



Material Safety Data Sheet

SECTION I – COMPANY AND PRODUCT IDENTIFICATION

Issue Date: 07/16/12

Company: Wear –Concepts Inc.
2845 E. Heartland Drive
Liberty, MO 64068

Telephone Number: 816-587-1923
Emergency Telephone Number: 800-424-9300
Internet: www.wearcon.com

Product Name: Wear-Con Inertia Tactical Wear Plate – Includes all sheet plate, strip products

SECTION II – INGREDIENTS/HAZARD INFORMATION

COMPONENT		CAS NUMBER	Wt. % (2)	OSHA PEL (mg/m3)	ACGIH TLV
Aluminum (Al)	(dust, fume)	7429-90-5	0.01-0.05	15	10, 5
Aluminum Oxide	(fume)			5	-
	(fume)	1344-28-1		Not established	10
Carbon (C)	(as carbon black)	1333-86-4	0.03-2.0	3.5	3.5
Carbon Monoxide		630-08-0		50 ppm, 55	25 ppm, 29
Carbon Dioxide		124-38-9		5000 ppm, 9000	5000 ppm, 9000
Chromium (Cr)	(metals)	7440-47-3	10-27	1	0.5
	(Cr II compounds)			0.5	-
	(Cr III compounds)			0.5	0.5
	(Cr VI compds-soluble)			5.0 ug/m3	0.05
	(Cr VI compds-insoluble)			5.0 ug/m3	0.01
Cobalt (Co)	(metal, dust & fume)	7440-48-4	0.01-0.75	0.1	0.02
Copper (Cu)	(dust & mist-inhalable particulate)	7440-50-8	0.18-4.5	1	(1)
	(fume & respirable fraction)			0.1	(0.2)
Iron (Fe)		7439-89-6	Balance	Not established	Not established
Iron oxide	(dust & fume)	1309-37-1		10	5
Manganese (Mn)	(compounds and fume)	7439-96-5	2-10	5 ceiling	0.2
Molybdenum (Mo)	(soluble compounds)	7439-98-7	0.04-5	5	5
	(insoluble compounds/dust)			15	10
Nickel (Ni)	(metal)	7440-02-0	.012-34	1	1.5
	(soluble compounds)			1	0.1
	(insoluble compounds)			1	0.2
Nitrogen (N)		7727-37-9	0.01-0.06	Not established	Not established
Nitric oxide		10102-43-9		25 ppm, 30	25 ppm, 31
Nitrogen dioxide		10102-44-0		5 ppm, 9 ceiling	3 ppm, 5.6
Oil mist, mineral		8012-95-1		5	5
Oil mist, mineral	Containing a total of 15 PAH's listed as carcinogens by the NTP			Not established	0.0005
Oxygen (O)		7782-44-7		Not established	Not established
Ozone		10028-15-6		0.1 ppm, 0.2	0.05 ppm ceiling
Phosphorous (P)	(yellow)	7723-14-0	0.01-0.06	0.1	0.1
Selenium (Se)	(and compounds)	7782-49-2	0.01-0.3	0.2	0.2
Silicon (Si)	(dust and fume)	7440-21-3	0.15-2.0	15	10
	(respirable fraction)			5	Not established
Tantalum (Ta)	(metal & oxide dusts)	1314-61-0	0.1-1.1	5	5

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Titanium (Ti)		7440-32-6	0.01-0.70	Not established	
Titanium dioxide	(total dust)	13463-67-7		15	10
Welding fumes				Not established	5

Note: The above listing is a summary of elements used in alloying stainless steels, Various grades will contain different combinations of these elements. Other trace elements may also be present in minute amounts. Values shown are applicable to component elements.

Stainless steel products as provided contain chromium metal in the zero valence state. As such, chromium metal does not present any unusual health hazard. However, welding, torch cutting, brazing, or perhaps grinding of chromium metal in stainless steel may generate airborne concentration of hexavalent chromium.

SECTION III – PHYSICAL AND CHEMICAL PROPERTIES

Material is ((normal condition): Solid
Melting Point (base metal): 2400-2800F
Boiling Point: N/A
Solubility in Water: N/A
Specific Gravity: -8

Appearance and Color: Silver-metallic, odorless
Vapor Pressure: N/A
Vapor Density: N/A
Evaporation Rate (butyl acetate=1): N/A

SECTION IV – FIRE-FIGHTING MEASURES

Flash Point (method used): N/A **Flammable Limits:** N/A **LEL:** N/A **UEL:** N/A
Extinguishing Media: Dry powdered dolomite, dry sand or dry graphite; DO NOT USE water on molten metal.
Special Fire Fighting Procedures: Use self-contained NIOSH breathing apparatus in pressure and demand mode.
Unusual Fire and Explosion Hazards: DO NOT USE water on molten metal. Use coarse water spray on chips, turning, etc. DO NOT USE halogenated extinguishing agents on small chips or fines.
Additional Information: Arc or spark generated when welding or burning could be a source of ignition for combustion and flammable materials. Dust clouds may be explosive; prevent formation. Molten aluminum may also react violently with rust and certain metal oxides (i.e. Cu, Fe, Pb)

SECTION V – STABILITY AND REACTIVITY

Stability: Stable
Conditions of Reactivity: Make certain any material to be re-melted is free of moisture.
Incompatibility: Avoid halogenated acids and solvents, bromates, iodates, aluminum nitrate
Hazardous Decomposition or Byproducts: Metallic dust or fumes may be produced during welding, burning, grinding, and possible machining. Refer to ANSI Z49.1.
Hazardous Polymerization: N/A
Conditions to Avoid: Aluminum particles coming into contact with copper, lead or iron oxides can react vigorously if source of ignition or intense heat.

SECTION VI – HEALTH HAZARD DATA

Primary Routes of Entry: skin, eye contact and inhalation.
Acute: Excess exposure to all metallic fumes and dusts may result in irritation of eyes nose and throat. Also high concentrations of fumes and dust of iron-oxide, manganese and copper may result in metal fume fever.
Chronic: Chronic and prolonged inhalation of high concentrations of fumes or dust of the following elements may lead to the conditions listed in the following elements:

Aluminum: May initiate fibrotic changes to lung tissue, irritation of the eyes, nose and throat. Particles deposited in the eye may cause irreversible tissue damage of the cornea. Al salts may cause dermatitis, eczema, conjunctivitis and irritation of the mucus membranes of the upper respiratory tract. Long term inhalation exposure to Al dusts or fumes has been associated with a fibrotic lung condition known as Shaver’s Disease. Al dust/fines and fumes are a low health risk by inhalation. For standard operations

(milling, cutting, grinding), aluminum dust should be treated as a nuisance dust as defined by the ACGIH. Welding aluminum, plasma arc cutting, and arc spray metalizing can generate ozone. Excessive exposure to aluminum fume and dust has been associated lung disease, but this effect is probably due to simultaneous silica exposure.

Carbon: Elemental carbon, as it exists in this product, is of very low toxicity; no chronic debilitating symptoms indicated.

Chromium: Cr fumes and dust can cause sensitization dermatitis, inflammation and/or ulceration of upper respiratory tract, lesions of the skin and mucus membranes, and possible cancer of the nasal passages or lungs-bronchogenic carcinoma.

Hexavalent Chromium (Chrome VI): Chrome VI can cause asthma, kidney damage, primary irritant dermatitis, sensitization dermatitis, skin ulceration, and pulmonary edema (fluid in the lungs). Chronic inhalation or overexposure has been associated with lung, nasal, and gastrointestinal cancer. Hexavalent chromium is listed as carcinogenic to humans by IARC. Chromium and some of its compounds are listed as carcinogenic by the NTP.

Cobalt: Inhalation of Co dust may cause asthma like disease with cough and dyspnea, respiratory tract irritation, and hyper sensitization dermatitis. Chronic overexposure to Co dust and fume may result in polythemia, hyperplasia of bone marrow and thyroid gland, pericardial effusion and damage to pancreas alpha cells. Animal studies have shown that particulate is an acutely irritating substance and industrial exposures, possible combined with small amounts of silica are reported capable of producing serious pneumoconiosis which is initially of an insidious nature.

Copper: No chronic debilitating symptoms indicated. Inhalation of Cu dusts, fumes and mists may cause irritation of the eyes, nose and throat and a flu-like illness called metal fume fever. Early symptoms of metal fume fever include a metallic or sweet taste in the mouth, dryness and irritation of the throat and coughing. These symptoms may progress to shortness of breath, headache, fever, chills, muscle aches, nausea, vomiting, weakness, fatigue and profuse sweating. The attack may last 6-48 hours and is more likely to occur after a period away from the job. Chronic overexposure to copper fumes may result in blood disorders (anemia). Repeated or prolonged exposure to Cu fumes may cause discoloration of hair, hands, and soles of the feet.

Iron: No chronic debilitating symptoms indicated. Subjecting Fe and alloys containing Fe to high temperatures (such as occurs during welding) will cause the formation of iron oxide. High exposure to iron oxide dust or fumes can cause x-ray changes (siderosis or iron pigmentation) in the lungs as a result of long term exposure. Siderosis is a benign condition and is not associated with pulmonary fibrosis (scarring of the lung). Ingestion of high levels of iron oxide can cause gastrointestinal irritation, bleeding and systemic toxicity.

Lead: Lead is an accumulated poison. Inhalation effects of exposure to fumes and or dust of inorganic lead may not develop quickly. Symptoms may include decreased physical fitness, fatigue, sleep disturbance, headache, aching bones and muscles, constipation, abdominal pains and decreasing appetite. The effects are reversible and complete recovery is possible. Inhalation of large amounts of lead may lead to seizures, coma and death. Chronic or acute inhalation exposures to the fumes or dust of inorganic lead compounds (such as lead oxide) can adversely affect several organ systems including the nervous system, the gastrointestinal system, the hematological system and renal system. The early effects are characterized by fatigue, constipation, muscle aches, abdominal pains, and decreased appetite. Later signs and symptoms can include anemia, pallor, a "lead line" on the gums, and reduced hand grip strength. Lead colic produces intense abdominal cramping which can be accompanied by constipation, nausea, and vomiting. A condition called "wrist drop" can develop if the peripheral nervous system is affected. Severe central nervous system effects (referred to as lead encephalopathy) usually only occur after heavy and rapid lead exposures. Signs and symptoms may include headache, dizziness, convulsions, delirium, coma and possibly death. Long term exposure can also produce kidney damage with possible decreased renal function leading to such conditions called stannosis. Alcohol ingestion and physical exertion may bring on symptoms. Continued exposure can result in decreased fertility and/or chances of miscarriage or birth defects. Lead inorganic dust and fume is listed as possible carcinogenic by IARC.

Lead Chromate: Anemia, urinary dysfunction, weakness, constipation, nausea, nervous disorder, peripheral neuropathy and chromosomal changes.

Manganese: Mn intoxication is usually due to the oxide or salts of Mn, elemental Mn exhibits very low toxicity. Manganese Oxide fumes can act as minor irritants to the eyes and respiratory tract and metal fume fever. Both acute and chronic exposures may adversely affect the central nervous system (manganism), pneumontitis (inflammation of lung tissue), and may cause fibrosis (scarring of lung tissue) and reproductive disorders (impotence) in males. Early symptoms may include weakness in lower extremities, sleepiness, salivation, nervousness and apathy. Bronchitis, pneumontitis, lack of coordination resembling Parkinson's Disease (apathy, weakness, etc.). The central nervous system is the chief site of the injury, and there may be adverse blood and kidney effects. Chronic manganese poisoning is not a fatal disease although it is extremely disabling. Some individuals may be hyper susceptible to manganese. Freshly formed manganese fume has caused fever and chills similar to metal fume fever.

Molybdenum: Dust of metallic Mo has caused difficulty breathing, general weakness, pain in chest, joints, hands and feet, expectoration, fatigue, headache, anorexia, possible liver and kidney damage and bone deformity. Mo has caused anemia and poor growth in experimental animals. Mo may also cause pneumoconiosis and irritation to lungs and eyes.

Nickel: Skin contact with nickel and its compounds may cause allergic dermatitis. The resulting skin rash is often referred to as "nickel itch", which usually occurs when the skin is moist. Ni metal is listed as possibly carcinogenic to humans by IARC. Ni fumes and dust can cause skin sensitization and allergic contact dermatitis. Ni and its compounds may also produce eye irritation, particularly on the inner surfaces of the eyelids (i.e. conjunctiva). Chronic inhalation of high levels of Ni can cause irritation of airways and lungs, lung fibrosis (scarring of the lungs), nasal septum perforation, nasal sinusitis, respiratory sensitization and asthma. Ni compounds have caused cancer of the lungs, larynx, and paranasal sinuses in lab animals.

Nitrogen: Oxides of nitrogen can cause irritation of the eyes, skin (when moist) and upper respiratory tract. Exposure to high levels of nitrogen oxides can cause delayed pulmonary edema (fluid in the lungs) which may be fatal. Nitric oxide can cause formation of methemoglobin which decreases the blood's ability to carry oxygen. Chronic overexposure can cause pulmonary fibrosis (scarring of the lungs).

Oil coating: Some products are supplied with an oil coating or have residual oil from the manufacturing process. Prolonged or repeated skin contact with oil may result in skin irritation, dermatitis, or both. Untreated mildly refined mineral oils have produced skin tumors on repeated applications to laboratory animals. They are listed as carcinogenic on the NTP and IARC. If the product is heated well above the ambient temperatures or machined, oil vapor or mist may be generated. Overexposure to oil mist or vapor may cause asthma, bronchitis, respiratory tract irritation and neurological effects such as headaches, dizziness, drowsiness and central nervous system depression.

Oxygen: Oxygen can cause irritation of the eyes, skin (when moist), and upper respiratory tract. Exposure to high levels of nitrogen oxides can cause delayed pulmonary edema (fluid in the lungs) which may be fatal. Nitric oxide can cause formation of methemoglobin which decreases the blood's ability to carry oxygen. Chronic overexposure can cause pulmonary fibrosis (scarring of the lungs).

Ozone: Overexposure to ozone can result in mucus membrane and respiratory tract irritation. Severe overexposures can cause pulmonary edema (fluid in the lungs).

Phosphorous: Chronic and prolonged inhalation of high concentrations of fumes or dust may cause necrosis of the mandible.

Selenium: Chronic inhalation of high concentrations of fumes and dust are associated with accumulation of fluid in the lungs, garlic breath, bronchitis asthma, nausea, chills, fever, headache, sore throat, shortness of breath, conjunctivitis, vomiting, abdominal pain, diarrhea and enlarged liver. Selenium is an eye and upper respiratory irritant and a sensitizer. Overexposure may result in red staining of the nails, teeth and hair. Selenium dioxide reacts with moisture to form selenious acid which is corrosive to the skin and eyes.

Silicon: No chronic debilitating symptoms indicated. Chronic exposure to inert dusts of silicon can cause increased airways resistance and contribute to chronic bronchitis. Accumulation in lungs may be responsible for benign pneumoniosis, but is not considered to be responsible for pulmonary functional impairment or respiratory symptoms. Intracheal administration of silicon in rabbits produced significant pulmonary lesions.

Sulfur: Chronic and prolonged inhalation of high concentrations of fumes or dust, as sulfur dioxide, may lead to edema of the lungs.

Titanium: Chronic and prolonged inhalation of high concentrations of fumes or dust may result in pulmonary irritation without disabling pneumoconiosis. Titanium dioxide is considered a nuisance particulate and may cause irritation of the eyes, nose and throat. Excessive exposure in humans may result in slight changes in the lungs. At extremely high concentrations, titanium dioxide has induced lung cancer in rats and is listed as carcinogen by NIOSH.

Welding Fumes: Welding fumes cannot be classified simply. The composition and quantity of both are dependent on the alloy being welded and the process and electrodes used. Reliable analysis of fumes cannot be made without considering the nature of the welding process and system being examined; reactive metals and alloys such as aluminum and titanium are arc-welded in a protective, inert atmosphere such as argon. These arcs create relatively little fume, but they do create an intense radiation which can produce ozone. Similar processes are used to arc-weld steels, also creating a relatively low level of fumes. Ferrous alloys also are arc-welded in oxidizing environments that generate considerable fume and can produce carbon monoxide instead of ozone. Such fumes generally are composed of discrete particles of amorphous slag containing iron, manganese, silicon, and other metallic constituents depending on the alloy system involved. Chromium and nickel compounds are found in fumes when stainless steels are arc welded. Some coated and flux-cored electrodes are formulated with fluorides and the fumes associated with them can contain significantly more fluorides than oxides. Because of the above factors, arc welding fumes frequently must be tested for individual constituents that are likely to be present to determine whether specific TLVs are exceeded.

SECTION VII – FIRST AID MEASURES

Inhalation: Remove to fresh air; if condition continues, consult a physician.

Eye Contact: Flush thoroughly with running water for 15 minutes to remove particulate; take care to rinse under eyelids. Obtain medical attention.

Skin Contact: Remove particulate by washing thoroughly with soap and water. Seek medical attention if condition persists.

Ingestion: Does not represent a hazard, if significant amounts of metal are ingested, consult physician.

SECTION VIII – HANDLING AND STORAGE

Fine turnings and small chips should be swept or vacuumed. Scrap metal can be reclaimed for re-use.

SECTION IX – PERSONAL PROTECTION

Respiratory Protection: Appropriate dust/mist/fume respirator should be used to avoid excessive inhalation of particulates. If exposure limits are reached or exceeded, use NIOSH/MSHA approved equipment.

Ventilation: Use with adequate ventilation to meet exposure limits listed in Section II.

Eye Protection: Safety glasses/face shields should be worn when grinding, cutting, or welding.

Protective Gloves: Should be worn as required for welding, burning or handling operations.

SECTION X – TRANSPORTATION INFORMATION

N/A

This information contained herein is based on data believed by WEAR CONCEPTS to be accurate, but we do not assume any liability for the accuracy of this information. We neither suggest nor guarantee that any hazards mentioned are the only ones that exist. Anyone intending to rely on any recommendation or to use any equipment, technique or material mentioned should also satisfy himself that he can meet all applicable safety and health standards.