SDS Number: Stainless Steel Welding Wire
Revision Date: 4/8/2025

SAFETY DATA SHEET

This Safety Data Sheet (SDS) covers welding consumables and related products and complies with OSHA's Hazard Communication Standard (29 CFR 1910.1200) and the Superfund Amendments and Reauthorization Act (SARA) of 1986. Refer to the OSHA standard for specific requirements. This SDS is available on our website at www.forneyind.com, through your sales representative, or by contacting customer service at 1-800-521-6038.

SECTION 1 – PRODUCT AND COMPANY IDENTIFICATION:

Manufacturer/Supplier:	Forney Industries, Inc.
Address:	2057 Vermont Drive Fort Collins, CO 80525
Website:	www.forneyind.com
Email:	CustomerService@forneyind.com
Phone Number:	+1 (800) 521-6038
USA Emergency Phone Number:	+1 (800) 535-5053
International Emergency Phone Number:	+1 (352) 323-3500
Trade Name:	Stainless Steel Welding Wire
AWS Specification:	A5.9
Recommended Use:	Arc and Gas Welding
Restrictions on Use:	Not Known
Forney ITEM#'s:	**42298**

SECTION 2 – HAZARDS IDENTIFICATION:

GHS Hazard Classification: Not Classified / **Label Elements** - Hazard symbol and Signal word = No symbol or signal word
Hazard statement and Precautionary statement = Not applicable
Other Hazards which do not result in GHS classification and Overview: Electric shock can kill. Wear approved head, hand and body protection, which help to prevent injury from radiation, sparks and electrical shock. Welding arc and sparks can ignite combustibles or flammable materials. See ANSI Z-49.1. This would include wearing welder's gloves and a protective face shield and may include arm protectors, apron, hats, shoulder protection, as well as dark substantial clothing. Welders should be trained not to allow electrically live parts to contract the skin or wet clothing and gloves. The welders should insulate themselves from the work and ground. Arc Rays can injure eyes and burn skin. Read and understand the manufacturer's instructions and precautionary label on this product and your employer's safety practices. See Section XIII.
As shipped these are odorless, solid rods that are nonflammable, non-explosive, non-reactive and non –hazardous and may be copper coated.
Substance: Welding fumes and gases cannot be classified simply. The composition and quantity of these fumes and gases are dependent upon the metal being welded, the procedures followed and the electrodes used. Fumes may affect eyes, skin, respiratory system as well as pancreas and liver.
Workers should be aware that the composition and quantity of fumes and gases to which they may be exposed, are influenced by: coatings which may be present on the metal being welded (such as paint, plating, or galvanizing), the number of welders in operation 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 procedure). When the filler is consumed, the fumes and gas decomposition products generated are different in percent and form from the ingredients listed in Section III, The composition of these fumes and gases are the concerning matter and not the composition of the electrode itself. Decomposition products include those originating from the volatilization, reaction, or oxidation of the ingredients shown in Section III, plus those from the base metal, coating and the other factors noted above.
Reasonable expected fume constituents of this product would include: Complex oxides or compounds of iron, manganese, silicon, copper, aluminum, titanium, and zirconium. (Other complex oxides may be present when using fluxes).

Chemical Identity	CAS No.	EINECS#
Carbon dioxide	124-38-9	204-696-9
Carbon monoxide	630-8-0	211-128-3
Nitrogen dioxide	10102-44-0	233-272-6
Ozone	10028-15-6	233-069-2
Manganese (Mn)	7439-96-5	231-105-1
Nickel (Ni)	7440-02-0	231-111-4
Chromium oxide	1308-38-9	215-160-9

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SECTION 3 - COMPOSITION/INFORMATION ON INGREDIENTS:

*The term "HAZARDOUS MATERIALS" should be interpreted as a term required and defined in OSHA HAZARD COMMUNICATION STANDARD 29 CFR 1910.1200 however the use of this term does not necessarily imply the existence of any hazard.

Chemical Identity Ingredients	CAS No.	EINECS#	Chemical Identity Ingredients	CAS No.	EINECS#
Iron (Fe) (limits as oxide fume)	7439-89-6	231-096-4	Molybdenum (Mn)	7439-98-7	231-107-2
Manganese (Mn) (limits as fume)	7439-96-5	231-105-1	Nickel (Ni)	7440-02-0	231-111-4
Silicon (Si)	7440-21-3	231-130-8	Copper (Cu)	7440-50-8	231-159-6
Carbon	7440-44-0	231-153-3	Chromium (Cr)	7440-47-3	231-157-5
Tungsten	7440-33-7	231-143-9	Vanadium (V) Respirable dust	7440-62-2	231-171-1
Cobalt	7440-48-4	231-158-0	Niobium	7440-03-1	231-113-5
Tantalum	7440-25-7	231-125-5	Titanium	7440-32-6	231-142-3

Chemical Composition Percent by Weight

AWS Classification	C	Cr	Ni	Mo	Nb (Cb) plus Ta	Mn	Si	P	S	N	Cu	OTHERS
ER209 N50[1]	0.05	20.5-24.0	9.5-12.0	1.5-3.0	—	4.0-7.0	0.90	0.03	0.03	0.10-0.30	0.75	V= 0.10-0.30
ER218 N60[1]	0.10	16.0-18.0	8.0-9.0	0.75	—	7.0-9.0	3.5-4.5	0.03	0.03	0.08-0.18	0.75	
ER219 N40[1]	0.05	19.0-21.5	5.5-7.0	0.75	—	8.0-10.0	1.00	0.03	0.03	0.10-0.30	0.75	
ER240 N35[1]	0.05	17.0-19.0	4.0-6.0	0.75	—	10.5-13.5	1.00	0.03	0.03	0.10-0.30	0.75	
ER307 AWS	0.04-0.14	19.5-22.0	8.0-10.7	0.5-1.5	—	3.30-4.75	0.30-0.65	0.03	0.03	—	0.75	
ER308	0.08	19.5-22.0	9.0-11.0	0.75	—	1.0-2.5	0.30-0.65	0.03	0.03	—	0.75	
ER308Si	0.08	19.5-22.0	9.0-11.0	0.75	—	1.0-2.5	0.65-1.00	0.03	0.03	—	0.75	
ER308H	0.04-0.08	19.5-22.0	9.0-11.0	0.50	—	1.0-2.5	0.30-0.65	0.03	0.03	—	0.75	
ER308L	0.03	19.5-22.0	9.0-11.0	0.75	—	1.0-2.5	0.30-0.65	0.03	0.03	—	0.75	
ER308LSi	0.03	19.5-22.0	9.0-11.0	0.75	—	1.0-2.5	0.65-1.00	0.03	0.03	—	0.75	
ER308Mo	0.08	18.0-21.0	9.0-12.0	2.0-3.0	—	1.0-2.5	0.30-0.65	0.03	0.03	—	0.75	
ER308LMo	0.04	18.0-21.0	9.0-12.0	2.0-3.0	—	1.0-2.5	0.30-0.65	0.03	0.03	—	0.75	
ER309	0.12	23.0-25.0	12.0-14.0	0.75	—	1.0-2.5	0.30-0.65	0.03	0.03	—	0.75	
ER309Si	0.12	23.0-25.0	12.0-14.0	0.75	—	1.0-2.5	0.65-1.00	0.03	0.03	—	0.75	
ER309L	0.03	23.0-25.0	12.0-14.0	0.75	—	1.0-2.5	0.30-0.65	0.03	0.03	—	0.75	
ER309LSi	0.03	23.0-25.0	12.0-14.0	0.75	—	1.0-2.5	0.65-1.00	0.03	0.03	—	0.75	
ER309Mo	0.12	23.0-25.0	12.0-14.0	2.0-3.0	—	1.0-2.5	0.30-0.65	0.03	0.03	—	0.75	
ER309LMo	0.03	23.0-25.0	12.0-14.0	2.0-3.0	—	1.0-2.5	0.30-0.65	0.03	0.03	—	0.75	
ER310	0.08-0.15	25.0-28.0	20.0-22.5	0.75	—	1.0-2.5	0.30-0.65	0.03	0.03	—	0.75	
ER312	0.15	28.0-32.0	8.0-10.5	0.75	—	1.0-2.5	0.30-0.65	0.03	0.03	—	0.75	
ER316	0.08	18.0-20.0	11.0-14.0	2.0-3.0	—	1.0-2.5	0.30-0.65	0.03	0.03	—	0.75	
ER316Si	0.08	18.0-20.0	11.0-14.0	2.0-3.0	—	1.0-2.5	0.65-1.00	0.03	0.03	—	0.75	
ER316H	0.04-0.08	18.0-20.0	11.0-14.0	2.0-3.0	—	1.0-2.5	0.30-0.65	0.03	0.03	—	0.75	
ER316L	0.03	18.0-20.0	11.0-14.0	2.0-3.0	—	1.0-2.5	0.30-0.65	0.03	0.03	—	0.75	
ER316LSi	0.03	18.0-20.0	11.0-14.0	2.0-3.0	—	1.0-2.5	0.65-1.00	0.03	0.03	—	0.75	
ER316LMn	0.03	19.0-22.0	15.0-18.0	2.5-3.5	—	5.0-9.0	0.30-0.65	0.03	0.03	0.10-0.20	0.75	
ER317	0.08	18.5-20.5	13.0-15.0	3.0-4.0	—	1.0-2.5	0.30-0.65	0.03	0.03	—	0.75	
ER317L	0.03	18.5-20.5	13.0-15.0	3.0-4.0	—	1.0-2.5	0.30-0.65	0.03	0.03	—	0.75	
ER318	0.08	18.0-20.0	11.0-14.0	2.0-3.0	8 x C, min. to 1.00 max.	1.0-2.5	0.30-0.65	0.03	0.03	—	0.75	
ER320	0.07	19.0-21.0	32.0-36.0	2.0-3.0	8 x C, min. to 1.00 max.	2.5	0.60	0.03	0.03	—	3.0-4.0	
ER320LR	0.025	19.0-21.0	32.0-36.0	2.0-3.0	8 x C, min. to 0.40 max.	1.5-2.5	0.15	0.015	0.02	—	3.0-4.0	
ER321	0.08	18.5-20.5	9.0-10.5	0.75		1.0-2.5	0.30-0.65	0.03	0.03	—	0.75	Ti =9 x C, min. to 1.00 max.
ER330	0.18-0.25	15.0-17.0	34.0-37.0	0.75	—	1.0-2.5	0.30-0.65	0.03	0.03	—	0.75	
ER347	0.08	19.0-21.5	9.0-11.0	0.75	10 x C, min. to 1.00 max.	1.0-2.5	0.30-0.65	0.03	0.03	—	0.75	
ER347Si	0.08	19.0-21.5	9.0-11.0	0.75	10 x C, min. to 1.00 max.	1.0-2.5	0.65-1.00	0.03	0.03	—	0.75	
ER383	0.025	26.5-28.5	30.0-33.0	3.2-4.2		1.0-2.5	0.50	0.02	0.03	—	0.70-1.50	
ER385 (904L)	0.025	19.5-21.5	24.0-26.0	4.2-5.2		1.0-2.5	0.50	0.02	0.03	—	1.2-2.0	
ER409	0.08	10.5-13.5	0.6	0.50		0.8	0.8	0.03	0.03	—	0.75	Ti =10 x C, min. to 1.5 max.

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ER409Nb (or Cb)	0.08	10.5-13.5	0.6	0.50	10 x C, min. to 0.75 max.	0.8	1.0	0.04	0.03	—	0.75	
ER410	0.12	11.5-13.5	0.6	0.75	—	0.6	0.5	0.03	0.03	—	0.75	
ER410NiMo	0.06	11.0-12.5	4.0-5.0	0.4-0.7	—	0.6	0.5	0.03	0.03	—	0.75	
ER420	0.25-0.40	12.0-14.0	0.6	0.75	—	0.6	0.5	0.03	0.03	—	0.75	
ER430	0.10	15.5-17.0	0.6	0.75	—	0.6	0.5	0.03	0.03	—	0.75	
ER439	0.04	17.0-19.0	0.6	0.5		0.8	0.8	0.03	0.03	—	0.75	Ti = 10 x C, min. to 1.1 max
ER446LMo	0.015	25.0-27.5	0.5 w/Ni	0.75-1.50	—	0.4	0.4	0.02	0.02	0.015	0.5 w/Cu	
ER630(17-4PH)	0.05	16.0-16.75	4.5-5.0	0.75	0.15-0.30	0.25-0.75	0.75	0.03	0.03	—	3.25-4.00	
ER19-10H	0.04-0.08	18.5-20.0	9.0-11.0	0.25	0.05	1.0-2.0	0.30-0.65	0.03	0.03	—	0.75	Ti =0.05
ER16-8-2	0.10	14.5-16.5	7.5-9.5	1.0-2.0	—	1.0-2.0	0.30-0.65	0.03	0.03	—	0.75	
ER2209	0.03	21.5-23.5	7.5-9.5	2.5-3.5		0.50-2.00	0.90	0.03	0.03	0.08-0.20	0.75	
ER2553	0.04	24.0-27.0	4.5-6.5	2.9-3.9		1.5	1.0	0.04	0.03	0.10-0.25	1.5-2.5	
ER2594	0.03	24.0-27.0	8.0-14.5	2.5-4.5		2.5	1.0	0.03	0.02	0.08-0.20	1.5	W=1.0
TENSILEWELD	0.25	25.0-32.0	8.0-10.5	2.50	—	1.0-3.5	0.30-1.25	0.03	0.03	—	1.25	
ER33-31	0.015	31.0-35.0	30.0-33.0	0.5-2.0		2.00	0.50	0.02	0.01	0.35-0.60	0.3-1.2	
ER3556	0.05-0.15	21.0-23.0	19.0-22.5	2.5-4.0	—	0.50-2.00	0.20-0.80	0.04	0.015	0.10-0.30		
	Others Co=16.0-21.0, W=2.0-3.5, Nb=0.30, Ta=0.30-1.25, Al=0.10-0.50, Zr=0.001-0.100, La=0.005-0.100, B=0.02											
ER307	0.14	18.0-22.0	8.0-10.7	1.5	—	5.30-8.75	0.30-0.65	0.04	0.04	—	0.75	
ER307Si	0.14	18.0-22.0	8.0-10.7	1.5	—	5.30-8.75	0.65-1.25	0.04	0.04	—	0.75	
PH 13-8Mo	0.05	12.25-13.25	7.5-8.5	2.0-2.5	O =0.005	0.20	0.10	0.01	0.01	0.01	Al=0.90-1.35	H=0.0025
ER15-5Ph	0.07	14.0 0-15.50	3.50-5.50		0.15-0.45	1.00	1.00	0.04	0.03		2.50-4.50	
PH 15-7Mo	0.09	14.00-16.00	6.50-7.75	2.0-3.0	O =0.005	1.00	1.00	0.04	0.03	0.01	Al=0.75-1.50	H=0.0025
A286	0.08	13.5-16.0	24.0-27.0	1.00-1.50	Ti=1.90-2.35	2.00	1.00	0.04	0.03	V=0.10-0.50	Al=0.35	B=0.001-.0.01
PH AM 355	0.10-0.15	15.0-16.0	4.0-5.0	2.50-3.25		0.50-1.25	0.50	0.04	0.03	0.07-0.13	0.50	
ER 17-7 PH	0.10	16.0-18.0	6.0-8.0	0.75	0.50	1.00	1.00	0.04	0.04	-	0.75	
ER 21-6-9	0.10	18.0-22.0	5.0-8.0	0.75	-	8.0-10.0	1.00	0.08	0.04	0.15-0.50	0.75	
ER 2283L	0.03	21.5-23.5	7.5-9.5	2.5-3.5		0.50-2.00	0.90	0.03	0.03	0.08-0.20	0.75	
ER 304L	0.08	17.5-22.0	7.0-13.0	0.75	—	2.50	1.50	0.045	0.045	—	0.75	
ER347H	0.04-0.10	17.0-21.5	9.0-13.0	0.75	8x C, min. to 1.00 max.	2.50	2.00	0.04	0.04	—	0.75	
ER 349	0.04-0.13	17.0-21.5	8.0-9.50	0.75	1.00 min	1.00-2.50	0.30-0.65	0.04	0.04	—	0.75	W=1.25-1.75, Ti =0.10-0.30
ER 440C	0.95-1.20	16.0-18.0	-	0.75	-	1.0	1.0	0.04	0.03	-		
ER 253MA®	0.10	20.0-22	9.0-12.0	0.75	-	1.00	1.0-2.0	0.04	0.30	0.14-0.20	-	Ce = 0.08
ER 309H	0.04-0.12	23.0-25.0	12.0-14.0	0.75	—	1.0-2.5	0.30-0.65	0.03	0.03	—	0.75	
ER363	0.05	10.5-12.5	3.5-5.5	0.50	-	0.50	0.30	0.03	0.03	-	0.50	Ti = 8 x C, min. to 1.0 max Al = 0.1, Sn = 0.05
ER505 (†) NOW ER80S-B8	0.10	8.0-10.5	0.6	0.45-0.65		0.6	0.5	0.03	0.03	-	0.75	

[1] N= NITRONIC ® is a registered trademark of AK Steel. 253MA® is a registered trademark Avesta Sheffield (†) Similar to current class ER80S-B8

Other elements or ingredients may be present but in quantities much less than 1%.(1) Subject to reporting requirements of Section 302, 304, 311, 312, and 313 of the Emergency Planning and Community Right-To-Know Act of 1986 and 40CFR 370 and 372; (Resp) = Respiratory/ Respiration: Welding and cutting of products that contain Chromium may produce hexavalent chromium and YOU should read and follow OSHA's final rules Fed Register #:71:10099-10385 dated 02-28-2006. Occupational Safety and Health Administration 29 CFR 1910.1000 Permissible Exposure Limit (PEL). American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV[R]). *Ceiling Limit **Short Term Exposure Limit

SECTION 4 – FIRST AID MEASURES:

Contact with skin, eyes, ingestion or injection should not be a source for exposure with proper protection.

Ingestion: Avoid contact with metal fume or powers which may lead to ingestion

Inhalation: If breathing has stop or difficult move to fresh air and as needed perform artificial respiration. Call medical assistance or physician.

Skin Contact: Remove any contaminated clothing, gloves or other personnel equipment and promptly wash/flush with mild soap and water. For reddish or blistered skin from thermal/arc radiation promptly wash/flush with water. Get medical assistance or physician help as needed.

Eye Contact: Arc radiation can injure eyes and also cause an arc flash – if this occurs, move to dark room removing lenses as required and get rest and cover eyes with non-stick dressings (padded dressing) Removal of dust and fumes requires flushing with abundant amounts of clean water for at least 15 minutes. Get medical assistance or physician help as needed or if issues persist.

Most important symptoms/effects, acute and delayed:

Symptoms: Short-term (acute) overexposure to welding fumes may result in discomfort such as metal fume fever, dizziness, nausea, dryness or irritation of nose, throat, or eyes. Pre-existing respiratory issues may be aggregated. Long-term (chronic) over-exposure to welding fumes can lead to siderosis (iron deposits in lung) and is believed to affect pulmonary function. Manganese and Manganese compounds above safe exposure limits can affect or cause irreversible damage to the central nervous system, including the brain: symptoms may result in impaired speech and movement, lack of energy, stiffness in legs, feet, toes, muscular weakness as well as psychological disturbances. Reports of bronchitis and lung fibrosis have also been noted.

Hazards: Welding fumes and gases cannot be classified simply. Refer to Section II under Substance

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SECTION 5 – FIRE-FIGHTING MEASURES:

As shipped these are odorless, solid rods that are nonflammable, non-explosive, non-reactive and non –hazardous. Welding arcs and sparks can ignite combustibles or flammable materials Read and understand the manufacturer's instructions and precautionary label on this product and your employer's safety practices. Read and understand: American National Standard ANSI Z49.1 *Safety in Welding, Cutting and Allied Processes*, published by the AMERICAN WELDING SOCIETY, 550 N.W. LeJeune Road, Miami, Florida 33126; OSHA *Safety and Health Standards* are published by the U.S. Government Printing Office, 732 North Capitol Street NW, Washington, DC 20401. Also National Fire Protection Association NFPA 51B, *Standard for Fire Prevention During Welding, Cutting and other Hot Work*

Suitable (and unsuitable) extinguishing media: As shipped these items will not burn however in the event use media recommended for the burning materials and fire situation and surroundings. No unsuitable media known at this time.
Specific hazards arising from the chemicals: Welding arcs and sparks can ignite combustibles or flammable materials
Specific protective equipment and precautions for firefighters: Wear self-contained breathing apparatus and full protective clothing in case of fire or when fumes and vapors are present. Follow general fire-fighting precautions as in the workplace.

SECTION 6 – ACCIDENTAL RELEASE MEASURES:

Personal Precautions, protective equipment and emergency procedures: With airborne dust and fumes be sure to use adequate engineering ventilation controls and personal protection to prevent overexposure limits recommendations found in Section VIII.
Environment precautions: Control work practices to eliminate environmental release. These products are solid metal rods, with no spill or leak hazards as shipped. If product becomes molten dam up with sand type media until it cools back to a solid and reuse/recycle as scrap.
Methods and Materials for containment and cleaning up: Solid rods can be picked up and placed back in the original container. Clean up immediately while following all safety guidelines as well as using all personal protection safety listed in section VIII. Avoid generating dust and prevent materials from entering and drains, sewers or water sources. Disposal considerations found in Section XIII.
When fumes and vapors are present. Follow general fire-fighting precautions as in the workplace.

SECTION 7 – HANDLING AND STORAGE:

Precautions for safe handling: Handle with care wearing gloves and keep formation of airborne dust and fumes to a minimum. If needed use adequate engineering ventilation controls and personal protection to prevent overexposure limits recommendations found in Section VIII. Also read American National Standard ANSI Z49.1 *Safety in Welding, Cutting and Allied Processes*, published by the AMERICAN WELDING SOCIETY, 550 N.W. LeJeune Road, Miami, Florida 33126; OSHA *Safety and Health Standards* are published by the U.S. Government Printing Office, 732 North Capitol Street NW, Washington, DC 20401. Do not eat or drink while using these products and ensure proper ventilation is used. Wash hands after use.
Conditions for safe storage, including any incompatibilities: All employees who handle these products should be trained to handle it safely. Open packages of these products/containers on a safe stable surface and must be properly labeled at all times. Store products in original closed packages, cool dry place, while avoiding extreme temperatures or incompatible items such as acids, oxidizers and halogens. Always follow all regulations in accordance with local/regional/state/national guidelines.

SECTION 8 – EXPOSURE CONTROLS AND PERSONAL PROTECTION:

Control parameters

Flux or other ingredients	CAS No.	EINECS#	Exposure Limit (mg/m³)		
			OSHA PEL	ACGIH TLV	NIOSH REL
Iron (Fe) (limits as oxide fume)	7439-89-6	231-096-4	10	5 (Resp)	5.0
Carbon (C)	7440-44-0	231-153-3	10 (TOTAL) 2 (Resp)	15 (TOTAL)5 (Resp)	-
Manganese (Mn) (limits as fume) (1)	7439-96-5	231-105-1	1 , 3.0** , 5*	0.02 (Resp) 0.1***	1.0
Silicon (Si)	7440-21-3	231-130-8	15 (dust) 5 (Resp)	WITHDRAWN	5 (Resp) 10 (TOTAL)
Copper (Cu) (1)	7440-50-8	231-159-6	1 (dust) 0.1(fume)	1 (dust) 0.2 (fume)	1.0
Chromium (Cr) (C) (1)	7440-47-3	231-157-5	1 (metal) 0.5 (Cr III) 0.005 (Cr VI)	0.5 (metal) 0.5 (Cr III) 0.05 (Cr VI) (SC) 0.01 (Cr VI)	0.5 (metal)
Nickel (Ni) (1)	7440-02-0	231-111-4	1	1.5 (inhalable fraction)	0.015
Tantalum	7440-25-7	231-125-5	5.0	5.0,10.0**	5.0
Niobium	7440-03-1	231-113-5	NA	NA	NA
Titanium (Ti) Oxide dust (1) (2)	7440-32-6	231-142-3	15(total particulate) 5 (Resp)	10, 20**	NA

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Cobalt	7440-48-4	231-158-0	0.1	0.02	0.05
Tungsten (W)	7440-33-7	231-143-9	5.0 ,10.0**	5.0 ,10.0**	5.0
Vanadium (V) Respirable dust[(1)]	7440-62-2	231-171-1	0.05 as V_2O_5	0. 5 * as V_2O_5	1.0

(SC)

Other elements or ingredients may be present but in quantities much less than 1%.[(1)] Subject to reporting requirements of Section 302, 304, 311, 312, and 313 of the Emergency Planning and Community Right-To-Know Act of 1986 and 40CFR 370 and 372; (Resp) = Respiratory/ Respiration: [(C)] TLV & PEL for water soluble Cr. III and Cr. VI , Welding and cutting of products that contain Chromium may produce hexavalent chromium and YOU should read and follow OSHA's final rules Fed Register #:71:10099-10385 dated 02-28-2006. Occupational Safety and Health Administration 29 CFR 1910.1000 Permissible Exposure Limit (PEL). American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV[R]).*Ceiling Limit**Short Term Exposure Limit***Inhalable fraction [(SC)] = Soluble compounds

ACGIH - **A**merican **C**onference of **G**overnmental **I**ndustrial **H**ygienists, a professional association which establishes exposure limits used a guideline in control for health hazards but not an indication of safe and dangerous exposure limits **TLV - Threshold Limit Value** - an airborne concentration of a substance, which represents conditions under which it is generally believed that nearly all workers, may be repeatedly exposed without adverse effect. The duration must be considered, including the 8-hour & **BEI** - Biological Exposure Indices, represent the levels of determinants which are most likely to be observed in specimens collected from a healthy worker who has been exposed to chemicals to the same extent as a worker with inhalation exposure to the TLV. **OSHA** - U.S. Occupational Safety and Health Administration. **PEL - Permissible Exposure Limit** - this exposure value means the same as a TLV, except that it is limits guideline by OSHA.

Eye Protection: Wear a helmet or face shield with a filter lens shade number 12-14 or darker for arc welding. Shield other workers by providing screens and flash goggles. Use face-shield with filter lens of appropriate shade number (per ANSI Z49.1-1988, "Safety in Welding and Cutting").

Protective Clothing: Wear approved head, hand and body protection, which help to prevent injury from radiation, sparks and electrical shock. See ANSI Z-49.1. This would include wearing welder's gloves and a protective face shield and may include arm protectors, apron, hats, shoulder protection, as well as dark substantial clothing. Welders should be trained not to allow electrically live parts to contract the skin or wet clothing and gloves. The welders should insulate themselves from the work and ground.

Ventilation: Use plenty of ventilation and/or local exhaust at the arc, to keep the fumes and gases below the threshold limit value within the worker's breathing zone and the general work area. Welders should be advised to keep their head out of the fumes.

Respiratory Protection: Use respirable fume respirator or air supplied respirator when welding in a confined space or general work area where local exhaust and/or ventilation does not keep exposure below the threshold limit value.

HYGIENE/ WORK PRACTICES: With all chemicals/materials, avoid getting these products ON YOU or IN YOU. Wash hands after handling these products. Do not eat or drink while handling these products. Use ventilation and other engineering controls to minimize potential exposure to these products.

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES:

Appearance / Color / Odor / Physical state / Form: Silver to gray round solid welding rods or wire that are odorless varying in color

Odor Threshold / pH / Flash Point / Evaporation Rate / Flammability (Solid, Gas) / Upper & Lower Flammability or Explosive Limits: No data available

Vapor Pressure & Density / Relative Density / Solubility(water/other) / Partition coefficient (n-octanol/water) / Auto-ignition Decomposition temperature : No data available

SECTION 10 – STABILITY AND REACTIVITY:

Chemical stability: These products are considered stable as shipped and under normal conditions

Possibility of hazard reactions: No data and will not occur

Conditions to avoid: Avoid exposure to extreme temperatures, Incompatible materials

Incompatible materials: Incompatible items such as acids, oxidizers and halogens Strong acids, strong oxidizers, mineral acids, and halogens. **Hazardous decomposition products:** Read Substance in Section II. Welding and cutting of products that contain Chromium may produce hexavalent chromium and YOU should read and follow OSHA's final rules Fed Register #:71:10099-10385 dated 02-28-2006. Occupational Safety and Health Administration 29 CFR 1910.1000 Permissible Exposure Limit (PEL). The best method to determine the actual composition of generated fumes and gases is to take an air sample from inside the welder's helmet if worn or in breathing zone. For additional information, refer to the American Welding Society Publication, "Fumes and Gases in the Welding Environment".

SECTION 11 – TOXICOLOGICAL INFORMATION:

Oral/Dermal/inhalation Iron: (Human-child); TDLo: 77 mg/kg. Oral (rat); LD50:30 gm/kg. Intraperitoneal (rabbit); LDLo: 20 mg/kg. Oral (guinea pig); LD50:20 gm/kg. Oral (rat); TDLo: 63 gm/kg/6W-C. Inhalation (rat); 250 mg/m3/6H/4W-I. Intratracheal (rat); TDLo: 450 mg/kg/15W-I. Silicon: Acute oral toxicity (LD50): 3160 mg/kg [Rat]. Copper: Acute oral LD50:481 mg/kg (rat); Cobalt: Acute Dermal LD50 :> 2000 mg/kg (rat) Acute Inhalation 4hours LD50:165 mg/kg (rat); Chromium (VI) Acute oral toxicity LD 50 (Rat): 27-59 mg/kg Inhalation (Rat 4h): 33-70 mg/m^3. Manganese: Acute oral toxicity (LD50): 9000 mg/kg [Rat].

Skin corrosion or irritation / Serious eye damage or irritation / Respiratory or skin sensitization / Germ cell mutagenicity / Reproductive toxicity / Specific target organ toxicity – single exposure / Specific target organ toxicity – repeated exposure: Not classified **Carcinogenicity:** Arc Rays can injure eyes and burn skin. Skin cancer has been reported. **Information on the likely routes of exposures: Ingestion** is not a likely route of exposure for this

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product or expected under normal use. If swallowed call physician immediately! Do not induce vomiting unless directed by medical personnel. Rinse mouth with water if person is conscious. Never give fluids or induce vomiting if person is unconscious, having convulsions, or not breathing. **Inhalation** of welding fumes and gases can be dangerous to your health.
Skin/Eye Contact: Arc Rays can injure eyes and burn skin. Skin cancer has been reported. International Agency for Research on Cancer **IARC**- has classified welding fumes, Cobalt & Nickel as a possible carcinogenic to humans (Group 2B). Chromium (VI) evaluation as carcinogenic to humans (Group1). Chromium oxides evaluation, not classified as to carcinogenicity to humans (Group 3). **National Toxicology Program** (NTP) list Nickel with Reasonably Anticipated to be a Human Carcinogen; Chromium (VI) known to be human carcinogen. **OSHA Specifically Regulated Substances** Chromium (VI) Cancer Symptoms **related to physical, chemical and toxicological characteristics: Inhalation:** Chromium (VI) and compounds pose a cancer risk to humans; liver damage, allergic and skin rash have been reported. Nickel and compounds pose a respiratory cancer risk, and may give skin itch to dermatitis. Short-term (acute) overexposure to welding fumes may result in discomfort such as metal fume fever, dizziness, nausea, dryness or irritation of nose, throat, or eyes. Pre-existing respiratory issues may be aggregated. Long-term (chronic) over-exposure to welding fumes can lead to siderosis (iron deposits in lung) and is believed to affect pulmonary function. Manganese and Manganese compounds above safe exposure limits can affect or cause irreversible damage to the central nervous system, including the brain: symptoms may result in impaired speech and movement, lack of energy, stiffness in legs, feet, toes, muscular weakness as well as psychological disturbances. Reports of bronchitis and lung fibrosis have also been noted.

Delayed and immediate effects and also chronic effects from short and long term exposure: There are no immediate health hazards associated with the wire or rod form of this product. Skin, respiratory, pancreas, and liver disorders may be aggravated by prolonged over-exposures to the dusts or fumes generated by these products. Pre-existing respiratory issues may be aggregated. Long-term (chronic) over-exposure to welding fumes can lead to siderosis (iron deposits in lung) and is believed to affect pulmonary function. Manganese and Manganese compounds above safe exposure limits can affect or cause irreversible damage to the central nervous system, including the brain: symptoms may result in impaired speech and movement, lack of energy, stiffness in legs, feet, toes, muscular weakness as well as psychological disturbances. Reports of bronchitis and lung fibrosis have also been noted. Treat symptoms and eliminate overexposure. **Other information during use**: **Inhalation acute toxicity**: Carbon dioxide LC Lo (Human, 5 min): 90000 ppm, Carbon monoxide LC 50 (Rat, 4 h): 1,300 mg/l, Nitrogen dioxide LC 50 (Rat, 4 h): 88 ppm, Ozone LC Lo (Human, 30 min): 50 ppm, Chromium (VI) LC 50 (Rat, 4 h): 33-70 mg/m^3

SECTION 12 – ECOLOGICAL INFORMATION:

Ecotoxicity / Persistence and Degradability / Bioaccumulative Potential / Mobility in Soil:
Acute; Fish /Aquatic *Invertebrates* Aquatic *Environment* = Iron= LC50 Channel catfish (Ictalurus punctatus) > 500 mg/l, 96 hours**; Nickel** LC50 Fathead minnows (Pimephales promelas) 2.916 mg/l, 96 hours**,** *EC50 Water flea* (Daphnia obtusa) 1 mg/l, 48 hours **; Copper** LC50 Fathead minnows (Pimephales promelas) 1.6 mg/l, 96 hours**,** *EC50 Water flea* (Daphnia obtusa) 0.102 mg/l, 48 hours, ***Environment-Toxicity to Aquatic Plants*** *LC50(green algeea (scenedesmus dimorphuis) 3 days) 0.0623 mg/l,* **;Molybdenum** LC50 Rainbow trout, Donaldson trout (Oncorhynchus mykiss) 800 mg/l, 96 hours**, Manganese** = *EC 50 (Water flea* (Daphnia magna), 48 h): 40 mg/l;
Persistence and Degradability / Mobility in Soil: No data
Bioaccumulative Potential Accumulation/The product contains potentially bioaccumulating substances.
Bioaccumulative Potential
Bioconcentration Factor (BCF) Product: No data available. **Specified substance(s):** Nickel Zebra mussel (Dreissana polymorpha), Bioconcentration Factor (BCF): 5,000 – 10,000 (lotic) Biocencentration factor calculated using dry weight tissue concentration: Copper and/or copper alloys and compounds (as Cu) Blue-green algea (Anacystis nidulans), Bioconcentration Factor (BCF): 36.01 (Static); Cobalt and compounds (as Co) Brown shrimp (Penaeus aztecus), Bioconcentration Factor (BCF) : >2,250 -<2,500 (Static)

Other Adverse Effects: Possibly harmful to aquatic life. Do not allow material to be released to the environment without proper governmental permits. No further relevant information available.

SECTION 13 – DISPOSAL CONSIDERATIONS:

Disposal Methods: Avoid or minimize generating waste**.** When possible collect scrap and by-products with proper id for recycling. Waste disposal must be in accordance with appropriate Federal, National, Provincial, State, and local regulations. These products, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority.

SECTION 14 – TRANSPORT INFORMATION:

UN Number / UN Proper shipping name / Transport Hazard class (es)/ Packing group / Marine pollutant / Special Precautions: Not Regulated as Dangerous Good or Not Regulated, No international regulations

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SECTION 15 – REGULATORY INFORMATION:

United States: TSCA INVENTORY STATUS: The components of these products are listed on the TSCA Inventory
CERCLA REPORTABLE QUANTITY (RQ): Copper = 5000 lbs. (for particulates less than 100 micrometers in size). Nickel = 100 lbs. Chromium and Chromium compounds or alloys 5000 lbs. Manganese & Cobalt = Reportable quantity: Included in the regulation but with no data values. See regulation (40 CFR 302.4). **EPCRA/SARA Title III 313 Toxic Chemicals** The following metallic components are listed as SARA 313 "Toxic Chemicals" and potential subject to annual SARA 313 reporting. See Section 3 for weight percent. Ingredient & Disclosure threshold: Copper 1.0% de minimis concentration; Manganese 1.0% de minimis concentration; Chromium 1.0% de minimis concentration; Nickel 0.1% de minimis concentration
Section 311 Hazard Class: As shipped: Immediate (Acute) In use: Immediate & delayed (Acute)

California Proposition 65: **WARNING**: This product may expose you to chemicals including [Cobalt (II) Oxide, Titanium dioxide (airborne, unbound particles of respirable size), Chromium (hexavalent compounds), Nickel, Lead and Lead Compounds, Carbon Black, Cadmium, Beryllium and Beryllium Compounds] which are known to the State of California to cause cancer, and [Chromium (hexavalent compounds), Nickel, Lead and Lead Compounds, Cadmium] which are known to the State of California to cause birth defects and/or other reproductive harm. For more information go to https://www.p65warnings.ca.gov/
Nickel, Cobalt and Chromium as possible carcinogens

US State Regulations list:
Alaska-Designated Toxic and Hazardous Substances: Carbon Black, Manganese.
California-Hazardous Substances Listed substance: Carbon Black, Chromium, Copper, Manganese, Molybdenum, Silicon, Iron, Iron oxide, Nickel,
California Proposition 65 - Carcinogens & Reproductive Toxicity (CRT): Listed substance: Hexavalent chromium compounds, Nickel **- CRT: Listed date/Carcinogenic substance**: Hexavalent chromium compounds (2-27-1987), Nickel (10-1-1989) **- CRT: Listed date/Developmental toxin & Listed date/Male or Female reproductive toxin:** Hexavalent chromium compounds (12-19-2008)
Florida-Substance List: Manganese
Illinois-Toxic Substance List: Carbon Black, Copper, Manganese and Silicon.
Kansas-Section 302/313 List: Copper, and Manganese.
Massachusetts-Substance List: Carbon Black, Chromium, Copper, Manganese, Molybdenum, Nickel, Silicon
Michigan - Critical Materials Register: Copper.
Minnesota-List of Hazardous Substances: Welding Fumes, Carbon Black, Manganese, and Silicon.
Missouri-Employer Information/Toxic Substance List: Carbon Black, Copper, Manganese, Molybdenum, Silicon,
New Jersey-Right to Know Hazardous Substance List: Carbon Black, Chromium, Hexavalent chromium compounds, Copper, Iron, Iron oxide, Manganese, Molybdenum, Nickel, Silicon,
North Dakota-List of Hazardous Chemicals, Reportable Quantities: Copper.
Pennsylvania-Hazardous Substance List: Carbon Black, Copper, Hexavalent chromium compounds, Chromium, Manganese, Molybdenum, Nickel, Silicon,
Rhode Island-Hazardous Substance List: Welding Fumes, Carbon Black, Manganese, Nickel, Silicon,
Texas-Hazardous Substance List: Carbon Black, Manganese
West Virginia-Hazardous Substance List: Carbon Black, Manganese.
Wisconsin-Toxic and Hazardous Substances: Carbon Black, Manganese.

SECTION 16 – OTHER INFORMATION:

HMIS® ratings Health: 2 Flammability: 0 Physical hazard: 0
NFPA CODES: FIRE: 0 HEALTH: 2 REACTIVITY: 0



U.S. DOT = Material is not hazardous and is not considered as a dangerous item.