

Material Safety Data Sheet

Bekaert Corporation
1395 South Marietta Parkway
Bldg. 500, Suite 100
Marietta, Georgia 30067

Phone: 770-421-8520
Prepared: 11/08/04
Updated: 09/16/08

MSDS Date: 11/08/04
Product Name: Non-Galvanized and Galvanized Steel Wire and Wire Products (All Grades)
Manufacturer: Bekaert Corporation

I. Product and Company Description

Bekaert Corporation
1881 Bekaert Drive
Van Buren, AR 72956-6801

For Product Information/Emergency:

479-474-5211

Chemical Name or Synonym:

Bezinal ® Wire	Barbed Wire	Dramix ® (Loose & Glued)
Spring Wire	Shape Wire	Strand & Flooded Strand
Galvanized Wire	Field Fence	Low/High Carbon Wire
Welded Mesh	Industrial Steel Wire	Plastic Coated Wire
Oil Tempered Wire	Armapipe ®	Music Wire
Chrome/Silicon Wire	Wire Rope	Standard Alloy Carbon Steel Wire

II. Chemical Composition

Component	CAS #	% Composition
Iron	7439-89-6	Balance
Zinc	7440-66-6	0-8.0
Manganese	7439-96-5	0-1.00
Nickel	7440-02-0	0-0.10
Lead	7439-92-1	0-0.10

III. Hazards Identification

Potential Health Effects:

Note: Steel products in their solid state under normal conditions, do not present an inhalation, ingestion or skin hazard. However, operations resulting in fume or particulate formation such as welding, sawing, brazing, grinding, and machining may present health hazards. Molten steel also is hazardous.

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Acute Eye:

Dusts or particulates may cause mechanical irritation including pain, tearing, and redness. Scratching of the cornea can occur if eye is rubbed. Fumes may be irritating. Contact with the heated material may cause thermal burns.

Acute Skin:

Dusts or particulates may cause mechanical irritation due to abrasion. Coated steel may cause skin irritation in sensitive individuals (See section 16 for additional information). Some components in this product are capable of causing an allergic reaction, possibly resulting in burning, itching, and skin eruptions. Contact with heated material may cause thermal burns.

Acute Inhalation:

Dusts may cause irritation of the nose, throat, and lungs. Excessive inhalation of metallic fumes and dusts may result in metal fume fever, an influenza-like illness. It is characterized by a sweet or metallic taste in the mouth, accompanied by dryness and irritation of the throat, cough, shortness of breath, pulmonary edema, general malaise, weakness, fatigue, muscle and joint pains, blurred vision, fever and chills. Typical symptoms last from 12 to 48 hours.

Acute Ingestion:

Not expected to be acutely toxic via ingestion based on the physical and chemical properties of the product. Swallowing of excessive amounts of the dust may cause irritation, nausea, and diarrhea.

Health Effects of Ingredients

Iron: A benign lung condition known as siderosis can result during long-term exposure to iron oxide fumes or dusts. Iron oxide is the result of subjecting iron and alloys to high temperature in the presence of oxygen as in a welding operation.

Zinc: Subjecting zinc or alloys containing zinc to high temperatures in the presence of oxygen (such as occurs during welding) will cause the formation of zinc oxide. Exposure to zinc oxide fumes or dusts can result in a flu-like illness called metal fume fever. Early symptoms may include a sweet or metallic taste in the mouth, dryness and irritation of the throat and coughing. These symptoms may progress to shortness of breath, headaches, fever, chills, muscle aches, nausea, vomiting, weakness, fatigue and profuse sweating. The attack may last 6 to 48 hours and is more likely to occur after a period away from the job.

Manganese dust or fumes: Chronic overexposure can cause inflammation of the lung tissue, scarring of the lungs (pulmonary fibrosis), central nervous system damage, secondary Parkinson's disease and reproductive harm in males. Early symptoms may include weakness in lower extremities, sleepiness, salivation, nervousness, and apathy. In more advanced stages, severe muscular incoordination, impaired speech, spastic walking, mask-like facial expression, and uncontrollable laughter may occur. Manganese fumes have also been reported to result in metal fume fever, a flu-like syndrome with symptoms such as dizziness, chills, fever, headache, and nausea. An increased incidence of pneumonia, bronchitis, and pneumonitis has been reported in some worker populations exposed to manganese. Animal studies indicate that manganese exposure may increase susceptibility to bacterial and viral infections.

Nickel: Nickel fumes and dusts are respiratory irritants and may cause a severe pneumonitis. Skin contact with nickel and its compounds may cause an allergic dermatitis. The resulting skin rash is often referred to as "nickel itch." Nickel and its compounds may also produce eye irritation, particularly on the

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Nickel (continued): inner surfaces of the eyelids (i.e., the conjunctive). Animal and/or epidemiology studies have linked nickel and certain nickel compounds to an increased incidence of cancer of the lungs and nasal passages.

III. Hazards Identification

Group 1: The agent is carcinogenic to humans. There is sufficient evidence that a causal relationship existed between exposure to the agent and human cancer.
Group 2B: The agent is possibly carcinogenic to humans. Generally includes agents for which there is limited evidence in the absence of sufficient evidence in experimental animals.

Medical Conditions Aggravated By Exposure to the Product
Asthma, chronic lung disease, and skin rashes.

Possible Residual Lead Effects: Lead intoxication due to inhalation may result from chronic overexposure with symptoms of anemia, insomnia, weakness, constipation, and gastrointestinal disorders. Ingestion may cause nausea and abdominal pain. Lead can aggravate diseases of the blood and blood-forming organs, kidneys, nervous, and possibly reproductive systems. Chronic toxicity results in the potential injury to developing fetus and possible effects on reproduction. Other conditions may include depression of blood-forming activity, kidney disease, and nervous system changes.

IV. First Aid Measures

First Aid Measures for Accidental:

Eye Exposure:

Flush eyes with plenty of water or saline for at least 15 minutes. SEEK MEDICAL ATTENTION.

Skin Exposure:

Wash skin with soap and water for at least 15 minutes. If irritation develops, SEEK MEDICAL ATTENTION.

Inhalation:

Move to fresh air. If not breathing, administer artificial respiration. If breathing is difficult, give oxygen. SEEK MEDICAL ATTENTION.

Ingestion:

Never give fluids or induce vomiting if the victim is unconscious or having convulsions. SEEK MEDICAL ATTENTION.

V. Fire Fighting Measures

Fire Hazard Data:

Flammable Properties

This product does not present fire or explosion hazards as shipped. Small chips, turnings, dust, and fines from processing may be readily ignitable.

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Fire/Explosion

May be potential hazard under the following conditions:

Dust or fines dispersed in the air can be explosive. Even a minor dust cloud can explode violently. Chips, dust or fines in contact with water can generate flammable/explosive hydrogen gas. Hydrogen gas could present an explosion hazard in confined or poorly ventilated spaces. Fines and dust in contact with certain metal oxides (e.g., rust), molten metal in contact with water/moisture or other metal oxides (e.g., rust) and moisture entrapped by molten metal can be explosive.

Extinguishing Media:

Use Class D extinguishing agents on dusts, fines, or molten metal. Use coarse water spray on chips and turnings.

Special Fire Fighting Procedures:

Fire fighters should wear NIOSH approved, positive pressure, self-contained breathing apparatus, and full protective clothing when appropriate. Avoid breathing metal oxide fumes, which may cause metal fume fever.

Unusual Fire and Explosion Hazards:

When heated beyond melting point, metal vapor burns in the air with a bright greenish-yellow flame to produce zinc oxide fumes.

VI. Accidental Release Measures

Cleanup and Disposal of Spill:

Avoid inhalation, eye, or skin contact of dusts by using appropriate precautions outlined in this MSDS (see section 8). Fine turnings and small chips should be swept or vacuumed and placed into appropriate disposable containers. Keep fine dust or powder away from sources of ignition. Scrap should be reclaimed for recycling. Prevent materials from entering drains, sewers, or waterways. Discard any product, residue, disposable container, or liner in full compliance with federal, state, and local regulations.

VII. Handling and Storage

Handling/Storage:

Product should be kept dry. Avoid generating dust. Avoid contact with sharp edges or heated metal. PACKAGES OF THIS MATERIAL MAY CONTAIN EXTREME INTERNAL STRESSES AND STORED MECHANICAL ENERGY. USE STANDARD INDUSTRY PRACTICES AND/OR CONSULT YOUR COMPANY'S SAFETY DEPARTMENT FOR PROPER PROCEDURES FOR HANDLING, OPENING, AND CUTTING.

Requirements for Processes, Which Generate Dusts or Fumes

If processing of these products includes operations where dust or extremely fine particulate is generated, obtain and follow the safety procedures and equipment guides contained in National Fire Protection Association (NFPA) brochure listed in Section 16. Cover and reseal partially empty containers. Use non-sparking handling equipment. Provide grounding and bonding where necessary to prevent accumulation of static charges during dust handling and transfer operations (See Section 16). Local ventilation and vacuum systems must be designed to handle explosive dusts. Dry vacuums and electrostatic precipitators must not be used. Avoid all ignition sources. Good housekeeping practices must be maintained.

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VIII. Exposure Controls/Personal Protection

Engineering Controls

Use with adequate explosion-proof ventilation to meet the limits listed in Section 8.

Personal Protective Equipment

Respiratory Protection

Use NIOSH-approved respiratory protection as specified by an Industrial Hygienist or other qualified professional if concentrations exceed the limits listed in Section 8.

Eye Protection

Wear safety glasses/goggles to avoid eye contact.

Skin Protection

Wear impervious gloves to avoid repeated or prolonged skin contact with residual oils and to avoid any skin injury.

General

Personnel who handle and work with **molten metal** should utilize primary protective clothing like face shields, fire resistant tapper's jackets, leggings, spats, and similar equipment to prevent burn injuries. In addition to primary protection, secondary or day-to-day work clothing that is fire resistant and sheds metal splash is recommended for use with molten metal.

Minimize breathing **oil vapors and mist** from those products coated with oil. Remove oil-contaminated clothing; launder or dry-clean before reuse. Remove oil contaminated shoes and thoroughly clean and dry before reuse. Cleanse skin thoroughly after contact, before breaks and meals, and at the end of the work period. Oil coating is readily removed from skin with waterless hand cleaners followed by a thorough washing with soap and water.

Component	Exposure Limits		
	ACGIH	NIOSH	OSHA-PELs
Iron	ND	ND	ND
Manganese	TWA 0.2 mg/m ³	ND	Ceiling 5 mg/m ³
Nickel	TWA 1.5 mg/m ³	ND	1 mg/m ³
Zinc Oxide	TWA 10 mg/m ³ ; (Inhalable particulate matter containing no asbestos and <1% crystalline silica) TWA 5 mg/m ³ ; STEL 10mg/m ³	(fume): 5 mg/m ³ TWA, 10 mg/m ³ STEL REL (total dust): 5 mg/m ³ TWA, 15 mg/m ³ TWA ceiling (15-min)	Total dust: 15 mg/m ³ ; Respirable fraction: 5.0 mg/m ³
Zinc	ND	ND	ND
Lead	TWA 0.05 mg/m ³	TWA 0.050 mg/m ³ : less than 0.1 mg Pb/m ³ TWA;	ND

IX. Physical and Chemical Properties

Physical State: Solid

Appearance: Gray Metal

Boiling Point: Not applicable

Solubility in Water: Negligible

pH Level: not applicable

Melting Point: 2800°F / 621.37 °F lead

Vapor Density: Not Applicable

Odor: None

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X. Stability and Reactivity

Stability

Stable under normal conditions of use, storage, and transportation as shipped.

Conditions to Avoid

Steel at temperatures above the melting point may liberate fumes containing oxides of iron and alloying elements. Avoid generation of airborne fume.

Hazardous Polymerization

Will not occur

Incompatibility/Materials to Avoid

Reacts with strong acids to form hydrogen gas. Hydrogen peroxide will react violently in contact with lead. (Water reacts violently with molten metals).

Hazardous Decomposition Products

Fumes and certain noxious gases, such as CO, may be produced from welding or burning operations. Lead oxide fumes can result if temperatures exceed the melting point for lead, 621.37 °F.

XI. Toxicological Information

Health Effects of Ingredients

A: General Product Information

The primary component of this product is iron. Long-term exposure to iron dusts or fumes can result in a condition called siderosis, which is considered a benign pneumoconiosis. Symptoms may include chronic bronchitis, emphysema, and shortness of breath upon exertion. Penetration of iron particles in the skin or eye may cause an exogenous or ocular siderosis, which may be characterized by a red-brown pigmentation of the effected area. Ingestion overexposure to iron may affect the gastrointestinal, nervous, and hematopoietic system and the liver. Iron and steel founding, but not iron oxide, has been listed as potentially carcinogenic by IARC.

When this product is welded, fumes are generated. Welding fumes may be different in composition from the original welding product, with the chief component being ordinary oxides of the metal being welded. Chronic health effects (including cancer) have been associated with the fumes and dusts of individual component metals (see above), and welding fumes as a general category have been listed by IARC as a carcinogen (Group B). There is also limited evidence that welding fumes may cause adverse reproductive and fetal effects. Evidence is stronger where welding materials contain known reproductive toxins, e.g., lead which may be present in the coating material of this product.

Breathing fumes or dusts of this product may result in metal fume fever, which is an illness produced by inhaling metal oxides. These oxides are produced by heating various metals including manganese, zinc and iron. Prolonged exposure to manganese dusts or fumes is associated with "manganism," a Parkinson-like syndrome characterized by a variety of neurological symptoms including muscle spasms, gait disturbances, tremors, and psychoses.

B. Component Analysis – LD50/LC50

Manganese (7439-96-5)

Oral LD50 Rat: 9gm/kg

Carcinogenicity

A. General Product Information

No information available for product.

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XII. Ecological Information

A: General Product Information

No information available for product.

B: Component Analysis – Ecotoxicity – Aquatic Toxicity

No ecotoxicity data was found for this product's components.

Environmental Fate

No information found for product.

XIII. Disposal Considerations

Disposal Instructions

Reuse or recycle material whenever possible. Material may be disposed of at an industrial landfill.

US EPA Waste Number & Descriptions

A. General Product Information

RCRA Status: Must be determined at time material is disposed. If material is disposed as waste, it must be characterized under RCRA according to 40 CFR, Part 261, or state equivalent in the U.S.

B. Component Waste Numbers

RCRA waste codes other than described under Section A may apply depending on use of product. Refer to 40 CFR 261 or state equivalent in the U.S.

XIV. Transportation Information

US Department of Transportation Shipping Name:

Not regulated

XV. Regulatory Information

US Federal Regulations

Component Analysis

This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65) and/or CERCLA (40 CFR 302.4)

Manganese (7439-96-5)

SARA 313: form R reporting required for 1.0% de minimis concentration

Nickel (7440-47-3)

SARA 313: form R reporting required for 0.1% de minimis concentration

Zinc (7440-66-6)

SARA 313: form R reporting required for 1.0% de minimis concentration

Lead (7439-92-1)

SARA 313: form R reporting required for 100 pound processing, manufacturing, and otherwise used threshold

SARA 311/312 Physical and Health Hazard Categories:

Immediate (acute) Health Hazard: Yes, if particulates/fumes generated during processing.

Delayed (chronic) Health Hazard: Yes, if particulates/fumes generated during processing.

Fire Hazard: No

Sudden Release of Pressure: No

Reactive: Yes, if molten

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State Regulations

Component Analysis – State

The following components appear on one or more of the following state hazardous substances list:

Component	CA	MA	MI	NJ	PA
Iron	No	No	No	No	No
Manganese	No	Yes	No	Yes	Yes
Nickel	No	Yes	Yes	Yes	Yes
Zinc	No	Yes	Yes	Yes	Yes
Lead	Yes	Yes	Yes	Yes	Yes

The following statement is provided under the California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): WARNING! This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Other Regulations

A: General Product Information

In reference to Title VI of the Clean Air Act of 1990, this material does not contain nor was it manufactured using ozone-depleting chemicals.

B: Components Analysis – WHMIS IDL

The following components are identified under the Canadian Hazardous Products Act Ingredient Disclosure List:

Component CAS # Minimum Concentration

Manganese 7439-96-5 1% item 974(1077)

XVI.

Other Information

- ? NFPA 70, Standard for National Electric Code (Electrical Equipment, Grounding and Bonding)
- ? NFPA 77, Standard for Static Electricity
- ? Guide to Occupational Exposure Values-1999, Compiled by the American Conference of Governmental Industrial Hygienists (ACGIH).
- ? Documentation of the Threshold Limit Values and Biological Exposure Indices, Sixth Edition, 1991, Compiled by the American Conference of Governmental Industrial Hygienists, Inc. (ACGIH).
- ? NIOSH Pocket Guide to Chemical Hazards, U.S. Department of Health and Human Services, June 1994
- ? Dangerous Properties of Industrial Materials, Sax, N.Irving, Van Nostrand Reinhold Co., Inc. 1984.
- ? Patty's Industrial Hygiene and Toxicology: Volume II: 4th ed., 1994, Patty, F. A.; edited by Clayton, G.D.and Clayton, F.E.: New York: John Wiley & Sons, Inc.
- ? TOMES CPS™, MICROMEDEX, Inc., 1999

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Key Legend Information:

ACGIH American Conference of Governmental Industrial Hygienists	NIOSH National Institute for Occupational Safety and Health
AICS Australian Inventory of Chemical Substances	NTP National Toxicology Program
CAS Chemical Abstract Service	OEL Occupational Exposure Limit
CERCLA Comprehensive Environmental Response Compensation, and Liability Act	OSHA Occupational Safety and Health Administration
CFR Code of Federal Regulation	PEL Permissible Exposure Limit
CPR Cardio-Pulmonary Resuscitation	RCRA Resource Conservation and Recovery Act
DOT Department of Transportation	SARA Superfund Amendments and Reauthorization Act
DSL Domestic Substance List (Canada)	STEL Short Term Exposure Limit
EINECS European Inventory of Existing Commercial Chemical Substance	TCLP Toxic Chemicals Leachate Program
EPA Environmental Protection Act	TDG Transportation of Dangerous Goods
IARC International Agency for Research on Cancer	TSCA Toxic Substance Control Act
LC ₅₀ Lethal concentration (50 percent kill)	TWA Time Weighted Average
LC ₁₀ Lowest published lethal concentration	UFL Upper Flammable Limit
LD ₅₀ Lethal dose (50 percent kill)	atm atmosphere
LD ₁₀ Lowest published lethal dose	cm centimeter
LFL Lower Flammable Limit	g, gm gram
	in inch
MITI Ministry of International Trade & Industry	kg kilogram
NFPA National Fire Protection Association	lb pound
m Meter	ppb parts per billion
mg milligram	ppm parts per million
ml, mL milliliter	psia pounds per square inch absolute
mm millimeter	u micron
n.o.s. not otherwise specified	ug microgram

The information contained herein is based on the data available to us and is believed to be correct. However Bekaert Corporation makes no warranty, expressed or implied regarding the accuracy of this data or the results to be obtained from the use thereof.