


## MATERIAL SAFETY DATA SHEET

This Material Safety Data Sheet (MSDS) complies with the requirements of OSHA's Hazard Communication Standard.

### 300 SERIES STAINLESS STEEL WELDING WIRE

		Emergency Phone Number: 866-734-3438		
Date: June 24, 2007		Product Information Number: 888-838-0615		
<b>SECTION 1 – PRODUCT IDENTIFICATION</b>				
Product Name/Class	AWS A5.9, ER: 308, 308L, 308LSi, 309, 309L, 309LSi, 316, 316L, 316LSi			
Product Number	004019			
Manufacturer	Radnor Welding Products 259 N. Radnor-Chester Road Suite 100 Radnor, PA 19087-5283			
<b>SECTION 2 – HAZARDOUS INGREDIENTS</b>				
Ingredient	CAS Number	Percent	Exposure Limits	
			TLV	PEL
Stainless steel wire		100	10*	10*
Chromium***	7440-47-3	19 – 25	0.5(b)	1.0(b)
Nickel***	7440-02-0	10 – 13	1	1
Molybdenum (316 types only)	7439-98-7	2.5	10	10
Manganese***	7439-96-5	2	0.2	1.0(c)
Iron	7439-89-6	Balance	10*	10*
Supplemental Information: (*) Not listed. Nuisance value maximum is 10 milligrams per cubic meter. PEL value for iron oxide is 10 mg/m <sup>3</sup> . TLV value for iron oxide is 5 milligrams per cubic meter. (b) The OSHA PEL for chromium is expressed as metal. The PEL expressed as chromate is 0.1 milligrams per cubic meter and is a ceiling value that shall not be exceeded at any time. The PEL for chromium (VI) is 5 micrograms (0.005 milligrams) per cubic meter. The TLV for water soluble chromium (VI) is 0.05 milligrams per cubic meter. The TLV for water soluble chromium (VI) is 0.05 milligrams per cubic meter; the TLV for insoluble chromium (VI) is 0.01 milligrams per cubic meter. (c) Values are for manganese fume. STEL (Short Term Exposure Limit) is 3.0 milligrams per cubic meter.				
<b>SECTION 3 – PHYSICAL CHARACTERISTICS</b>				
Boiling Point: N/A	Specific Gravity (H <sub>2</sub> O = 1): N/A	Solubility in Water: N/A		
Vapor Pressure (mm Hg): N/A	Melting Point: N/A	% Volatile: N/A		
Vapor Density (Air = 1): N/A	Evaporation Rate (Butyl Acetate=1): N/A	Appearance and Odor: Metallic wire with no odor.		
<b>SECTION 4 – FIRE and EXPLOSION HAZARD DATA</b>				
Flash Point (Method Used): N/A	Flammable Limits: N/A	LEL: N/A UEL: N/A		
Extinguishing Media: N/A				
Special Fire Fighting Procedures: Welding arc and sparks can ignite combustibles and flammables. Refer to American National Standard Z49.1 for fire prevention during the use of welding and allied procedures.				
Unusual Fire and Explosion Hazards: N/A				
<b>SECTION 5 – REACTIVITY DATA</b>				
Hazardous Decomposition Products: Welding fumes and gases cannot be classified simply. The composition and quantity of both are dependent upon the metal being welded, the process, procedures, and electrodes used. Other conditions which also influence the composition and quantity of the fumes and gases to which workers may be exposed include: coatings on the metal being welded (such as paint, plating, or galvanizing), the number of welders and the volume of the work area, the quality and amount of ventilation, the position of the welder's head with respect to the fume plume, as well as the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapors from cleaning and degreasing activities). When the electrode is consumed, the fume and gas decomposition products generated are different in percent and form from the ingredients listed in Section 2. Decomposition products of normal operation include those originating from the volatilization, reaction, or oxidation of the materials shown in Section 2, plus those from the base metal and coating, etc., as noted above. It is understood, however, that the elements and/or oxides to be mentioned are virtually always present as complex oxides and not as metals. (Characterization of Arc Welding Fume: American Welding Society). The elements or oxides listed below correspond to the ACGIH categories located in (TLV Threshold Limit Values for Chemical Substances and Physical Agents in the Workroom Environment). Reasonably expected constituents of the fume would include: primarily iron oxide and fluorides; secondarily complex oxides of aluminum, calcium, chromium, magnesium, manganese, nickel, potassium, silicon, sodium and zirconium when used with recommended fluxes. Primarily iron oxide, manganese oxide, and complex chromium oxides; secondarily complex oxides of molybdenum and nickel when used with gas shielding.				
Stability	Unstable <input type="checkbox"/> Stable <input checked="" type="checkbox"/>	Conditions to Avoid: Avoid breathing fumes created by the welding process.		
Incompatibility (Materials to Avoid): N/A				
Hazardous Decomposition or Byproducts: Welding fumes and gases cannot be classified simply. The composition and quantity of both are dependent upon the metal being welded, the process, procedure and electrodes used.				
Hazardous Polymerization	May Occur <input type="checkbox"/> Will Not Occur <input checked="" type="checkbox"/>	Conditions to Avoid: N/A		

## SECTION 6 – HEALTH HAZARD DATA

Threshold Limit Value: The exposure level for welding fume has been established at 5 mg/m<sup>3</sup> with OSHA's PEL and ACGIH's TLV. TLV-TWAs should be used as a guide in the control of health hazards and not as fine lines between safe and excessive concentrations. Effects of Overexposure: Electric arc welding may create one or more of the following health hazards: Fumes and Gases can be dangerous to your health. Common entry is by inhalation. Other possible routes are skin contact and ingestion. Short-Term (Acute) Overexposure to welding fumes may result in discomfort such as metal fume fever, dizziness, nausea, or dryness or irritation of nose, throat or eyes. May aggravate pre-existing respiratory problems (e.g. asthma, emphysema). Chromates present in the fume have been known to cause severe irritation of the bronchial tubes and lungs. Asthma has been reported. Exposure to extremely high levels of fluorides can cause abdominal pain, diarrhea, muscular weakness and convulsions. In extreme cases it can cause loss of consciousness and death. Long-Term (Chronic) Overexposure may lead to siderosis (iron deposits in lungs) and is believed by some investigators to affect pulmonary functions. Manganese overexposure can affect the central nervous system, resulting in impaired speech and movement. Bronchitis and some lung fibrosis have been reported. Chromates may cause ulceration and perforation of the nasal septum. Liver damage and allergic reactions, including skin rash, have been reported. Repeated exposure to fluorides may cause excessive calcification of the bone and calcification of ligaments of the ribs, pelvis, and spinal column. May cause skin rash. Chromium and nickel and their compounds are on the IARC (International Agency for Research on Cancer) and NTP (National Toxicology Program) lists as posing a carcinogenic risk to humans. Rays can injure eyes and burn skin. Electric Shock can kill. Emergency and First Aid Procedures Call for medical aid. Employ first aid techniques recommended by the American Red Cross. Eyes & Skin: If irritation or flash burns develop after exposure, consult a physician. Carcinogenicity: The composition of welding fumes may contain carcinogens, depending on several factors that are unknown and unknowable to the product manufacturer (see Section 5). Always assume that welding fumes may contain toxic and/or carcinogenic materials, and follow sound Work/Hygiene practices as recommended by ANSI Z49.1.

HMS Rating	HMS Scale	NFPA Rating	NFPA Scale
Health = 2 Flammability = 0 Reactivity = 0	4 = Severe Hazard 3 = Serious Hazard 2 = Moderate Hazard 1 = Slight Hazard 0 = Minimal Hazard	Health = 1 Flammability = 0 Reactivity = 0 Other = 0	4 = Severe Hazard 3 = Serious Hazard 2 = Moderate Hazard 1 = Slight Hazard 0 = Minimal Hazard

## SECTION 7 – PRECAUTIONS for SAFE HANDLING and USE

Read and understand the manufacturer's instructions and precautionary label on the product. See American National Standard Z49.1, "Safety in Welding and Cutting", published by the American Welding Society, P.O. Box 351040, Miami, FL 33135 and OSHA Publication 2206 (29CFR1910), U.S. Government Printing Office, Washington, D.C. 20402 for more details on many of the following:

Steps to Be Taken in Case Material Is Released or Spilled: N/A  
Waste Disposal Method: Discard any product, residue, disposable container, or liner as ordinary waste in an environmentally acceptable manner according to Federal, State and Local Regulations unless otherwise noted.

## SECTION 8 – CONTROL MEASURES

Respiratory Protection (*Specify Type*): Use respirable fume respirator or air supplied respirator when welding in confined space or general work area when local exhaust or ventilation does not keep exposure below TLV.

Ventilation: Use enough ventilation, local exhaust at the arc, or both to keep the fumes and gases from the worker's breathing zone and the general area. Train the welder to keep his head out of the fumes. Keep exposure as low as possible.

Eye Protection: Wear helmet or use face shield with filter lens shade number 12\* or darker. Shield others by providing screens and flash goggles. (\*) No specific recommendation for submerged arc.

Other Protective Clothing or Equipment: Wear hand, head, and body protection which help to prevent injury from radiation, sparks and electrical shock. See Z49.1. At a minimum this includes welder's gloves and a protective face shield, and may include arm protectors, aprons, hats, shoulder protection, as well as dark substantial clothing. Train the welder not to permit electrically live parts or electrodes to contact skin or clothing or gloves if they are wet. Insulate from work and ground.

Work/Hygiene Practices: Maintain exposure below the PEL/TLV. Use industrial hygiene monitoring to ensure that your use of this material does not create exposures which exceed PEL/TLV. Always use exhaust ventilation. Refer to the following sources for important additional information. ANSI Z49.1 The American Welding Society, P.O. Box 351040, Miami, FL 33135 – OSHA (29CFR1910) U.S. Dept. of Labor, Washington, D.C. 20210.

## OTHER INFORMATION REQUIRED BY STATE OR FEDERAL LAW

California Proposition 65 Information: Warning: This product contains a chemical known to the State of California to cause cancer.

New Jersey Right-To-Know Information: 5 most predominant ingredients/hazardous and non-hazardous) 1. Chromium; 2. Nickel; 3. Molybdenum (316 types only); 4. Manganese; 5. Iron

SARA Title III Notification Information: All chemical compounds marked with (\*\*\*) are toxic chemicals subject to the reporting requirements of Section 311, 312, and 313 of Title III of the Super Fund Amendments and Reauthorization Act (SARA) of 1986 and 40 CFR Part 372.

Disclaimer of Expressed and Implied Warranties: The information in this document is believed to be correct as of the date issued. However, no warranty of merchantability, fitness for any particular purpose, or any other warranty is expressed or is to be implied regarding the accuracy or completeness of this information, the results to be obtained from the use of this information or the product, the safety of this product, or the hazards related to its use.