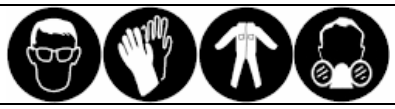
SULZER

Sulzer Metco (Canada) Inc.

Material Safety Data Sheet

WHMIS (Pictograms)	TDG CANADA	PROTECTIVE CLOTHING
	NOT REGULATED	

Section I. Chemical Product and Company identification

PRODUCT NAME/ TRADE NAME	E-FILL 2733, 2757, 2759, 2760 CUSTOM AU/NI/C	MSDS NUMBER: 16018 REVISION NUMBER: Ver 1.0
SYNONYM	Gold Nickel Graphite Composite Powder	MSDS DATE: 6/23/2005 **24 HOUR EMERGENCY TELEPHONE NUMBER:** CHEMTREC 1-800-424-9300
CHEMICAL NAME	**Not Available**	
CHEMICAL FAMILY	**Metals**	
CHEMICAL FORMULA	**Not Available**	
MATERIAL USES	**Electronic applications for conductivity of shielding.**	
DSL	**All ingredients on DSL**	

MANUFACTURER	Sulzer Metco (Canada) Inc. 10108 - 114 Street Fort Saskatchewan, Alberta Canada, T8L 4R1	SUPPLIER	Sulzer Metco (Canada) Inc. 10108 - 114 Street Fort Saskatchewan, Alberta Canada, T8L 4R1

Section II. Hazardous Ingredients

		Exposure Limits					
NAME	CAS#	ACGIH TLV-TWA mg/m^3	TWA OSHA PEL mg/m^3	ORAL LD_{50} mg/kg	CEIL mg/m^3	CEIL ppm	% Wt.
Nickel	7440-02-0	1.5 (I)	1	5000 (rat oral)*	No Data Available		42-95
Graphite (synthetic)	Not Available	2.0 (R)	10 (T) 5 (R)	440 (rat IV)	No Data Available		3.5-40
Gold**	7440-57-5	10 (I) 3 (R)	15 (T) 5 (R)	No Data Available	No Data Available		0.5-30

(I) = Inhalable fraction, (T) = Total fraction, (R) = Respirable fraction

* LD_{LO}

** Gold has no exposure limit, therefore values for PNOS (particle not otherwise specified) are given

TOXICOLOGICAL DATA ON INGREDIENTS	Nickel LD_{LO}: 5 g/kg (Rat Oral) carcinogen
	Graphite LD_{50}: 440 mg/kg (Rat Intravenous)
	Gold: No information available

Section III. Hazardous Identification

POTENTIAL ACUTE HEALTH HAZARDS	This product may irritate eyes upon contact due to mechanical abrasion. May irritate eyes and skin upon prolonged or repeated contact. May cause allergic skin reaction in individuals sensitive to

	nickel (nickel itch). Inhalation of dust may produce irritation to the respiratory tract. Ingestion of this substance may produce irritation of the gastro-intestinal tract, characterized by burning and diarrhea. Amounts ingested incidental to industrial handling are not likely to cause injury. Single dose oral toxicity is low.
POTENTIAL CHRONIC HEALTH HAZARDS	CARCINOGENICITY: The ACGIH Guide to Occupation Exposure Values, 2002, classifies nickel and some nickel alloys in the category A5 based on properly conducted epidemiologic studies in humans; however, the IARC classified nickel as Group 2B, possibly carcinogenic to humans, based on inadequate evidence of effects in humans. While epidemiology studies have demonstrated an increased risk of nasal, lung, and possible risk of laryngeal cancer, the most likely causative agents were nickel subsulphide, nickel sulfide and nickel oxide, with cancer linked principally to the nickel refining process of roasting nickel sulphide ores and not to metallic nickel itself. Evidence implicating metallic nickel and nickel alloys, or the hydrometallurgical nickel refining process as respiratory carcinogens for humans is lacking. Cohort mortality studies of workers in industries in which exposure was limited to metallic nickel or the hydrometallurgical process found no association between exposure to metallic nickel and its alloys to the subsequent development of respiratory cancer. SKIN: Nickel and its inorganic compounds are not absorbed through the skin. Nickel and nickel salts are known to cause contact dermatitis in sensitized individuals. Dermal or internal contact may result in the development of allergic nickel sensitivity (nickel rash) characterized by redness, inflammation, or in severe cases, skin eruptions. Nickel may be the most common sensitizer in women due to exposure to coins, watches, kitchen appliances, and jewelry containing nickel. Once acquired, nickel sensitivity usually persists. Recovery usually occurs after a week but may be delayed for several weeks. EYE: Eye irritation in workers caused by mechanical abrasion from dusts is possible. INHALATION: Exposure to nickel containing dusts may produce coughing, shortness of breath, increased susceptibility to pulmonary edema and insterstitial fibrosis. Repeated inhalation of impure graphite for years may cause graphitosis, a progressive and disabling pneumoconiosis. Exposed persons may be asymptomatic for years and then suddenly become disabled or may develop headache, cough dyspnea tightness in the chest, pain, depression, decreased appetite black sputum and digital clubbing. Gold compounds may cause irritation to the respiratory tract. INGESTION: Nickel metal and its alloys are considered to be of low toxicity for both acute and chronic ingestion exposure. Repeated or prolonged overexposure to metallic nickel can produce kidney damage. However, metallic nickel and its soluble salts have rarely produced systemic toxic effects in humans, even from therapeutic administration. Most of the nickel that is ingested remains unabsorbed

	passing through the gastrointestinal tract. Gold compounds may cause damage to the blood forming organs, resulting in aplastic anemia.

Section IV. First Aid Measures	
EYE CONTACT	IMMEDIATELY flush eyes with running water for at least 15 minutes, keeping eyelids open. Obtain medical attention if irritation persists.
MINOR SKIN CONTACT	Wash contaminated skin with soap and water. Remove contaminated clothing and wash before reuse. Avoid prolonged or repeated contact with the skin. Wash thoroughly after handling.
EXTENSIVE SKIN CONTACT	No additional information
MINOR INHALATION	Inhalation of dust may produce irritation to the respiratory tract, characterized by burning, sneezing and coughing. Allow the person to rest in a well ventilated area. If irritation persists, obtain medical attention.
SEVERE INHALATION	No additional information
SLIGHT INGESTION	Remove dentures if any. Have conscious person drink several glasses of water or milk. DO NOT INDUCE VOMITING. NEVER give an unconscious person anything to ingest. Seek medical attention.
EXTENSIVE INGESTION	No additional information

Section V. Fire and Explosion Data	
THE PRODUCT IS	Non-flammable.
AUTO-IGNITION TEMPERATURE	Not applicable.
FLASH POINT	Not applicable.
FLAMMABILITY LIMITS	Not applicable.
HAZARDOUS DECOMPOSITION MATERIALS	Some metallic oxides may form following exposure to intense heat. Carbon oxides (CO, CO_2) can decompose at high temperatures forming toxic gases (nickel carbonyl).
FIRE HAZARD IN PRESENCE OF VARIOUS SUBSTANCES	Not applicable.
EXPLOSION HAZARD IN PRESENCE OF VARIOUS SUBSTANCES	This product is normally non-flammable and non-explosive but may form an explosive or flammable dust-air mixture. Low hazard for usual industrial or commercial handling. Nickel may react violently on contact with strong oxidizers and can produce hydrogen gas when in contact with mineral acids.
FIRE FIGHTING MEDIA AND INSTRUCTIONS	Use class D fire extinguisher for metal fires. As in any fire, wear MSHA/NIOSH approved pressure-demand self-contained breathing apparatus, or equivalent and full protective gear.
SPECIAL REMARKS ON FIRE HAZARDS	None.
SPECIAL REMARKS ON EXPLOSION HAZARDS	None.

Section VI. Accidental Release Measures	
SMALL SPILL	Small spills should be swept up using either wet or dry methods. When using dry methods, use dust suppression. Cleanup personnel should protect against dust inhalation and dermal contact. Wear adequate personal protective equipment and avoid dust generation.
LARGE SPILL	The material should be scooped up and placed in appropriate

	containers for reclamation or disposal. If vacuums are used, they should be equipped with a high efficiency particulate air filter (HEPA). Do not release the material to sewers or waterways.
PERSONAL PROTECTION IN CASE OF A LARGE SPILL	Long sleeved shirts and long legged pants. Boots. Gloves that are impermeable to dust and resistant to abrasion. Thoroughly wash contaminated clothing before re-use. Use industrial safety glasses with side shields or chemical goggles. The use of contact lenses when handling this product is discouraged. Use a supplied air respirator (positive pressure mode) or SCBA for emergency situations, fires, or exposures that exceed 1000 times the exposure limit specified by the local authority. Otherwise, if the airborne concentration exceeds the applicable exposure limit, use an air-purifying respirator. If the exposure is more than 50 times the applicable exposure limit, use only a full facepiece respirator. If the exposure is to product dust only, a cartridge with a dust filter may be used. If the exposure is to fume, use a cartridge with a HEPA filter or a cartridge approved for exposure to fume. Use only respirators approved by NIOSH or NIOSH/MSHA.

Section VII. Handling and Storage	
PRECAUTIONS	Use good housekeeping practices to prevent accumulation of dust. Avoid generating dust when handling this material. DO NOT breathe dust. Wear approved respiratory equipment. Avoid contact with skin and eyes. After handling, always wash hands thoroughly with soap and water. Clean work clothing should be provided daily. No food or smoking in work areas.
HANDLING AND STORAGE	Keep container tightly closed. Store containers in a cool well-ventilated area away from mineral acids and incompatible materials. Protect containers from physical damage.

Section VIII. Exposure Controls/Personal Protection	
ENGINEERING CONTROLS	Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit. Safety showers and eyewash stations should be present in the work area.
PERSONAL PROTECTION	Use a NIOSH-approved high efficiency air-purifying dust respirator (HEPA) whenever the airborne dust levels exceed the occupational exposure limits. Wear appropriate coveralls and gloves to prevent skin or body contact. Wear protective safety glasses or chemical safety goggles. Contact lenses are not recommended in the work area.
PERSONAL PROTECTION IN CASE OF LARGE RELEASE	No further information
EXPOSURE LIMITS	ACGIH TLV-TWA (2003) 1.5 mg/m^3 (I), OSHA-PEL 1 mg/m^3 for Nickel. ACGIH TLV-TWA (2003) 2.0 mg/m^3 (R) all forms except graphite fiber. ACGIH TLV-TWA (2003) 10 mg/m^3 (I), 3 mg/m^3 (R) for Gold dust. (I) = Inhalable fraction, (R) = Respirable fraction

Section IX. Physical and Chemical Properties	
PHYSICAL STATE AND APPEARANCE	Solid. (Powdered solid)

MOLECULAR WEIGHT	Not available	**COLOR**	Yellowish red
pH (10% SOLN/WATER)	Not applicable	**ODOR**	Odorless
BOILING POINT	Nickel 2732 ºC (4950 ºF) Graphite 4827 °C (8721 °F) Gold 2807 °C (5085 °F)	**ODOR THRESHOLD**	Not available
MELTING POINT	Nickel 1453 ºC (2647 ºF) Gold 1064 °C (1948 °F) Graphite 3652 °C (6606 °F) (sublimes)	**TASTE**	Metallic
RADIOACTIVITY	Not available	**IONICITY (in water)**	Not applicable
SPECIFIC GRAVITY g/cc	4.1-9.3 (Water = 1)	**SOLUBILITY**	Insoluble in cold water, hot water.
VAPOR PRESSURE	Not applicable	**DISPERSION PROPERTIES**	Not available
VAPOR DENSITY	Not applicable	**WATER/OIL DIST. COEFF.**	Not available
VOLATILITY	Not applicable		

Section X. Stability and Reactivity Data

STABILITY	The product is stable.
INSTABILITY TEMPERATURE	Not available.
DECOMPOSITION	Some metallic oxides may form following exposure to intense heat. Carbon oxides (CO, CO_2) can decompose at high temperatures forming toxic gases (nickel carbonyl).
INCOMPATABILITY WITH VARIOUS SUBSTANCES	Nickel reacts violently with fluorine, ammonium nitrate, hydrazine, performic acid, phosphorous, selenium, sulphur, chlorinated paraffins (alkanes) and titanium plus potassium chlorate. Nickel is also incompatible with oxidizers. Gold is incompatible with ammonia, oxidizing agents, halogens and hydrogen peroxide.
CORROSION PROPERTIES	Non-corrosive.
SPECIAL REMARKS ON REACTIVITY	Nickel is soluble in acids. Contact with mineral acids liberates hydrogen gas which may form explosive mixtures in air. Under the right conditions (high pressure, high carbon monoxide concentration) toxic nickel carbonyl gas may be formed. Gold can form explosive compounds with ammonia, ammonium hydroxide and hydrogen peroxide.
SPECIAL REMARKS ON CORROSIVITY	No additional remark.

Section XI. Toxicological Information

ROUTES OF ENTRY	Ingestion, skin contact & inhalation.
TOXICITY TO ANIMALS	NICKEL Monkeys, dogs and cats fed up to 1,000 ppm Ni in the diet on a chronic basis showed no deleterious effects in terms of growth, behavior or clinical findings. Rats and guinea pigs receiving lifespan inhalation exposure to elemental nickel at an average concentration of 15 mg/m showed respiratory irritation and pulmonary inflammation. Adverse effects on reproductive processes have been reported in rats after oral and subcutaneous administration of soluble nickel salts. Nickel has been reported to upset the hormonal balance of the mother and thereby affect the pregnancy.

	GOLD Exposure to gold has caused tumors and reproductive effects in laboratory animals via implant, intraperitoneal and subcutaneous routes.
SPECIAL REMARKS ON TOXICITY TO ANIMALS	No additional information.

Section XII. Ecological Information

ECOTOXICITY	NICKEL Nickel forms many water soluble compounds. At low levels (approximately 0.05 mg/L) in water, nickel stimulates the growth of algae while at higher concentrations (>0.05 mg/L) it is generally toxic. Nickel has both an acute and a chronic toxic effect on fish and aquatic invertebrates. Studies of nickel in the aquatic food chain show decreasing nickel concentrations at increasing levels in the food chain indicating that there is no biomagnification of nickel.
BOD and COD	Not applicable

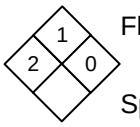
Section XIII. Disposal Considerations

WASTE DISPOSAL OR RECYCLING	Salvage spilled material for reuse or contact the appropriate environmental authority for guidance on acceptable waste disposal methods.

Section XIV. Transport Information

TDG CLASSIFICATION	Not regulated under TDG (Canada).
SPECIAL PROVISIONS FOR TRANSPORT	Consult the local regulations for transporting outside of Canada.

Section XV. Other Regulatory Information and Pictograms

OTHER REGULATIONS	CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA): This product is on the Domestic Substances List (DSL), and acceptable for use under the provisions of CEPA	
OTHER CLASSIFICATIONS	HCS (USA)	HCS CLASS: Irritating substance HCS CLASS: Dangerous may cause cancer HCS CLASS: Sensitizing substance.
	DSCL (EEC)	R40: Limited evidence of a carcinogenic effect. R43: May cause sensitization by skin contact. Carc. Cat. 3
	WHMIS (Classification)	WHMIS CLASS D-2A: Materials causing other toxic effects (Very TOXIC).
		WHMIS CLASS D-2B: Materials causing other toxic effects (TOXIC).
National Fire Protection Agency (USA)	Health  Flammability Instability Special	

Section XVI. Other Information

REFERENCES	• Canadian Centre for Occupational Health and Safety CCInfo Dis. • The Transportation of Dangerous Goods Act (2002) and Regulations, Transport Canada. • American Conference of Governmental Industrial Hygienists, TLVs™ and other Occupational Exposure Values, 2003-02-20

	• Domestic Substances List, Canadian Environmental Protection Act, Environment Canada • SAX, Properties of Dangerous Chemicals, 1998 • Flammability testing, The Westaim Corporation Project #9000, October 27, 1999
OTHER SPECIAL CONSIDERATIONS	No additional information
Validated by the Environment, Health and Safety Department on 7/5/2004	Printed 7/21/2005
FOR FURTHER SAFETY, HEALTH, OR ENVIRONMENTAL INFORMATION ON THIS PRODUCT, CONTACT	Sulzer Metco (Canada) Inc. Fort Saskatchewan, Alberta **(780) 992-5100**