



## 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 2901	MSDS NUMBER: 16000	REVISION NUMBER: Ver 4.0
SYNONYM	Nickel Coated Carbon Fiber	MSDS DATE: 6/23/2005	<b>24 HOUR EMERGENCY TELEPHONE NUMBER:</b> CHEMTREC 1-800-424-9300
CHEMICAL NAME	Not Available		
CHEMICAL FAMILY	Metals		
CHEMICAL FORMULA	Not Available		
MATERIAL USES	Electronic applications for conductivity or 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 <sup>3</sup>	TWA OSHA PEL mg/m <sup>3</sup>	ORAL LD <sub>50</sub> mg/kg	CEIL mg/m <sup>3</sup>	CEIL ppm	% Wt.
Nickel	7440-02-0	1.5 (I)	1	5000 (rat oral)*	No Data Available		60-95
Carbon Fiber**	308063-67-4	10 (I) 3 (R)	15 (T) 5 (R)	440 (rat IV)***	No Data Available		5-40

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

\* LD<sub>LO</sub>

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

\*\*\* LD<sub>50</sub> for Carbon in Graphite form

TOXICOLOGICAL DATA ON INGREDIENTS	Nickel LD <sub>LO</sub> : 5 g/kg (Rat Oral) carcinogen
	Carbon (in Graphite form) LD <sub>50</sub> : 440 mg/kg (Rat Intravenous)

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

	<p>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.</p>
<p><b>POTENTIAL CHRONIC HEALTH HAZARDS</b></p>	<p><b>CARCINOGENICITY:</b>          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.</p> <p><b>SKIN:</b>          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.</p> <p><b>EYE:</b>          Eye irritation in workers caused by mechanical abrasion from dusts is possible.</p> <p><b>INHALATION:</b>          Exposure to nickel containing dusts may produce coughing, shortness of breath, increased susceptibility to pulmonary edema and interstitial fibrosis.</p> <p><b>INGESTION:</b>          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.</p>

<p><b>Section IV. First Aid Measures</b></p>	
<p><b>EYE CONTACT</b></p>	<p>IMMEDIATELY flush eyes with running water for at least 15 minutes, keeping eyelids open. Obtain medical attention if irritation persists.</p>
<p><b>MINOR SKIN CONTACT</b></p>	<p>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.</p>

<b>EXTENSIVE SKIN CONTACT</b>	No additional information
<b>MINOR INHALATION</b>	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.
<b>SEVERE INHALATION</b>	No additional information
<b>SLIGHT INGESTION</b>	Remove dentures if any. Have conscious person drink several glasses of water or milk. <b>DO NOT INDUCE VOMITING.</b> NEVER give an unconscious person anything to ingest. Seek medical attention.
<b>EXTENSIVE INGESTION</b>	No additional information

<b>Section V. Fire and Explosion Data</b>	
<b>THE PRODUCT IS</b>	Non-flammable.
<b>AUTO-IGNITION TEMPERATURE</b>	Not applicable.
<b>FLASH POINT</b>	Not applicable.
<b>FLAMMABILITY LIMITS</b>	Not applicable.
<b>HAZARDOUS DECOMPOSITION MATERIALS</b>	Oxides of carbon and nitrogen and some metallic oxides may form following exposure to intense heat. Carbon oxides (CO, CO <sub>2</sub> ) can decompose at high temperatures forming toxic gases (nickel carbonyl).
<b>FIRE HAZARD IN PRESENCE OF VARIOUS SUBSTANCES</b>	Not applicable.
<b>EXPLOSION HAZARD IN PRESENCE OF VARIOUS SUBSTANCES</b>	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.
<b>FIRE FIGHTING MEDIA AND INSTRUCTIONS</b>	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.
<b>SPECIAL REMARKS ON FIRE HAZARDS</b>	None.
<b>SPECIAL REMARKS ON EXPLOSION HAZARDS</b>	None.

<b>Section VI. Accidental Release Measures</b>	
<b>SMALL SPILL</b>	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.
<b>LARGE SPILL</b>	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.
<b>PERSONAL PROTECTION IN CASE OF A LARGE SPILL</b>	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.
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Section VII. Handling and Storage	
<b>PRECAUTIONS</b>	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.  Fibers are electrically conductive. Protect electrical systems from exposure to airborne fibers.
<b>HANDLING AND STORAGE</b>	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	
<b>ENGINEERING CONTROLS</b>	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.
<b>PERSONAL PROTECTION</b>	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.
<b>PERSONAL PROTECTION IN CASE OF LARGE RELEASE</b>	No further information
<b>EXPOSURE LIMITS</b>	ACGIH TLV-TWA (2003) 1.5 mg/m <sup>3</sup> (I), OSHA-PEL 1 mg/m <sup>3</sup> for Nickel. ACGIH TLV-TWA (2003) 10 mg/m <sup>3</sup> (I), 3 mg/m <sup>3</sup> (R) for Carbon Fiber dust. (I) = Inhalable fraction, (R) = Respirable fraction

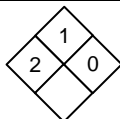
Section IX. Physical and Chemical Properties			
<b>PHYSICAL STATE AND APPEARANCE</b>	Solid. (Powdered solid)		
<b>MOLECULAR WEIGHT</b>	Not available	<b>COLOR</b>	Dark silvery grey
<b>pH (10% SOLN/WATER)</b>	Not applicable	<b>ODOR</b>	Odorless
<b>BOILING POINT</b>	Nickel 2732 °C (4950 °F) Carbon 4827 °C (8721 °F)	<b>ODOR THRESHOLD</b>	Not available
<b>MELTING POINT</b>	Nickel 1453 °C (2647 °F) Carbon 3652 °C (6606 °F) (sublimes)	<b>TASTE</b>	Metallic
<b>RADIOACTIVITY</b>	Not available	<b>IONICITY (in water)</b>	Not applicable

<b>SPECIFIC GRAVITY g/cc</b>	3.7-7.6 (Water = 1)	<b>SOLUBILITY</b>	Insoluble in cold water, hot water.
<b>VAPOR PRESSURE</b>	Not applicable	<b>DISPERSION PROPERTIES</b>	Not available
<b>VAPOR DENSITY</b>	Not applicable	<b>WATER/OIL DIST. COEFF.</b>	Not available
<b>VOLATILITY</b>	Not applicable		

<b>Section X. Stability and Reactivity Data</b>	
<b>STABILITY</b>	The product is stable.
<b>INSTABILITY TEMPERATURE</b>	Not available.
<b>DECOMPOSITION</b>	Oxides of carbon and nitrogen and some metallic oxides may form following exposure to intense heat. Carbon oxides (CO, CO <sub>2</sub> ) can decompose at high temperatures forming toxic gases (nickel carbonyl).
<b>INCOMPATIBILITY WITH VARIOUS SUBSTANCES</b>	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.
<b>CORROSION PROPERTIES</b>	Non-corrosive.
<b>SPECIAL REMARKS ON REACTIVITY</b>	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.
<b>SPECIAL REMARKS ON CORROSIVITY</b>	No additional remark.

<b>Section XI. Toxicological Information</b>	
<b>ROUTES OF ENTRY</b>	Ingestion, skin contact & inhalation.
<b>TOXICITY TO ANIMALS</b>	<b>NICKEL</b> 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.
<b>SPECIAL REMARKS ON TOXICITY TO ANIMALS</b>	No additional information.

<b>Section XII. Ecological Information</b>	
<b>ECOTOXICITY</b>	<b>NICKEL</b> 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.
<b>BOD and COD</b>	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)	<div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 10px;">Health</div> <div style="text-align: center;">  </div> <div style="margin-left: 10px;">                     Flammability Instability Special                 </div> </div>
Section XVI. Other Information	
REFERENCES	<ul style="list-style-type: none"> <li>• Canadian Centre for Occupational Health and Safety CCIInfo Dis.</li> <li>• The Transportation of Dangerous Goods Act (2002) and Regulations, Transport Canada.</li> <li>• American Conference of Governmental Industrial Hygienists, TLVs™ and other Occupational Exposure Values, 2003-02-20</li> <li>• Domestic Substances List, Canadian Environmental Protection Act, Environment Canada</li> <li>• SAX, Properties of Dangerous Chemicals, 1998</li> <li>• Flammability testing, The Westaim Corporation Project #9000, October 27, 1999</li> </ul>
OTHER SPECIAL CONSIDERATIONS	No additional information
Validated by the Environment, Health and Safety Department on 1/24/2003	Printed 7/20/2005
FOR FURTHER SAFETY, HEALTH, OR ENVIRONMENTAL INFORMATION ON THIS PRODUCT, CONTACT	Sulzer Metco (Canada) Inc. Fort Saskatchewan, Alberta <b>(780) 992-5100</b>
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