds are classified as animal carcinogens by the ACGIH.

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## 4. FIRST AID MEASURES

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- Inhalation: Remove from area to fresh air. Seek medical attention if respiratory irritation develops or if breathing becomes difficult.
- Eye contact: Immediately rinse eyes with water. Remove any contact lenses, and continue flushing eyes with running water for at least 15 minutes. Hold eyelids apart to ensure rinsing of the entire surface of the eyes and lids with water. Get immediate medical attention.
- Skin Contact: Wash affected areas with plenty of water, and soap if available, for several minutes. Remove and clean contaminated clothing and shoes. Seek medical attention if irritation develops and persists.
- Ingestion: Give 3-4 glasses of water, but **DO NOT** induce vomiting. If vomiting occurs, give fluids again. Get medical attention to determine whether vomiting or evacuation of stomach is necessary. Do not give anything by mouth to an unconscious or convulsing person.

### NOTE TO PHYSICIAN

Acute exposure to manganese sulfate dust can result in metal fume fever. Chronic exposure to dust can lead to manganism, a disease of the central nervous system, characterized by psychic and neurologic disorders. Cobalt and Nickel compounds are classified as animal carcinogens by the ACGIH. Ingestion may cause burning of the mouth, esophagus, and stomach. Inhalation of dusts and fumes may cause irritation of the respiratory tract, labored breathing and coughing.

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**5. FIRE FIGHTING MEASURES**

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Flash Point and Method..... N/A

NOTE: Cake contains various metal sulfides. These may give off irritating or toxic fumes of metal or sulfur oxide when exposed to fire.

**GENERAL HAZARD**

Material is not flammable.

NOTE: Can lead to the generation of a combustible H<sub>2</sub>S gas if exposed to acidic conditions. See an MSDS for Hydrogen Sulfide for more specific information.

**EXTINGUISHING MEDIA**

Use media that are appropriate for the materials that are burning.

**SPECIAL FIREFIGHTING INSTRUCTIONS**

Move containers from area if it can be done without risk. Cool fire-exposed containers with water from side.

**FIREFIGHTING EQUIPMENT**

As in any fire, wear NIOSH approved, positive pressure self-contained breathing apparatus and full protective gear.

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**6. ACCIDENTAL RELEASE MEASURES**

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Wear appropriate protective equipment (See Section 8). Avoid breathing dust. Avoid contact with eyes, skin and clothing.

**ON LAND**

Sweep up and place in a compatible container for disposal. Do not flush into drains, sewers, or sources of water runoff.

**IN WATER**

Dredge up and dispose of waste at an industrial waste site.

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**7. HANDLING AND STORAGE**

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Wear appropriate protective equipment (See Section 8). Avoid breathing dust. Avoid contact with eyes, skin and clothing. Wash thoroughly after handling.

Store in tightly seal containers located in a cool well ventilated area.

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**8. EXPOSURE CONTROLS/PERSONAL PROTECTION**

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**ENGINEERING CONTROLS**

If user operations generate dust, use local exhaust ventilation equipment to meet exposure limit.

**PERSONAL PROTECTION**

Respirator: In operations where exposure levels exceeding the TWA are generated, use a NIOSH approved respirator that has been selected by an industrial hygienist or other technically qualified person for the specific work conditions. If a respirator is used, OSHA requires compliance with its Respiratory Protection Program (29 CFR 1910.134).

Eye Protection: Wear safety glasses or vented safety goggles.  
 Gloves: Wear gloves that will not allow the product to penetrate.  
 Clothing: Wear easily washable clothing. Change daily. Wash clothing before reuse.  
 Other: Eye wash.

**EXPOSURE CONTROLS**

COMPONENT	OSHA PEL		ACGIH TLV	
	TWA	STEL	TWA	STEL
Manganese compounds, as Mn	N/E	5 mg/m <sup>3</sup>	0.2 mg/m <sup>3</sup>	N/E
Calcium Sulfate	N/E	N/K	N/K	N/E
Cobalt Sulfide	N/E	0.1 (dust fume)	0.02 mg/m <sup>3</sup>	N/E
Nickel Sulfide	N/E	1 mg/m <sup>3</sup>	0.1 mg/m <sup>3</sup>	N/E

**9. PHYSICAL AND CHEMICAL PROPERTIES**

State .....Semi-wet cake  
 Color .....Black  
 Odor .....Slight sulfurous smell possible  
 Melting Point °C .....N/D  
 Boiling Point °C .....101  
 Specific Gravity @ 20°C .....1.30  
 Water Solubility .....Soluble, solids content insoluble in nonacidic solutions  
 pH .....3-8

**10. STABILITY AND REACTIVITY**

**REACTIVITY**

Stable at ordinary temperatures and pressures.

**INCOMPATIBILITIES**

Strong oxidizers, acids or acidic materials

**HAZARDOUS DECOMPOSITION PRODUCTS**

Metal oxides, oxides of sulfur, hydrogen sulfide

**CONDITIONS TO AVOID**

Incompatible materials.

**11. TOXICOLOGICAL INFORMATION**

For Manganese Sulfate: RTECS OP1050000

Oral LD<sub>50</sub> (rat) .....2,150 mg/kg  
 Oral LD<sub>50</sub> (mouse) .....2,330 mg/kg

For Manganese Compounds:

Prolonged administration of manganese in the drinking water of rats resulted in fetotoxicity and mutagenic effects. The threshold dose was 0.005 mg/kg.

A two year feeding study performed by the National Toxicology Program showed no evidence of carcinogenic activity in rats, and equivocal evidence in mice. There was an increased severity of nephropathy in male rats, focal squamous hyperplasia of the forestomach in male and female mice, and ulcers and inflammation of the forestomach in male mice.

This compound was not mutagenic in *Salmonella typhimurium*, with or without exogenous metabolic activation, and did not induce sex-linked recessive lethal mutations in germ cells of male *Drosophila melanogaster*. It induced sister chromatid exchanges and chromosomal aberrations in Chinese hamster ovary cells without activation; with activation, only the sister chromatid exchange test was positive.

For Calcium Sulfate:

Oral LD<sub>50</sub> (Rat).....>10000 mg/kg

For Cobalt Sulfide:

To the best of our knowledge chronic toxicity of nickel sulfide is not fully known.

For Nickel Sulfide:

To the best of our knowledge chronic toxicity of nickel sulfide is not fully known.

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## 12. ECOLOGICAL INFORMATION

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For Manganese Sulfate, manganese compounds, and nickel sulfide ecological toxicity data is unknown.

Calcium sulfate: Fish toxicity (*L.macrochirus* LC<sub>50</sub>): 2980 mg/196 h.

Cobalt sulfide is known to be very toxic for fish

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## 13. DISPOSAL CONSIDERATIONS

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Dispose of in an approved industrial or hazardous waste landfill. Observe all applicable federal, state, and local regulations.

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## 14. TRANSPORT INFORMATION

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DOT Hazard Class.....Not regulated

TDG Hazard Class.....Not regulated

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## 15. REGULATORY INFORMATION

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OSHA HAZARD COMMUNICATION STANDARD (29 CFR 1910.1200)

Hazardous

Nonhazardous

CERCLA/SUPERFUND (40 CFR 117, 302)

Chemical Name	RQ (lbs)/(kg)
Manganese Compounds were designated as Hazardous Air Pollutants under the Clear Air Act Amendments of 1990, and hence are listed as hazardous substances. As such, they are subject to CERCLA clean-up standards and liability. However, release reporting is not required.	None assigned

SAFE DRINKING WATER ACT - SECONDARY MAXIMUM CONTAMINANT LEVELS

Chemical Name	mg/l
Manganese	0.05

SARA EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355)

Chemical Name	TPQ (lbs)	RQ (lbs)
N/A		

SARA HAZARD CATEGORIES (40 CFR 370)

Acute       Chronic       Fire       Pressure       Reactive       None

SARA TOXIC CHEMICALS (40 CFR 372)

Chemical Name	CAS Number	%
Manganese compounds	N/A	9-11

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (CPR Section (33))

This product has been classified according to the hazard criteria of the Controlled Products Regulations, and the MSDS contains all required information.

Controlled Product; Classification: D2B       Not a Controlled Product

INVENTORY STATUS

The chemicals in this mixture are listed on the US TSCA Chemical Substance Inventory and the Canadian Domestic Substances List.

TOXIC SUBSTANCES CONTROL ACT

No specific regulations apply.

STATE REGULATIONS

None

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**16. OTHER INFORMATION**

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ABBREVIATIONS

C - Ceiling limit

LD<sub>Lo</sub> - The lowest dose that will kill a test animal within a certain exposure period.

LD<sub>50</sub> - The dose that causes death in 50% of test animals.

N/A - Not applicable

N/D - Not determined

N/E - Not established

N/K - Not known

NAERG - North American Emergency Response Guidebook

RQ - Reportable Quantity

TC<sub>Lo</sub> - The lowest concentration of a substance in air that will cause a specific toxic effect.

TPQ - Threshold Planning Quantity

PREPARATION INFORMATION

Prepared by: Tronox LLC Product Management

MSDS No:

Date Revised: N/A

Date of Issue: July 2008

Replaces: None

REVISION INFORMATION: New