

VERMONT TAP AND DIE COMPANY Division of Greenfield Industries
MATERIAL SAFETY DATA SHEET

MSDS # 905
K-0963-905

Date of Issue: 5/09
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SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: High Speed Steel Cutting Tools
Chemical Name: Ferrous Alloys, Steel Solids
Synonyms: Titanium Nitride coating is trade named Vertainium
Product Use: Metalworking Tools
Manufacturer: Vermont Tap and Die Company, Division of Greenfield Industries,
79 Main St, Lyndonville, VT 05854

EMERGENCY TELEPHONE NUMBER: CHEMTREC
For Domestic Shipments: 1-800-424-9300
For Shipments outside the US: 703-527-3887

SECTION 2 - COMPOSITION/INFORMATION ON INGREDIENTS

Material	CAS Number	Analysis M1	Analysis M7	OSHA PEL TWA (mg/m ³)	ACGIH TLV TWA (mg/m ³)	NFPA HAZARD RATING SCALE		
						Health	0-4 Fire	Reactivity
Iron (Fe)	7439-89-6			10	None est.	0	3	0
**Tungsten (W)	7440-33-7	1.4-2.1	1.4-2.1	15	5	1	3	0
Molybdenum (Mo)	7439-98-7	8.2-9.2	8.2-9.2	15	10	1	1	0
*Chromium (Cr)	7440-47-3	3.5-4.0	3.5-4.0	1	0.5	2	1	1
Vanadium (V)	7440-62-2	2.3-3.6	1.75-2.25	5	5	2	0	0
*Manganese (Mn)	7439-96-5	0.15-0.4	0.15-0.4	5 (ceiling)	0.2	3	2	1
*Nickel (Ni)	7440-02-0			1	1.5	2	0	0
**Titanium Nitride (TiN)	26683-20-4			15	10	No rating	0	0
Carbon	1333-86-4	0.78-0.88	0.97-1.05	3.5	3.5	2	3	2
*Cobalt (Co)	7440-48-4			0.1	0.02	2	3	0

*Identifies substances that are subject to the requirements of Section 313 of Title III of Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

**This substance is regulated by OSHA as a Particulate Not Otherwise Regulated (PNOR). The exposure limit listed for OSHA refers to total dust; the OSHA PEL for the respirable fraction is 5 mg/m³.

SECTION 3 - HAZARDS IDENTIFICATION

Operations such as welding, grinding, polishing, melting, and brazing may cause dust or fume generation which can result in exposure to the elements present in the alloy.

[Note: Health effects listed are for exposure to metallurgical powders, dust, or mist from altering the tool. No health effects have been reported for exposure to this material in solid form.]

Inhalation: Irritant: 10 mg (Ni)/m³, 250 mg(Cr)/m³, 35 mg(V)/m³ or 10 mg(Co)/m³ is immediately dangerous to life and health.

Acute Overexposure: Symptoms of metal fume fever including chills, fever, sweating, nausea, and cough may appear. Metal fume fever begins 4 to 12 hours after exposure and lasts 24 hours without causing permanent damage. Other effects caused by dust and fume inhalation include metallic taste, eyes, nose, and throat irritation, wheezing, difficulty breathing, and chest pain.

Chronic Overexposure: May cause respiratory irritation, bronchitis, allergic respiratory reaction, obstructed airways, build-up of dust in the lungs, damage to lung tissue, and lung disease, with symptoms as described in acute overexposure, especially inflammation of the respiratory tract, nose and throat irritation, violent coughing, wheezing, rasping, and shortness of breath. There may also be blood changes, liver and kidney damage, and an increased susceptibility to respiratory changes.

Skin Contact: Irritant.

Acute Overexposure: May cause irritation.

Chronic Overexposure: May cause inflammation and/or rash (irritant or allergic contact dermatitis).

Eye Contact: Irritant.

Acute Overexposure: May cause irritation with redness, pain, and itching.

Chronic Overexposure: May cause conjunctivitis.

Ingestion: Irritant.

Acute Overexposure: Ingestion of large amounts of steel dust is highly unlikely. However, ingestion of small amounts may occur by eating or smoking with contaminated hands.

Chronic Overexposure: May produce the same symptoms as for acute overexposure. May also adversely affect the pancreas, thyroid gland, heart, or bone marrow.

SECTION 4 - FIRST AID MEASURES

Inhalation: If symptoms of pulmonary involvement develop (coughing, wheezing, shortness of breath), remove from exposure area to fresh air immediately. If breathing has stopped, perform artificial respiration. Keep affected person warm and at rest. Get medical attention immediately.

Skin Contact: If irritation or rash occurs, remove contaminated clothing and shoes immediately. Wash affected area with soap or mild detergent and large amounts of water until no evidence of material remains (approximately 15-20 minutes). Get medical attention.

Eye Contact: If irritation occurs, wash eyes immediately with large amounts of water, occasionally lifting upper and lower lids, until no evidence of material remains (approximately 15-20 minutes). Get medical attention immediately.

Ingestion: If this material has been swallowed and person is conscious, immediately give person large amounts of water. Do not attempt to make an unconscious person drink or vomit. Get medical attention immediately. Induce vomiting only if specifically instructed by a physician.

SECTION 5 - FIRE FIGHTING MEASURES

Fire and Explosion Hazards: Fine metal particles produced when ground, sawed, etc. can burn. High concentrations of these particles in the air may present an explosion hazard.

Flash Point: None reported.

Extinguishing Media: In solid finished form, will not burn. Use water to cool.

Special Firefighting Procedures: Do not release runoff from fire control methods to sewers or waterways. Because fire may produce toxic thermal decomposition products, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Steps to be Taken if Material is Released or Spilled: Sweep up with minimum amount of dust generation and place in suitable clean, dry containers for later disposal or reclamation. Residue should be cleaned up using a high efficiency particulate filter vacuum or wet clean up.

SECTION 7 - HANDLING AND STORAGE

Handling Precautions: Operations such as welding, dust generation, or fume generation can result in hazardous exposure to the elements present in the alloy if necessary precautions aren't taken. Protect against dust and fume inhalation and skin or eye contact. Use only with local exhaust ventilation. If the steel is contaminated with oil or other compounds, take precautions to prevent additional exposure to the contaminants when handling, welding, cutting, and/or heating or melting.

Storage Requirements: Store in a manner that prevents accidental environmental contamination from traces of industrial lubricants or wetting oils.

SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

Ventilation: Provide local exhaust ventilation or general dilution to maintain exposure levels below the PEL and TLV.

Respiratory Protection:

0.05 mg (Co)/m³ - Single-use approved dust and mist respirator.

0.5 mg (Co)/m³ - Dust mask, except single-use respirator.

1 mg (Co)/m³ - Dust mask, except single-use and quarter-mask respirator. Fume or high efficiency particulate respirator.

5 mg (Co)/m³ - High efficiency particulate respirator with a full facepiece. Supplied-air respirator with a full facepiece, helmet or hood. Self-contained breathing apparatus with a full facepiece.

20 mg (Co)/m³ - Powered air-purifying respirator with a high efficiency filter with a full facepiece. Type "C" supplied-air respirator with a full facepiece operated in pressure-demand or other positive-pressure mode.

Firefighting: Self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive-pressure mode.

Clothing: Employee must wear appropriate protective clothing and equipment to prevent repeated or prolonged skin contact with this substance. Soiled clothing should be laundered separately.

Gloves: Employee must wear appropriate protective gloves or barrier creams to prevent contact with this substance.

Eye Protection: Safety glasses with side shields or goggles are recommended. Where there is any possibility that an employee's eyes may be exposed to this substance, the employer should provide an eye wash fountain within the immediate work area for emergency use. Contact lenses should not be worn when handling these materials.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor: Solid, odorless, metallic silver

Boiling Point: 5000°F

Solubility in Water: Practically insoluble

Melting Point: 2500°F

Petroleum Based Solvent Solubility: Practically insoluble

Specific Gravity: (H₂O = 1): 7.8 to 8.2

SECTION 10 - STABILITY AND REACTIVITY

Stability: Stable under normal temperatures and pressure.

Decomposition: Thermal oxidative decomposition of steel can produce metallic and carbon oxides.

Incompatibilities:

Iron:

Fluorine or phosphorus: May become incandescent when heated.

Chlorine Trifluoride: May cause incandescent reaction.

Hydrogen Peroxide: Violently decomposes on contact.

Tungsten:

Air + Wide Range of Oxidants: Ignites upon heating.

Alkali, Alkaline-Earth Metals with Halocarbons: Results in heat- or impact-sensitive explosions.

Bromine Trifluoride: Reacts vigorously.

Molybdenum:

Bromine Pentafluoride: Incandescent at ambient or slightly elevated temperatures.

Bromine Trifluoride, Chlorine Trifluoride, Lead Dioxide, Nitryl Fluoride, or Iodine Pentafluoride: Incandescent reaction when heated.

Fluorine: Incandescent reaction at 205°C.

Sodium Peroxide: Explosive reaction at 240°C.

Potassium Perchlorate: Ignites at 330°C.

Chromium:

Ammonium Nitrate: May produce violent or explosive reaction.

Carbon Dioxide: Chromium dust may become ignitable and explosive.

Bromine Pentafluoride: May cause violent reaction.

Nitrogen Oxide or Sulfur Dioxide: May produce vigorous reaction with incandescence.

Vanadium:

Oxidants, Nitryl Fluoride, Lithium, Chlorine, Bromine Trifluoride: Violent reaction.

Cobalt:

Ammonium Nitrate + Metals or Bromine Pentafluoride: Reacts violently and sometimes explosively.

Hydrazinium Nitrate: Decomposes explosively upon rapid heating.

Nitryl Fluoride, Acetylene: Reacts incandescently.

Nickel:

Oxidants, Fluorine Ammonium Nitrate, Hydrazine, Ammonia, Performic Acid, or Strong Acids: Reacts violently.

Aluminum: May react explosively upon heating.

Aluminum Trichloride and Ethylene: May explode upon heating.

Hydrogen: Exothermic above 150°C.

Titanium and Potassium Chlorate: May explode due to friction.

Sulfur, Sulfur Compounds, Selenium: Incandescent upon heating.

Manganese:

Water or steam: Produces highly flammable hydrogen.

Carbon Dioxide: Ignitable and explosive when suspended.

Fluorine: Ignitable and explosive when suspended.

Chlorine: Ignitable and becomes incandescent when warmed.

Hydrogen Peroxide, concentrated: Violent decomposition and/or ignition.

Nitric Acid: Incandescent reaction and feeble explosion.

Phosphorus: Incandescent reaction when heated.

Sulfur Dioxide: Pyrophoric manganese burns brilliantly on warming.

Carbon:

Aluminum Nitrate: Explosive reaction on heating.

Ammonium Perchlorate: Exothermic decomposition below 240°C; above 240°C produces mild explosions.

Barium Bromate, Barium Chlorate, Barium Iodate, Bromates, Calcium Bromate, Calcium Chlorate, Calcium Iodate, Chlorates, Iodates, Magnesium Bromate, Magnesium Chlorate, Magnesium Iodate, Potassium Bromate, Potassium Chlorate, Potassium Iodate, Sodium Bromate, Sodium Chlorate, Sodium Iodate, Zinc Bromate, Zinc Chlorate, Zinc Iodate: Explosive reaction upon heating, percussion, or mild friction.

Calcium Hypochlorite: Explosive reaction on heating in a closed vessel.

Chlorine: Spontaneous ignition.

Chlorine and Chronyl Chloride, Iodine Pentoxide, Lead Nitrate, Potassium and Air, Zinc Nitrate: Explosive reaction.

Chlorine Monoxide: Immediate explosion.

Fluorine: Explosive reaction after an intermediate period.

Nitric Acid: Violent reaction.

Oils and Air: Spontaneously flammable.

Sodium Sulfide: Spontaneous heating.

SECTION 11 - TOXICOLOGICAL INFORMATION

Nickel: Carcinogenic status: The International Agency for Research on Cancer (IARC) lists metallic Nickel and Nickel compounds as Category 2B carcinogens (Possibly Carcinogenic to Humans). Epidemiological studies indicate an increased incidence of cancer of the nasal cavity, lungs and possibly the larynx in nickel refinery workers. Nickel is an eye, skin, and mucous membrane irritant, and a pulmonary and skin sensitizer.

Rat Oral LD_{Lo}: 5 mg/kg.

Dog Intravenous LD_{Lo}: 10 mg/kg

Guinea Pig Subcutaneous LD_{Lo}: 500 mg/kg

Rat Intratracheal LD_{Lo}: 12 mg/kg

Mouse Intravenous LD_{Lo}: 50 mg/kg

Carbon: This material has not been identified as a suspected or known carcinogen.

Mouse Intravenous LD₅₀: 440 mg/kg.

Molybdenum: Molybdenum is an eye and mucous membrane irritant. Individuals with a history of kidney, chronic respiratory, or liver disease may be at increased risk from exposure.

Rat Intraperitoneal LD_{Lo}: 114 mg/kg.

Rabbit Intratracheal LD_{Lo}: 70 mg/kg

Chromium: Carcinogenic status: There is evidence of increased incidence of lung cancer among chromium alloy workers. However, according to IARC, the chromium compounds responsible cannot be specified.

Cobalt: Carcinogenic status: The International Agency for Research on Cancer (IARC) lists Cobalt and Cobalt compounds as Category 2B carcinogens (Possibly Carcinogenic to Humans). Cobalt fumes or dust may cause pulmonary, skin, or eye irritation. Cobalt may be a sensitizing agent for skin and respiratory system. Chronic exposure may affect the heart, pancreas, thyroid gland, or bone marrow.

Rat Oral LD_{Lo}: 1500 mg/kg.

Rabbit Oral LD_{Lo}: 20 mg/kg

Rat Intraperitoneal LD_{Lo}: 250 mg/kg

Rabbit Intratracheal LD_{Lo}: 100 mg/kg

Rat Intravenous LD_{Lo}: 100 mg/kg

SECTION 12 - ECOLOGICAL INFORMATION

No data are available.

SECTION 13 - DISPOSAL CONSIDERATIONS

Waste Disposal Method: This is a valuable material that should be sent to an appropriate reclamation facility if available. If material cannot be sent to a reclamation facility, disposal should be made in compliance with federal, provincial/state, and local environmental regulations.

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May be classified as a hazardous substance when it is in a quantity, in one package, in which individual, regulated components equal or exceed the reportable quantities established by the Department of Transportation.

SECTION 15 - REGULATORY INFORMATION

Some ingredients in Greenfield Industries products, including Cobalt, Nickel, Copper, Chromium and Chromium Compounds, are subject to the requirements of Section 313 of Title III of Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

SECTION 16 - OTHER INFORMATION

Although Greenfield Industries and Kennametal Inc. have attempted to provide current and accurate information herein, Greenfield Industries and Kennametal Inc. make no representations regarding the accuracy or completeness of the information and assumes no liability for any loss, damage, injury of any kind which may result from or arise out of the use of or reliance on the information by any person.

For technical information contact Corporate EHS: phone 724-539-5066 fax 724-539-5372.

For additional MSDSs, contact Greenfield Industries: phone 802-626-3331 or fax 802-626-1035.

Prepared by: Greenfield Industries and Kennametal Inc. Hazard Communication Committee.