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MSDS NO: SOLID WIRE AND RODS I
REVISED 3-88

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MATERIAL SAFETY DATA SHEET (MSDS)

For Welding Consumables and Related Products
Conforms to OSHA Hazard Communication Standard 29CFR 1910.1200
Standard Must Be Consulted for Specific Requirements

SECTION I - IDENTIFICATION

Manufacturer/Supplier Name: Washington Alloy Company		Telephone No: 206-848-2230
Address: 9809 160th St E., Puyallup, WA 98373		Emergency No: 206-848-2230
Trade Name	Classification:	
USA 70S-2, USA 70S-3, USA 70S-4, USA 70S-6 USA RG 45, USA RG 60 USA EL12, USA EM12K, USA EH14	AWS A5.18 Carbon Steel Wire AWS A5.2 Gas Welding Rod AWS A5.17 Submerged Arc Wire	

SECTION II - HAZARDOUS MATERIALS*

IMPORTANT: This section covers the materials from which the product is manufactured. The fumes and gases produced during welding with the normal use of this product are covered under Section V.

*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.

Flux or other ingredients	CAS No.	Exposure Limit (mg/m ³)	
		OSHA PEL	ACGIH TLV
Iron	7439-89-6	5	Nothing Found
Manganese	7439-96-5	5*	1* (Fume)
Silicon	7440-21-3	Nothing Found	10, 20**
Copper	7440-50-8	1 (Dust)	2**
Aluminum	7429-90-5	Nothing Found	10
Titanium	7440-32-6	15 (as TiO ₂)	10 (as TiO ₂)
Zirconium Silicate	7440-42-6	5	5

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 † Present in USA 70S-2

SECTION III - PHYSICAL DATA

NOT APPLICABLE

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Non-Flammable: Welding arc and sparks can ignite combustibles. See Z-49.1 referenced in Section VI

SECTION V - REACTIVITY DATA

Hazardous Decomposition Products

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.

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 procedures). When the electrode is consumed, the fumes and gas decomposition products generated are different in percent and form from the ingredients listed in Section II. 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 II, plus those from the base metal, coating and the other factors noted above.

Reasonable expected fume constituents of this product would include: Complex oxides of iron, manganese, silicon, copper, potassium, sodium, aluminum, titanium, and zirconium. (Other complex oxides may be present when using fluxes).

Substance	CAS No.	Exposure Limit (mg/m ³)	
		OSHA PEL	ALGIH TLV
Iron Oxide	1309-38-2	5	10 (as Fe ₂ O ₃)
Manganese	7439-96-5	5*	1* (Fume)
Silicon Oxide	7631-86-9	5	3
Copper	7440-50-8	0.1 (Fume)	0.2 (Fume)
Titanium Oxide	13463-67-7	15	10, 20**
Aluminum Oxide	1344-28-1	Nothing Found	10

*Ceiling Limit **Short Term Exposure Limit † Present in USA 70S-2

Gaseous reaction products may include carbon monoxide and carbon dioxide.

Ozone and nitrogen oxides may be formed by the radiation from the arc.

One method of determining the composition and quantity of the fumes and gases to which the workers are exposed is to take an air sample from inside the welder's helmet while worn or within the worker's breathing zone. See ANSI/AWS F 1.1 publication available from the American Welding Society 550 N.W. LeJeune Road, Miami, Florida 33126.

SECTION VI - HEALTH HAZARD DATA

Threshold Limit Value: The ACGIH recommended general limit for welding fume NOC (Not otherwise classified) is 5 mg/m³. ACGIH - 1985 preface states: "The TLV-TWA should be used as guides in the control of health hazards and should not be used as fine lines between safe and dangerous concentrations." See section V for specific fume constituents which may modify this TLV.

Common Entry Is by Inhalation

Effects of Overexposure: Inhalation of welding fumes and gases can be dangerous to your health. Short-term (acute) overexposure to welding fumes may result in discomfort such as dizziness, nausea, or dryness or irritation of nose, throat, or eyes.

Long-Term (chronic) over exposure to welding fumes can lead to siderosis (iron deposits in lung) and is believed to affect pulmonary function.

Arc Rays can injure eyes and burn skin.

Electric shock can kill.

See Section VII.

Emergency and First Aid Procedures: Call for medical assistance. Use first aid procedures recommended by the American Red Cross. If breathing is difficult - give oxygen. If not breathing - use CPR (Cardiopulmonary Resuscitation).

Carcinogenicity

These products do not contain ingredients that are defined as carcinogenic per 29CFR 1910.1200 - Hazard Communication Standard.

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See Section VII.

Emergency and First Aid Procedures: Call for medical assistance. Use first aid procedures recommended by the American Red Cross. If breathing is difficult - give oxygen. If not breathing - use CPR (cardiopulmonary resuscitation). Consult a physician if irritation of the eyes and skin or flash burns develop after exposure.

Carcinogenicity

These products do not contain ingredients that are defined as carcinogenic per 29 CFR 1910.1200 - Hazard Communication Standard.

SECTION VII - CONTROL MEASURES AND PRECAUTIONS FOR SAFE HANDLING AND USE

Read and understand the manufacturer's instructions and precautionary label on this product. See American Standard Z49.1 Safety in Welding and Cutting, published by the AMERICAN WELDING SOCIETY, 550 N.W. LeJeune Road, Miami, Florida 33126 and OSHA Publication 2206 (29 CFR 1910), U.S. Government Printing Office, Washington D.C. 20402 for more details on the following topics.

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.

Eye Protection: Wear a helmet or face shield with a filter lens shade number 12-14 or darker. Shield other workers by providing screens and flash goggles.

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 contact the skin or wet clothing and gloves. The welders should insulate themselves from the work and ground.

Waste Disposal Method: Discard any product, residue, disposal container, or liner in an environmentally acceptable manner approved by Federal, State and Local regulations.

Washington Alloy Co. believes that the information contained in this (MSDS) Material Safety Data Sheet is accurate. However, Washington Alloy Co. does not express or imply any warranty with respect to this information.



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MSDS NO: ALUMINUM WIRE
 REVISED 1-89

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MATERIAL SAFETY DATA SHEET (MSDS)

For Welding Consumables and Related Products
 Conforms to OSHA Hazard Communication Standard 29CFR 1910.1200
 and Superfund Amendments and Reauthorization Act (SARA) of 1986 Public Law 99-499
 Standard Must Be Consulted for Specific Requirements

SECTION I - IDENTIFICATION

Manufacturer/Supplier Name: Washington Alloy Company		Telephone No: 206-848-2230
Address: 9809 160th St. E., Puyallup, WA 98373		Emergency No: 206-848-2230
Trade Name: ER4043, ER5356, ER1100, ER2319, ER4047, ER4145, ER5183, ER4643, ER5554, ER5556, ER5654		Classification: AWS A5.10

SECTION II - HAZARDOUS MATERIALS*

IMPORTANT: This section covers the materials from which the product is manufactured. The fumes and gases produced during welding with the normal use of this product are covered under Section V.

*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.

Flux or other ingredients	% Weight	CAS No.	Exposure Limit (mg/m ³)	
			OSHA PEL	ACGIH TLV
Aluminum (Al)	Bal	7429-90-5	Nothing Found	10
Copper (Cu) - A	3-7	7440-50-8	1 (dust)	2**
Magnesium (Mg)	2-6	7439-95-4	15	10
Beryllium (Be)	.04-.07	7440-41-7	0.002 (TWA)	0.002 (TWA)
Silicon (Si)	3-13	7440-21-3	15 (dust)	10, 20**
Chromium (Cr)	.05-.35	7440-47-3	1	0.5
Manganese (Mn) - B	.5-1.0	7439-96-5	5*	1* (fume)

Other elements or ingredients may be present but in quantities much less than 1%.

A. This weight (%) found only in ER2319 and ER4145. All other products contain copper but in quantities less than 1%.

B. This weight (%) found only in ER5183, ER5554 and ER5556. All other products contain manganese but in quantities less than 1%.

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 III - PHYSICAL DATA

NOT APPLICABLE

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Non-Flammable: Welding arc and sparks can ignite combustibles. See Z-49.1 referenced in Section VI.

SECTION V - REACTIVITY DATA

Hazardous Decomposition Products

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.

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 procedures). When the electrode is consumed, the fumes and gas decomposition products generated are different in percent and form from the ingredients listed in Section II. 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 II, plus those from the base metal, coating and the other factors noted above.

Reasonable expected fume constituents of this product would include: Complex oxides of aluminum, iron, manganese, silicon, titanium, chromium, magnesium, zinc, beryllium and copper. Fume limit for Cr(VI) (0.05 mg/m³) may be reached before limit of 5 mg/m³ for general welding fumes is reached. Watch the Cr(VI) level. (Other complex oxides may be present when using fluxes).

Flux or other ingredients	CAS No.	Exposure Limit (mg/m ³)	
		OSHA PEL	ALGIH TLV
Aluminum Oxide	1344-28-1	Nothing Found	10
Iron Oxide	1309-38-2	5	10 (as Fe ₂ O ₃)
Manganese	7439-96-5	5*	1* (Fume)
Chromium Oxide	1308-38-9	0.5 (as Cr)	0.5 (Ox)
Silicon Oxide	7631-86-9	5	3
Titanium Oxide	13463-67-7	15	10, 20**
Copper	7440-50-8	0.1 (as Fume)	0.2 (as Fume)
Aluminum Oxide	1344-28-1	Nothing Found	10

*Ceiling Limit **Short Term Exposure Limit

Gaseous reaction products may include carbon monoxide and carbon dioxide.

Ozone and nitrogen-oxides may be formed by the radiation from the arc.

One method of determining the composition and quantity of the fumes and gases to which the workers are exposed is to take an air sample from inside the welder's helmet while worn or within the worker's breathing zone. See ANSI/AWS F1.1 publication available from the American Welding Society 550 N.W. LeJeune Road, Miami, Florida 33126.

SECTION VI - HEALTH HAZARD DATA

Threshold Limit Value: The ACGIH recommended general limit for welding fume NOC (Not otherwise classified) is 5 mg/m³. ACGIH - 1985 preface states: "The TLV-TWA should be used as guides in the control of health hazards and should not be used as fine lines between safe and dangerous concentrations." See section V for specific fume constituents which may modify this TLV.

Common Entry Is by Inhalation or Through the Eyes and Skin.

Effects of Overexposure: Inhalation of welding fumes and gases can be dangerous to your health. Short-term (acute) overexposure to welding fumes may result in discomfort such as dizziness, nausea, or dryness or irritation of nose, throat, or eyes.

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Chromium (VI) compounds present in the fume may cause severe irritation of the bronchial tubes and lungs. Ingesting Chromium (VI) salts may cause injury or death. Chromium (VI) compounds may burn eyes. Chromium compounds may cause allergic reactions in some people.

Beryllium in fume or dust form is highly toxic.

Inhalation of excessive levels of beryllium and beryllium compounds can cause pneumonitis (inflammation of the lung tissues). Long-term (chronic) over-exposure to welding fumes can lead to siderosis (iron deposits in lung) and is believed to affect pulmonary function. Constant inhalation of chromium (VI) compounds may cause an ulceration and perforation of the nasal septum as well as liver and kidney damage. Workers exposed to chromium (VI) compounds and beryllium have a higher incidence of lung and nasal cancers.

Long-term exposure to beryllium by inhalation can cause berylliosis (progressive lung disease) and systemic beryllium disease.

Chromium and Beryllium compounds are on the IARC (International Agency for Research of Cancer) list as posing a carcinogenic risk to humans.

Arc Rays can injure eyes and burn skin.

Electric shock can kill.

See Section VII.

Emergency and First Aid Procedures: Call for medical assistance. Use first aid procedures recommended by the American Red Cross. If breathing is difficult - give oxygen. If not breathing - use CPR (cardiopulmonary resuscitation). Consult a physician if irritation of the eyes and skin or flash burns develop after exposure.

Carcinogenicity

OSHA (29 CFR 1910.1200) lists Beryllium and Chromium as possible carcinogens.

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Eye Protection: Wear a helmet or face shield with a filter lens shade number 12-14 or darker. Shield other workers by providing screens and flash goggles.

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 contact the skin or wet clothing and gloves. The welders should insulate themselves from the work and ground.

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