

MATERIAL SAFETY DATA SHEET

Complies with ANSI Z400.1 format

HMIS Code

Health	1
Fire Hazard	0
Physical Hazard	0
Personal Protection – depends upon use of product	X

PRODUCTS: Electric Arc Furnace Dust (KO61) *Date of Preparation:* 01/01
 Cascade Steel Rolling Mills *Revised:* 04/03, 9/05, 1/08

Section 1 General Information

Chemical Name & Synonyms: Electric Arc Furnace Dust (KO61), Baghouse Dust
Chemical Family: Metal dust **Formula:** Mixture

Manufacturers Name:
 Cascade Steel Rolling Mills
 P.O. Box 687
 3200 North Highway 99W
 McMinnville, OR 97128-9399

Prepared by: DeEtta Burrows, MSPH, CIH
 Wise Steps, Inc. and Cascade Steel

Telephone Number: (503) 472-4181
Emergency same number

Section 2 Composition of Ingredients

Dust Emissions	% Weight (approximate)	OSHA PEL	ACGIH TLV
Iron (base metal)	30%-40%	10 mg/m ³	5 mg/m ³ R
Zinc	10%-20%	10 mg/m ³ – total 5 mg/m ³ – respirable	2 mg/m ³ – R 10 mg/m ³ – STEL - R
Calcium Oxide	0.1%-10%	5 mg/m ³	2 mg/m ³
Magnesium Oxide	0.1%-10%	10 mg/m ³ as total	10 mg/m ³ inhalable
Silicon	0.1%-10%	10 mg/m ³ – total as silicon 5 mg/m ³ – respirable	10 mg/m ³ inhalable
Manganese	0.1%-5%	5 mg/m ³ ceiling limit	0.2 mg/m ³
Lead	0.1%-5%	0.05 mg/m ³	0.05 mg/m ³
Copper	0.1%-1%	0.1 mg/m ³ – fume 1 mg/m ³ - dust	0.2 mg/m ³ fume 1 mg/m ³ dust
Chromium	0.1%-1%	1 mg/m ³ as Metal & Cr III 0.005 mg/m ³ as Cr VI 8-hr TWA and 0.0025 mg/m ³ as Action Limit	0.5 mg/m ³ as Metal & Cr III 0.01 mg/m ³ as insoluble Cr VI
Aluminum metal	0.1%-1%	10 mg/m ³ – dust 5 mg/m ³ - fume	1 mg/m ³ inhalable

Notations:

OSHA PEL = Federal OSHA Permissible Exposure Limit (Note in some state programs the level may be lower)
 ACGIH TLV = American Conference of Governmental Industrial Hygienist Threshold Limit Values (recommended limits)
 TWA = time weighted average
 STEL = short term exposure limit

Ceiling Limit = at no time shall exposures exceed this limit.
Total = total dust
R is Respirable = collection of respirable sized particles

Section 3 Toxicology and Health Information

Effects of Overexposure: Electric Arc Furnace Dust under normal conditions does not present an inhalation, ingestion or contact health hazard. However, operations such as blowing, sweeping, or moving the dust may result in the following effects if exposure exceeds the exposure limits. Exposures to high concentrations of metallic dusts may result in irritation of the respiratory tract and/or sensitization of the lungs and other mucous membranes. Signs and symptoms of overexposure include redness, swelling, itching, and/or irritation of skin and eyes, respiratory difficulties such as coughing, wheezing, shortness of breath, central nervous system effects, flu-like symptoms, anorexia and/or weight loss.

Acute: Exposure to metal particulates can cause eye, skin, and respiratory tract irritation and/or sensitization. Ingestion of dust may result in increased levels of lead in the body, resulting in lead poisoning. Skin contact with dust may cause irritation or sensitization, possibly leading to dermatitis.

Chronic: Excessive and repeated exposures to dust may cause:

- Allergic sensitization – dermatitis and asthma
- Lung inflammation and damage – pneumonitis, pneumonia, bronchitis, siderosis, diffuse pulmonary fibrosis
- Nasal perforation and nasal cavity damage
- Eye inflammation
- Central nervous system damage, possibly permanent
- Kidney damage
- Liver damage
- Gout – inflammation of the joints
- Lead poisoning

Target Organs: Respiratory tract and various organ systems

Route of Entry: Inhalation, skin contact, ingestion

Carcinogenicity: The carcinogenicity of this product as a whole has not been tested. Individual components and some compounds of these elemental metals may have been associated with carcinogenicity by NTP and IARC. Possible trace (much less than 0.1% by weight) elements known by the state to cause cancer – arsenic (inorganic), hexavalent chromium, nickel, cadmium, lead

Section 4 Emergency First Aid

Inhalation: Remove from area to fresh air. Seek medical attention if breathing becomes difficult.

Eye Contact: Immediately flush eyes with copious amounts of water for at least 15 minutes. Assure adequate flushing of the eyes by separating the eyelids with fingers. Seek emergency medical care if irritation persists.

Skin Contact: Wash with soap and rinse with copious amounts of water. Remove and wash contaminated clothing. If persistent rash or irritation occurs, seek medical attention.

Ingestion: Get medical attention immediately.

Section 5 Fire and Explosion Hazard

Flash point (Method Used) Not Applicable	Flammable limits	LEL Not Applicable	UEL Not Applicable
--	-------------------------	------------------------------	------------------------------

Extinguishing Media: Not flammable metals, all oxidized.

Special Fire Fighting Procedures

As with all fires, fire fighters should wear full protective gear including supplied air respirators.

Unusual Fire & Explosion: None

Section 6 Accidental Release Measures

Steps to be Taken in Case Material is Released or Spilled: Do not touch or walk through spilled material. Compressed air should not be used to clean up spills. During cleanup, skin and eye contact and inhalation of dust should be avoided as much as possible. Provide local exhaust or dilution ventilation as required. Appropriate PPE should be worn if exposure limits are exceeded. Collect material in compatible and appropriately labeled containers. For small dry spills, place material into clean dry container with a clean shovel, and cover loosely.

Waste Disposal Method: Follow safe waste disposal guidelines in accordance with federal state and local regulations. National or regional provisions may also be in force.

Section 7 Storage and Handling

Storage Precautions: Keep away from incompatible materials.

Handling Precautions: Avoid breathing of and contact with dusts.

Section 8 Exposure Controls & Personal Protection

Exposure to this material can be controlled in many ways. The measure appropriate for a particular worksite depends on how this material is used and on the extent of exposure. This general information can be used to help develop specific control measures. Ensure that the control systems are properly designed and maintained. Comply with occupational, environmental, fire, and other applicable regulations.

Required Ventilation: Local and/or general exhaust ventilation should be used to keep worker exposures below applicable exposure limits.

Respiratory Protection: Use a NIOSH/MSHA approved dust/fume respirator if there is overexposure to fume or particulate.

Protective Gloves: Suitable for protection against physical injury and skin contact during handling.

Eye Protection: Safety glasses or goggles when there are flying particles or high levels of airborne dust or fume.

Protective Clothing: Coveralls, boots, and/or other protective clothing is recommended to prevent skin contact.

Section 9 Physical & Chemical Properties

Physical State: Solid

Color: Brown/Gray

Odor: Odorless

Melting Point: Not applicable

Vapor Pressure (mm Hg, @ 68°F): Negligible

Specific Gravity (H₂O =1): Heavier than H₂O approximately 5

Evaporation Rate: Not applicable

Solubility in Water: Insoluble

Freezing Point: Not applicable

Section 10 Stability and Reactivity

Stability: Stable under normal conditions.

Incompatible: Acids, bases or strong oxidizing agents.

Hazardous Decomposition Products: Extreme heat from fire may produce toxic or irritating airborne particulate, including metal and metallic oxide fumes. Reaction of some metals with water, steam, acids, etc. can evolve hydrogen, which is a highly dangerous fire and explosion hazard.

Conditions to Avoid: Contact with incompatible materials. Avoid creating finely divided, concentrated airborne particulates in the presence of ignition sources.

Section 11 Toxicological Information

Data not available for the mixture.

Iron: Excessive exposure of eyes to airborne iron dust can cause conjunctivitis, choroiditis, and retinitis. Chronic inhalation of excessive concentrations of iron oxide fumes or dusts may result in development of a benign pneumoconiosis, called siderosis, which is observable via x-ray. Inhalation of excessive concentrations of iron oxide may enhance the risk of lung cancer development in workers exposed to pulmonary carcinogens. LD50 (oral, rat) – 30 gm/kg.

Zinc: High airborne concentrations of dust may cause temporary irritation of the nose and throat. Metal fume fever can be caused by inhalation of zinc oxide fume formed in air from welding or heating zinc metal. Zinc compounds have relatively low toxicity by ingestion.

Calcium oxide: Industrial experience has shown calcium oxide to be very irritating to mucous membranes and moist skin as a result of local liberation of heat and dehydration of tissues when in contact with dust. Inflammation of the respiratory passages and ulceration and perforation of the nasal septum have been reported. Inhalation of lime dust results in eye and skin irritation.

Magnesium: HUMAN EXPOSURE STUDIES/ Examination of 95 workers exposed to an unspecified concentration of MgO dust revealed slight irritation of the eyes and nose. Conjunctivitis, nasal discharge, and coughing up discolored sputum /was cited/ after industrial exposures, but even when such exposures doubled serum magnesium as compared to normal concentrations, no systematic effects were noted among these workers; however, serum calcium concentrations were elevated. Inhalation of

magnesium oxide produced a fever reaction and a leukocytosis, similar to metal fume fever, in the exposed subjects analogous to that caused by inhalation of zinc oxide.

Section 11 Toxicological Information - continued

Silicon: Elemental silicon is an inert material which appears to lack the property of causing fibrosis in lung tissue. Silicon dust has little adverse affect on lungs and does not appear to produce significant organic disease or toxic effects when exposures are below the permissible exposure limit. Silicon may cause chronic respiratory effects.

Manganese: Chronic manganese poisoning may result from prolonged inhalation of manganese dust and fumes. The central nervous system is the chief site of damage from the disease, which may result permanent disability. Symptoms include languor, sleepiness, weakness, emotional disturbances, spastic gait, recurring leg cramps, and paralysis. LD50 (oral, rat) – 30 mg/mkg.

Lead: Lead toxicity causes hematological, gastrointestinal, and neurological dysfunction in adults and children. Symptoms are usually noted with blood lead greater than 1.93 umol/L. Severe or prolonged exposure may also cause chronic nephropathy, hypertension, and reproductive impairment. Lead inhibits enzymes; alters cellular calcium metabolism; stimulates synthesis of binding proteins in kidney, brain, and bone; and slows nerve conduction. Less severe exposure to lead, designated by blood lead levels of 0.48-0.96 umol/L, has been implicated in poor pregnancy outcomes, impaired neurobehavioral development, reduced stature in young children, and higher blood pressure in adults. Chronic exposure can lead to irreversible vascular sclerosis, tubular cell atrophy, interstitial fibrosis, and glomerular sclerosis. Severe toxicity can cause sterility, abortion, and neonatal mortality and morbidity. An experimental teratogen. Experimental reproductive effects. Human mutation data reported. Very heavy intoxication can sometimes be detected by formation of a dark line on the gum margins, the so-called lead line. Questionable carcinogen

Copper: Industrial exposure to copper fumes, dusts, or mists may result in metal fume fever with atrophic changes in nasal mucous membranes. Chronic copper poisoning results in Wilson's Disease, characterized by a hepatic cirrhosis, brain damage, demyelination, renal disease, and copper deposition in the cornea.

Chromium: The health hazards associated with exposure to chromium are dependent upon its oxidation state. The metal form (chromium as it exists in this product) is of low toxicity; however, Hexavalent Chromium (Cr VI) can be found in welding or high temperature decomposition by-products. Cr VI is listed as Confirmed Human Carcinogen by ACGIH, IARC Group 1 and OSHA

Aluminum: Inhalation of finely divided aluminum and aluminum oxide powder has been reported as a cause of pulmonary fibrosis and lung damage.

Section 12 Ecological Information

This material, based on its components, will be hazardous to fish, animals, plants and the environment if released, the degree of which would depend on the particle size and quantity released. This material may persist in the environment for long periods, based upon its corrosion resistant, insoluble, and non-biodegradable properties. As with all foreign substances do not allow to enter the storm drainage systems.

Section 13 Waste Disposal

Product dusts are classified as a hazardous waste. Follow safe solid waste disposal guidelines in accordance with federal, state and local regulations. For proper disposal, an assessment must be completed to determine the proper and permissible waste management options permissible under applicable rules, regulations, and/or laws governing your location.

Section 14 Transportation Information

Hazardous materials description/proper shipping name: RQ, Hazardous Waste, solid, N.O.S.

Hazard Class: Class 9 Packaging iii

Product Identification No.: NA 3077

Section 15 Regulatory Information

SARA Title III Section 302 Extremely hazardous substances: No components are listed as extremely hazardous substances.

SARA Title III Section 313 Reportable Substances: Manganese, lead, zinc, and chromium are subject to reporting requirements. All other components are below the de minimis levels.

CERCLA Hazardous Substances: Nickel (threshold quantity 100 lbs.), chromium (threshold 5000 lbs.), copper (threshold 5000 lbs.). CERCLA reporting only if diameter of particles released is less than 100 micrometers.

Pennsylvania R-T-K List: Listed components (greater than 0.1% by weight) – Aluminum (E), Manganese (E), Silicon, Chromium (E,S). E-environmental hazard, S-special hazardous substance.

New Jersey R-T-K Environmental Hazardous substance list: Listed components – aluminum (as dust and fume), chromium, copper, lead, manganese, and nickel.

California Proposition 65: Listed possible trace (less than 0.1% by weight) elements known by the State to cause cancer or be developmental risks. This trace metals may be present in the furnace dust which includes: antimony, arsenic, beryllium, cadmium, lead, nickel, carbon as carbon black, hexavalent chromium.

Section 16 Other Information

HMIS Hazard Rating: *Health – 1 Flammability – 0 Physical Hazard - 0* Personal Protective Equipment – X (PPE depends upon use of product) (0- Insignificant, 1- Slight, 2- Moderate, 3- High, 4- Extreme)

NFPA Rating (for solid formed product): Health – 1 Flammability – 0 Reactivity – 0

References

- 1) TLV's Threshold Limit Values and Biological Exposure Indices for 2007. American Conference of Governmental Industrial Hygienists, 2007.
- 2) Air Contaminants, OSHA regulations CFR 29 1910.1000
- 3) Toxnet, on-line current publications
- 4) Material Safety Data Sheets and Cheminfo, Canadian Centre for Occupational Health and Safety
- 5) SAX'S Dangerous Properties of Industrial Materials

Cascade Steel Rolling Mills, Inc. believes the information and recommendations contained herein to be accurate and reliable. However, no liability whatsoever is assumed for the accuracy or completeness of the information contained herein. Final determination of occupational safety and health and environmental compliance and suitability of this material is the sole responsibility of the user. All materials may present unknown health hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist. Cascade Steel Rolling Mills, Inc. assumes no obligation or liability for such information and recommendations and does not guarantee results from use of product described or other information contained herein