

## MATERIAL SAFETY DATA SHEET

This Material Safety Data Sheet (MSDS) is for U.S. manufactured or distributed welding consumables and related products and may be used to comply with OSHA's Hazard Communication standard, 29 CFR 1910.1200, and Superfund Amendments and Reauthorization Act (SARA) of 1986 Public Law 99-499. The OSHA standard must be consulted for specific requirements. This Safety Data Sheet complies with European Commission Directive 89/106/EEC, 91/155/EEC, ISO 11014-1 and ANSI Z400.1. This document is translated in several languages and available on our website at [www.hobartbrothers.com](http://www.hobartbrothers.com), from your sales representative or by calling customer service at 1 (937) 332-4000.

### SECTION 1 - IDENTIFICATION

Manufacturer Name: HOBART BROTHERS COMPANY  
Address: 101 TRADE SQUARE EAST, TROY, OH 45373  
Website: [www.hobartbrothers.com](http://www.hobartbrothers.com)

Telephone No: 1 (937) 332-4000  
Emergency No: 1 (800) 424-9300

Product Type: SHIELDED METAL ARC WELDING (SMAW) ELECTRODES

GROUP A: Product For: CARBON STEEL  
AWS Specification: E6010, E6011, E6012, E6013, E6022, E7014, E7024-1

GROUP B: Product For: LOW HYDROGEN CARBON STEEL  
AWS Specification: E7016, E7018, E7018-1, E7018-M

GROUP C: Product For: LOW HYDROGEN, LOW ALLOY STEEL  
AWS Specification: E7018-A1, E7018-G, E8018-B2, E8018-B2L, E8018-B6, E8018-B8, E8018-C1, E8018-C2, E8018-C3, E8018-G, E9015-B9, E9018-B3, E9018-B3L, E9018-M, E10018-D2, E10018-M, E10518-M, E11018-M, E12018-M

GROUP D: Product For: HIGH STRENGTH CELLULOSE CARBON STEEL  
AWS Specification: E7010-P1, E8010-P1, E9010-G, E9010-P1

### SECTION 2 - IDENTIFICATION OF HAZARDS

**IMPORTANT** - This section covers the hazardous materials from which this product is manufactured. The fumes and gases produced during welding with normal use of this product are also addressed in Section 8. The term "hazardous" in this section should be interpreted as a term required and defined in OSHA Hazard Communication Standard (29 CFR Part 1910.1200).

HAZARDOUS INGREDIENT	CAS	EINECS <sup>f</sup>	REGULATORY HAZARD CLASSIFICATION/DESIGNATION 67/548/EEC <sup>A</sup>	IARC <sup>E</sup>	NTP <sup>Z</sup>	OSHA <sup>H</sup>	65 <sup>O</sup>
ALUMINUM OXIDE	1344-28-1	215-691-6	None	---	---	---	---
CALCIUM CARBONATE	1317-65-3	215-279-6	None	---	---	---	---
CELLULOSE	9004-34-6	232-674-9	None	---	---	---	---
CHROMIUM	7440-47-3	231-157-5	O - R9; Carc 1 <sup>O</sup> - R45; Muta 2 - R46; Repr 3 - R62; T+ - R26; T - R24/25, R48/23; C - R35, R42/43; N - R50, R53 <sup>ZZ</sup>	1 <sup>ZZ</sup> , 3 <sup>I</sup>	K <sup>ZZ</sup>	X <sup>ZZ</sup>	X <sup>ZZ</sup>
FLUORSPAR	7789-75-5	232-188-7	None	---	---	---	---
IRON	7439-89-6	231-096-4	None	---	---	---	---
MAGNESIUM CARBONATE	546-93-0	208-915-9	None	---	---	---	---
MANGANESE	7439-96-5	231-105-1	Xn - R20/22 <sup>Y</sup>	---	---	---	---
MICA	12001-26-2	None	None	---	---	---	---
MOLYBDENUM	7439-98-7	231-107-2	Xn - R48/20/22; Xi - R36/37 <sup>X</sup>	---	---	---	---
NICKEL	7440-02-0	231-111-4	Carc 3 <sup>O</sup> - R40; T - R43, R48/23	1	K	X	X
POTASSIUM OXIDE	12136-45-7	235-227-6	None	---	---	---	---
SILICA	14808-60-7	238-878-4	Xn - R43/20, R40/20	1 <sup>W</sup>	K	X	X
(Amorphous Silica Fume)	69012-64-2	273-761-5	None	3	K	---	X
SILICON	7440-21-3	231-130-8	None	---	---	---	---
SODIUM OXIDE	7681-49-5	215-208-9	None	---	---	---	---
STRONTIUM CARBONATE	1633-05-2	216-643-7	None	---	---	---	---
TITANIUM DIOXIDE	13463-67-7	236-675-5	None	2B	---	---	---

f - European Inventory of Existing Chemical Substances Number Δ - European Union Directive 67/548/EEC - Annex 1 E - International Agency for Research on Cancer (1 - Human Carcinogen, 2A - Probably Carcinogenic to Humans, 2B - Possibly Carcinogenic to Humans, 3 - Unclassifiable as to Carcinogenicity in Humans, 4 Probably Not Carcinogenic to Humans) Z - US National Toxicology Program (K - Known Carcinogen, S - Suspected Carcinogen) H - OSHA Known Carcinogen List ⊕ - California Proposition 65 (X - On Proposition 65 list) --- Dashes indicate the ingredient is not listed with the IARC, NTP, OSHA or 65 ⊕ - Carcinogen, Mutagen or Reproductive Category per European Council Directive 67/548/EEC Annex I Σ - Metal and Chromium III Compounds ΣΣ - Chromium VI Compounds ΣΣΣ - Chromium (VI) Trioxide EU 67/548/EEC Classification/Designation Y - Manganese Dioxide EU 67/548/EEC Classification/Designation X - Molybdenum Trioxide EU 67/548/EEC Classification/Designation Ψ - Silica Crystalline α-Quartz

The following symbols correspond with the EU 67/548/EEC column above are in European Union Directive 67/548/EEC Annex 1 and EC 1272/2008 Annex VI - Table 3.2:



**WARNING!** - Avoid breathing welding fumes and gases, they may be dangerous to your health. Always use adequate ventilation. Always use appropriate personal protective equipment.

PRIMARY ROUTES OF ENTRY: Respiratory System, Eyes and/or Skin.  
ELECTRIC SHOCK: Arc welding and associated processes can kill. See Section 8.

ARC RAYS: The welding arc can injure eyes and burn skin.  
FUMES AND GASES: Can be dangerous to your health.

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. Most fume ingredients are present as complex oxides and compounds and not as pure metals. When the electrode is consumed, the fume and gas decomposition products generated are different in percent and form from the ingredients listed in Section 3. Decomposition products of normal operation include those originating from the volatilization, reaction or oxidation of the materials shown in this section, plus those from the base metal and coating, etc., as noted above. Monitor for the materials identified in the list within this section.

Fumes from the use of this product may contain complex oxides or compounds of the following elements and molecules: amorphous silica fume, calcium oxide, chromium, fluorospar or fluorides, manganese, nickel, silica and strontium. Other reasonably expected constituents of the fume would also include complex oxides of iron, titanium, silicon and molybdenum. Gaseous reaction products may include carbon monoxide and carbon dioxide. Ozone and nitrogen oxides may be formed by the radiation from the

arc. 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). One recommended way to determine the composition and quantity of fumes and gases to which workers are exposed is to take an air sample inside the welder's helmet if worn or in the worker's breathing zone. See ANSI/AWS F1.1, available from the "American Welding Society", P.O. Box 351040, Miami, FL 33135. Also, from AWS is F1.3 "Evaluating Contaminants in the Welding Environment - A Sampling Strategy Guide", which gives additional advice on sampling.

**SECTION 3 - HAZARDOUS INGREDIENTS**

**CONTENT PERCENTAGE BY INGREDIENTS**

INGREDIENT	CAS	EINECS	GROUP AND %WEIGHT				INGREDIENT	CAS	EINECS	GROUP AND %WEIGHT			
			A	B	C	D				A	B	C	D
ALUMINUM OXIDE	1344-28-1	215-691-6	<5	---	---	---	MOLYBDENUM	7439-98-7	231-107-2	---	---	<2	<1
CALCIUM CARBONATE	1317-65-3	215-279-6	<2	<2	---	---	NICKEL	7440-02-0	231-111-4	---	---	<5	<2
CELLULOSE	9004-34-6	232-674-9	<5	<5	<5	<5	POTASSIUM OXIDE	12136-45-7	235-227-6	<2	<2	<2	<2
CHROMIUM	7440-47-3	231-157-5	---	---	<9	---	SILICA	14808-60-7	238-878-4	<7	<8	<7	<7
FLUORSPAR	7789-75-5	232-188-7	---	1-12	4-15	---	(Amorphous Silica Fume)	69012-64-2	273-761-5	---	---	---	---
IRON	7439-89-6	231-096-4	70-90	60-80	60-90	70-90	SILICON	7440-21-3	231-130-8	---	<2	<5	<2
MAGNESIUM CARBONATE	546-93-0	208-915-9	<2	<5	<1	<1	SODIUM OXIDE	7681-49-5	215-208-9	<2	<2	<2	<2
MANGANESE	7439-96-5	231-105-1	1-5	1-5	1-5	1-5	STRONTIUM CARBONATE	1633-05-2	216-643-7	---	<2	<2	---
MICA	12001-26-2	None	<5	---	---	---	TITANIUM DIOXIDE	13463-67-7	236-675-5	<14	<10	<5	<5

--- Dashes indicate the ingredient is not present within the group of products

**SECTION 4 - FIRST AID MEASURES**

**INHALATION:** If breathing is difficult provide fresh air and contact physician.  
 Section 11 of this MSDS covers the acute effects of overexposure to the various ingredients within the welding consumable. Section 8 of this MSDS lists the exposure limits and covers methods for protecting yourself and your co-workers.

**EYE/SKIN INJURIES:** For radiation burns, see physician.

**SECTION 5 - FIRE AND EXPLOSION HAZARD DATA**

Welding consumables applicable to this sheet as shipped are nonreactive, nonflammable, nonexplosive and essentially nonhazardous until welded. Welding arcs and sparks can ignite combustibles and flammable products. Unused welding consumables may remain hot for a period of time after completion of a welding process. See American National Standard (ANSI) Z49.1 for further general safety information on the use and handling of welding consumables and associated procedures.

**SECTION 6 - ACCIDENTAL RELEASE MEASURES**

Solid objects can be picked up and placed into a container. Wear proper personal protective equipment while handling. Do not discard as general trash.

**SECTION 7 - HANDLING AND STORAGE**

**HANDLING:** No specific requirements in the form supplied. Handle with care to avoid cuts. Wear gloves when handling welding consumables. Avoid exposure to dust. Do not ingest. Some individuals can develop an allergic reaction to certain materials. Retain all warning and product labels.

**STORAGE:** Keep separate from acids and strong bases to prevent possible chemical reactions.

**SECTION 8 - EXPOSURE CONTROL AND PERSONAL PROTECTION**

Read and understand the instructions and the labels on the packaging. Welding fumes do not have a specific OSHA PEL or ACGIH TLV. The OSHA PEL for Particulate - Not Otherwise Classified (PNOC) is 5 mg/m<sup>3</sup> - Respirable Fraction, 15 mg/m<sup>3</sup> - Total Dust. The ACGIH TLV for Particles - Not Otherwise Specified (PNOS) is 3 mg/m<sup>3</sup> - Respirable Particles, 10 mg/m<sup>3</sup> - Inhalable Particles. The individual complex compounds within the fume may have a lower OSHA PEL or ACGIH TLV than the OSHA Particulate - Not Otherwise Classified (PNOC) and ACGIH Particles - Not Otherwise Specified (PNOS). An Industrial Hygienist, the OSHA Permissible Exposure Limits for Air Contaminants (29 CFR 1910.1000), and the ACGIH Threshold Limit Values should be consulted to determine the specific fume constituents present and their respective exposure limits. European Union Occupational Exposure Limits (EU OEL) are listed with the most stringent limit among the EU member nations. All exposure limits are in milligrams per cubic meter (mg/m<sup>3</sup>).

INGREDIENT	CAS	EINECS	OSHA PEL	ACGIH TLV	EU OEL
ALUMINUM OXIDE##	1344-28-1	215-691-6	5 R*	1 R* {A4}	1.5 R* (Aerosol) - Germany; 2 - Poland
CALCIUM CARBONATE	1317-65-3	215-279-6	5 R*, 5 (as CaO)	3 R*, 2 (as CaO)	3 R* (Aerosol) - Switzerland; 10 I* (Aerosol) - UK
CELLULOSE	9004-34-6	232-674-9	5 R*	10	3 R* (Aerosol) - Switzerland; 10 I* (Aerosol) - UK
CHROMIUM#	7440-47-3	231-157-5	1 (Metal) 0.5 (Cr II & Cr III Cpnds) 0.005 (Cr VI Cpnds)	0.5 (Metal) {A4} 0.5 (Cr III Cpnds) {A4} 0.05 (Cr VI Sol Cpnds) {A1} 0.01 (Cr VI Insol Cpnds) {A1}	0.1 I* (Aerosol) - Switzerland 0.005; 0.01*** - Denmark 0.005 (Total Aerosol); 0.015*** (Total Aerosol) - Sweden
FLUORSPAR	7789-75-5	232-188-7	2.5 (as F)	2.5 (as F) {A4}	1 I* (Aerosol as F); 4*** (Aerosol as F) - Germany
IRON+	7439-89-6	231-096-4	5 R*	5 R* (Fe <sub>2</sub> O <sub>3</sub> ) {A4}	3 R* (Aerosol as Fe <sub>2</sub> O <sub>3</sub> ) - Switzerland 7*** (as Fe <sub>2</sub> O <sub>3</sub> ) - Denmark
MAGNESIUM CARBONATE	546-93-0	208-915-9	5 R*	3 R*	3 R* (Aerosol) - Switzerland; 10 I* (Aerosol) - UK
MANGANESE#	7439-96-5	231-105-1	5 CL ** (Fume) 1, 3 STEL*** ■	0.2 I* {A4} ◆ 0.02 R* ◆, ◆◆	0.02 R* (Aerosol); 0.16 R*** (Aerosol) - Germany 0.2 I* (Aerosol) - Germany 0.2; 0.4*** - Denmark
MICA	12001-26-2	None	3 R*	3 R*	0.8 R* (Aerosol); 10 I* (Aerosol) - UK
MOLYBDENUM	7439-98-7	231-107-2	5 R*	3 R*; 10 I* (Ele and Insol) 0.5 R* (Sol Cpnds) {A3}	3 R* - Spain; 4; 10*** - Poland
NICKEL#	7440-02-0	231-111-4	1 (Metal) 1 (Sol Cpnds) 1 (Insol Cpnds)	1.5 I* (Ele) {A5} 0.1 I* (Sol Cpnds) {A4} 0.2 I* (Insol Cpnds) {A1}	0.05; 0.1*** - Denmark
POTASSIUM OXIDE	12136-45-7	235-227-6	5 R*	3 R*	1.5 R* (Dust NOS - Aerosol) - Germany
SILICA++	14808-60-7	238-878-4	0.1 R*	0.025 R* {A2}	0.1 (Fused, Respirable Dust) - Denmark 0.2*** (Fused, Respirable Dust) - Denmark
(Amorphous Silica Fume)	69012-64-2	273-761-5	0.8	3 R*	2 I*; 4 I*** - Denmark
SILICON+	7440-21-3	231-130-8	5 R*	3 R*	4 R* (Aerosol); 10 I* (Aerosol) - Denmark
SODIUM OXIDE	7681-49-5	215-208-9	5 R*	3 R*	1.5 R* (Dust NOS - Aerosol) - Germany
STRONTIUM CARBONATE+	1633-05-2	216-643-7	5 R*	3 R*	1.5 R* (as Dust - NOS) - Germany
TITANIUM DIOXIDE	13463-67-7	236-675-5	15 (Dust)	10 {A4}	1.5 R* - Germany

R\* - Respirable Fraction R\*\*\* - Respirable Fraction - Short Term Exposure Limit I\* - Inhalable Fraction I\*\*\* - Inhalable Fraction - Short Term Exposure Limit \*\* - Ceiling Limit \*\*\* - Short Term Exposure Limit + - As a nuisance particulate covered under "Particulates Not Otherwise Regulated" by OSHA or "Particulates Not Otherwise Classified" by ACGIH ++ - Crystalline silica is bound within the product as it exists in the package. However, research indicates silica is present in welding fume in the amorphous (noncrystalline) form #- Reportable material under Section 313 of SARA ## - Reportable material under Section 313 of SARA only in fibrous form ■ - NIOSH REL TWA and STEL ◆ - Listed under ACGIH Notice of Intended Changes for Mn in 2010 ◆◆ - Limit of 0.02 mg/m<sup>3</sup> is proposed for Respirable Mn in 2011 by ACGIH Ele - Element Sol - Soluble Insol - Insoluble Inorg - Inorganic Cpnds - Compounds NOS - Not Otherwise Specified {A1} - Confirmed Human Carcinogen per ACGIH {A2} -

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Suspected Human Carcinogen per ACGIH {A3} - Confirmed Animal Carcinogen with Unknown Relevance to Humans per ACGIH {A4} - Not Classifiable as a Human Carcinogen per ACGIH {A5} - Not Suspected as a Human Carcinogen per ACGIH (noncrystalline) form

**VENTILATION:** Use enough ventilation, local exhaust at the arc or both to keep the fumes and gases below the PEL/TLV/OELs in the worker's breathing zone and the general area. Train the welder to keep his head out of the fumes.

**RESPIRATORY PROTECTION:** Use NIOSH approved or equivalent fume respirator or air supplied respirator when welding in confined space or where local exhaust or ventilation does not keep exposure below the regulatory limits.

**EYE PROTECTION:** Wear helmet or use face shield with filter lens. As a rule of thumb begin with Shade Number 14. Adjust if needed by selecting the next lighter and/or darker shade number. Provide protective screens and flash goggles, if necessary, to shield others from the weld arc flash.

**PROTECTIVE CLOTHING:** Wear hand, head and body protection which help to prevent injury from radiation, sparks and electrical shock. See ANSI 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 nonsynthetic clothing. Train the welder not to touch live electrical parts and to insulate himself from work and ground.

**PROCEDURE FOR CLEANUP OF SPILLS OR LEAKS:** Not applicable

**SPECIAL PRECAUTIONS (IMPORTANT):** Maintain exposure below the PEL/TLV/OEL. Use industrial hygiene monitoring to ensure that your use of this material does not create exposures which exceed PEL/TLV/OEL. Always use exhaust ventilation. Refer to the following sources for important additional information: American National Standard (ANSI) Z49.1; Safety in Welding and Cutting published by the American Welding Society, P.O. Box 351040, Miami, FL 33135 and OSHA Publication 2206 (29 CFR 1910), U.S. Government Printing Office, Washington, DC 20402.

**SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES**

Welding consumables applicable to this sheet as shipped are nonreactive, nonflammable, nonexplosive and essentially nonhazardous until welded.

**PHYSICAL STATE:** Cored Wire

**ODOR:** N/A

**COLOR:** Gray

**FORM:** Coated Rod

**SECTION 10 - STABILITY AND REACTIVITY**

**GENERAL:** Welding consumables applicable to this sheet are solid and nonvolatile as shipped. This product is only intended for use per the welding parameters it was designed for. When this product is used for welding, hazardous fumes may be created. Other factors to consider include the base metal, base metal preparation and base metal coatings. All of these factors can contribute to the fume and gases generated during welding. The amount of fume varies with the welding parameters.

**STABILITY:** This product is stable under normal conditions.

**REACTIVITY:** Contact with acids or strong bases may cause generation of gas.

**SECTION 11 - TOXICOLOGICAL INFORMATION**

**SHORT-TERM (ACUTE) OVEREXPOSURE EFFECTS:** **Welding Fumes** - May result in discomfort such as dizziness, nausea or dryness or irritation of nose, throat or eyes. **Aluminum Oxide** - Irritation of the respiratory system. **Calcium Oxide** - Dust or fumes may cause irritation of the respiratory system, skin and eyes. **Chromium** - Inhalation of fume with chromium (VI) compounds can cause irritation of the respiratory tract, lung damage and asthma-like symptoms. Swallowing chromium (VI) salts can cause severe injury or death. Dust on skin can form ulcers. Eyes may be burned by chromium (VI) compounds. Allergic reactions may occur in some people. **Fluorides** - Fluoride compounds evolved may cause skin and eye burns, pulmonary edema and bronchitis. **Iron, Iron Oxide** - None are known. Treat as nuisance dust or fume. **Magnesium, Magnesium Oxide** - Overexposure to the oxide may cause metal fume fever characterized by metallic taste, tightness of chest and fever. Symptoms may last 24 to 48 hours following overexposure. **Manganese** - Metal fume fever characterized by chills, fever, upset stomach, vomiting, irritation of the throat and aching of body. Recovery is generally complete within 48 hours of the overexposure. **Mica** - Dust may cause irritation of the respiratory system, skin and eyes. **Molybdenum** - Irritation of the eyes, nose and throat. **Nickel, Nickel Compounds** - Metallic taste, nausea, tightness in chest, metal fume fever, allergic reaction. **Potassium Oxide** - Dust or fumes may cause irritation of the respiratory system, skin and eyes. **Silica (Amorphous)** - Dust and fumes may cause irritation of the respiratory system, skin and eyes. **Sodium Oxide** - Dust or fumes may cause irritation of the respiratory system, skin and eyes. **Strontium Compounds** - Strontium salts are generally non-toxic and are normally present in the human body. In large oral doses, they may cause gastrointestinal disorders, vomiting and diarrhea. **Titanium Dioxide** - Irritation of respiratory system.

**LONG-TERM (CHRONIC) OVEREXPOSURE EFFECTS:** **Welding Fumes** - Excess levels may cause bronchial asthma, lung fibrosis, pneumoconiosis or "siderosis." **Aluminum Oxide** - Pulmonary fibrosis and emphysema. **Calcium Oxide** - Prolonged overexposure may cause ulceration of the skin and perforation of the nasal septum, dermatitis and pneumonia. **Chromium** - Ulceration and perforation of nasal septum. Respiratory irritation may occur with symptoms resembling asthma. Studies have shown that chromate production workers exposed to hexavalent chromium compounds have an excess of lung cancers. Chromium (VI) compounds are more readily absorbed through the skin than chromium (III) compounds. Good practice requires the reduction of employee exposure to chromium (III) and (VI) compounds. **Fluorides** - Serious bone erosion (Osteoporosis) and mottling of teeth. **Iron, Iron Oxide Fumes** - Can cause siderosis (deposits of iron in lungs) which some researchers believe may affect pulmonary function. Lungs will clear in time when exposure to iron and its compounds ceases. Iron and magnetite (Fe<sub>3</sub>O<sub>4</sub>) are not regarded as fibrogenic materials. **Magnesium, Magnesium Oxide** - No adverse long term health effects have been reported in the literature. **Manganese** - Long-term overexposure to manganese compounds may affect the central nervous system. Symptoms may be similar to Parkinson's disease and can include slowness, changes in handwriting, gait impairment, muscle spasms and cramps and less commonly, tremor and behavioral changes. Employees who are overexposed to manganese compounds should be seen by a physician for early detection of neurologic problems. Overexposure to manganese and manganese compounds above safe exposure limits can cause irreversible damage to the central nervous system, including the brain, symptoms of which may include slurred speech, lethargy, tremor, muscular weakness, psychological disturbances and spastic gait. **Mica** - Prolonged overexposure may cause scarring of the lungs and pneumoconiosis characterized by cough, shortness of breath, weakness and weight loss. **Molybdenum** - Prolonged overexposure may result in loss of appetite, weight loss, loss of muscle coordination, difficulty in breathing and anemia. **Nickel, Nickel Compounds** - Lung fibrosis or pneumoconiosis. Studies of nickel refinery workers indicated a higher incidence of lung and nasal cancers. **Potassium Oxide** - Prolonged overexposure may cause ulceration of the skin and perforation of the nasal septum, dermatitis and pneumonia. **Silica (Amorphous)** - Research indicates that silica is present in welding fume in the amorphous form. Long term overexposure may cause pneumoconiosis. Noncrystalline forms of silica (amorphous silica) are considered to have little fibrotic potential. **Sodium Oxide** - Prolonged overexposure may cause ulceration of the skin and perforation of the nasal septum, dermatitis and pneumonia. **Strontium Compounds** - Strontium at high doses is known to concentrate in bone. Major signs of chronic toxicity, which involve the skeleton, have been labeled as "strontium rickets". **Titanium Dioxide** - Pulmonary irritation and slight fibrosis.

**MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:** Persons with pre-existing impaired lung functions (asthma-like conditions). Persons with a pacemaker should not go near welding and cutting operations until they have consulted their doctor and obtained information from the manufacturer of the device. Respirators are to be worn only after being medically cleared by your company-designated physician.

**EMERGENCY AND FIRST AID PROCEDURES:** Call for medical aid. Employ first aid techniques recommended by the American Red Cross. If irritation or flash burns develop after exposure, consult a physician.

**CARCINOGENICITY:** Chromium VI compounds, nickel compounds and silica (crystalline quartz) are classified as IARC Group 1 and NTP Group K carcinogens. Titanium dioxide compounds are classified as IARC Group 2B carcinogens. Chromium VI compounds, nickel compounds, silica (crystalline quartz) and welding fumes must be considered as carcinogens under OSHA (29 CFR 1910.1200).

**CALIFORNIA PROPOSITION 65:** For Group B, C and D products: WARNING: This product contains or produces a chemical known to the State of California to cause cancer and birth defects (or other reproductive harm). (California Health & Safety Code Section 25249.5 et seq.) For Group A products: WARNING: This product, when used for welding or cutting, produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code Section 25249.5 et seq.)

**SECTION 12 - ECOLOGICAL INFORMATION**

Welding processes can release fumes directly to the environment. Welding wire can degrade if left outside and unprotected. Residues from welding consumables and processes could degrade and accumulate in the soil and groundwater.

**SECTION 13 - DISPOSAL CONSIDERATIONS**

Use recycling procedures if available. Discard any product, residue, packaging, disposable container or liner in an environmentally acceptable manner, in full compliance with federal, state and local regulations.

**SECTION 14 - TRANSPORT INFORMATION**

No international regulations or restrictions are applicable. No special precautions are necessary.

**SECTION 15 – REGULATORY INFORMATION**

Read and understand the manufacturer's instructions, your employer's safety practices and the health and safety instructions on the label and the material safety data sheet. Observe all local and federal rules and regulations. Take all necessary precautions to protect yourself and others.

United States EPA Toxic Substance Control Act: All constituents of these products are on the TSCA inventory list or are excluded from listing.

**CERCLA/SARA TITLE III:** Reportable Quantities (RQs) and/or Threshold Planning Quantities (TPQs):

Ingredient name	RQ(lb)	TPQ (lb)
Products on this MSDS are a solid solution in the form of a solid article.	--	--

Spills or releases resulting in the loss of any ingredient at or above its RQ require immediate notification to the National Response Center and to your Local Emergency Planning Committee.

**Section 311 Hazard Class**

As shipped: Immediate In use: Immediate delayed

**EPCRA/SARA TITLE III 313 TOXIC CHEMICALS:** The following metallic components are listed as SARA 313 "Toxic Chemicals" and potentially subject to annual SARA 312 reporting: Chromium, Manganese and Nickel. See Section 3 for weight percentage.

**CANADIAN WHMIS CLASSIFICATION:** Class D; Division 2, Subdivision A

**CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA):** All constituents of these products are on the Domestic Substance List (DSL).

**SECTION 16 – OTHER INFORMATION**

The following Risk and Safety Phrase Texts and Hazard Statements correspond with the columns labeled - EU 67/548/EEC within Section 2 of this material safety data sheet. Take appropriate precautions and protective measures to eliminate or limit the associated hazard.

**EU Directive 67/548/EEC - Risk Phrase Texts**

R9 – Explosive when mixed with combustible material	R46 – May cause heritable genetic damage
R20/22 – Harmful by inhalation and if swallowed	R48/20 – Harmful: danger of serious damage to health by prolonged exposure through inhalation
R24/25 – Toxic in contact with skin and if swallowed	R48/20/22 – Harmful: danger of serious damage to health by prolonged exposure through inhalation and if swallowed
R26 – Very toxic by inhalation	R48/23 – Toxic: danger of serious damage to health by prolonged exposure through inhalation
R35 – Causes severe burns	R50 – Very toxic to aquatic organisms
R36/37 – Irritating to eyes and respiratory system	R53 – May cause long-term adverse effects in the aquatic environment
R40 – Limited evidence of a carcinogenic effect	R62 – Possible risk of impaired fertility
R40/20 – Harmful: possible risk of irreversible effects through inhalation	
R42/43 – May cause sensitization by inhalation and skin contact	
R43 – May cause sensitization by skin contact	
R45 – May cause cancer	

For additional information please refer to the following sources:

USA: American National Standard (ANSI) Z49.1 "Safety in Welding and Cutting", ANSI/American Welding Society (AWS) F1.5 "Methods for Sampling and Analyzing Gases from Welding and Allied Processes", ANSI/AWS F1.1 "Method for Sampling Airborne Particles Generated by Welding and Allied Processes", AWSF3.2M/F3.2 "Ventilation Guide for Weld Fume", American Welding Society, 550 North Le Jeune Road, Miami, Florida, 33135. Safety and Health Fact Sheets available from AWS at [www.aws.org](http://www.aws.org).  
OSHA Publication 2206 (29 C.F.R. 1910), U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954.  
Threshold Limit Values and Biological Exposure Indices, American Conference of Governmental Hygienists (ACGIH), 6500 Glenway Ave., Cincinnati, Ohio 45211, USA.  
NFPA 51B "Standard for Fire Prevention During Welding, Cutting and Other Hot Work" published by the National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169.

UK: WMA Publication 236 and 237, "Hazards from Welding Fume", "The arc welder at work, some general aspects of health and safety".

Canada: CSA Standard CAN/CSA-W117.2-01 "Safety in Welding, Cutting and Allied Processes".

Hobart Brothers Company strongly recommends the users of this product study this MSDS, the product label information and become aware of all hazards associated with welding. Hobart Brothers Company believes this data to be accurate and to reflect qualified expert opinion regarding current research. However, Hobart Brothers Company cannot make any expressed or implied warranty as to this information.



#48

MSDSNO: COPPER BASED ALLOYS  
REVISED 05-2006

## 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: Washington Alloy Company	Telephone No: 704-598-1325
Address: 7010-G Reames Road, Charlotte, NC 28216	Emergency No: 704-598-1325
Trade Name: USA	Specification:
Rainier 3A (ECuSn-C), Rainier 4A (ECu), Rainier 5A (ECuAl-A2), Rainier 6A (ECuSi), Alloy 187 (ECuNi)	AWS A5.6
Silicon Bronze (ERCuSi-A), Deox Copper (ERCu), Phos-Bronze A(ERCuSn-A), Phos-Bronze C (ERCuSn-C), Aluminum Bronze A-1(ERCuAl-A1), Aluminum Bronze A-2(ERCuAl-A2), Aluminum Bronze A-3 (ERCuAl-A3), Nickel-Aluminum Bronze (ERCuNiAl), Manganese-Nickel-Aluminum (ERCuMnNiAl), Alloy 67 (ERCuNi)	AWS A5.7
Nickel Bronze (RBCuZn-B), Low Fuming Bronze (RBCuZn-C), Nickel Silver (RBCuZn-D), Naval Bronze (RBCuZn-A)	AWS A5.8
Some rods may be bare or Flux Coated (FC)	

### SECTION II

#### HAZARDOUS INGREDIENTS/Identity Information

**IMPORTANT:** This section covers materials from which these products are manufactured.

Flux or other ingredients	CAS No.	Weight %	Exposure Limit (mg/m <sup>3</sup> )	
			OSHA PEL	ACGIH TLV
Copper (fume)(4)	7440-50-8	44-97	0.1, 1 (dust)	0.2, 1(Dust)
Zinc (oxide fume) (2,4)	7440-66-6	45.0	5, 10 **	5, 10 **
Iron	7439-86-6	1.5	10	5.0
Manganese (3,4)	7439-95-5	1.5	1, 5*, 3.0**	0.2
Nickel (4)	7440-02-0	13.0	1.0	1, 1.5 (inhalable fraction)
Silicon	7440-21-3	3.5	15 (dust) 5 (Resp)	10, 20 **
Boric Acid (1)	10043-35-3	7.0	none found	none found
Borax Glass, Anhydrous (1)	1303-96-4	2.0	10	1.0
Acrylic Copolymer (non-haz) (1)	none found	1.0	none found	none found
Residual Monomer (non regst) (1)	none found	1.0	none found	none found
Tin	7440-31-5	1.0	2.0	2.0

Single values shown are maximum (1) Flux coating on the flux coated rods (2) STEL of 10 mg/m<sup>3</sup> (3) STEL of 3.0 mg/m<sup>3</sup>, 5.0 mg/m<sup>3</sup> ceiling  
(4) Subject to reporting requirements of Section 304, 313 of the Emergency Planning and Community Right-To-Know Act of 1986 and 40CFR 370 and 372  
Short Term Exposure Limit (STEL) Values proposed by OSHA in 1989 \*Ceiling Limit \*\*Short Term Exposure Limit (Resp) = Respiratory/ Respiration

### SECTION III - PHYSICAL DATA

Boiling point: 760 mm hg: N.A.

Specific Gravity @ 20c/20C: 8.3 - 8.5 g/cc

Melting point: 1600 - 1900 F

Appearance and Odor: The products are silver or yellow to red solid at room temperature and exhibit no odor. The metallic rod is insoluble in water. Flux coating is white or blue green. Slightly soluble in water.

### SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Non-flammable. Welding arc and sparks can ignite combustible and flammable products. See ANSI 49.1 "Safety in Welding & Cutting" (referenced in section VII) for fire prevention and protection information. Never use water as an extinguishing agent around molten metal.  
Unusual fire and explosion hazards: None but material may react with acids, bases, or oxidizers, material does not present a significant health hazard under normal handling and storage conditions.

### 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 procedure). 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.

(Continued on page 2)

Primary routes of exposure are inhalation of fumes, gases of particulate and ingestion of particulate. Absorption through the skin is not likely. Chronic exposure to copper, zinc and manganese may cause metal fume fever. Symptoms of metal fume fever include fever, dryness of throat, head and body ache, and chill.

Chronic exposure may affect central nervous system leading to emotional disturbances, gait and balance difficulties or paralysis. Overexposure to copper may result in skin and hair discoloration. Nickel has been identified as a potential cancer-causing agent. 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/m<sup>3</sup>. ACGIH 1985 preface states: "The TLC-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.

**Effects of Overexposure:** Inhalation of welding fumes and gases can be dangerous to your health. Primary route of entry is by inhalation. Pre-existing medical conditions: individuals with impaired respiratory function may have symptoms worsened by exposure to welding fumes. Short term (acute) over-exposure to zinc vapors when heated form zinc oxide, which inhaled can cause habituation, which you become immune to. Long term (chronic) overexposure to welding fumes can lead to siderosis (iron deposits in lung) and affect pulmonary function. Arc rays can injure eyes and burn skin. Heat rays (infrared radiating from flame of hot metal) can injure eyes. Electric shock can kill. Noise can damage hearing. Carcinogenic assessment: chromium and nickel must be considered a possible carcinogen under OSHA 29CFR 1910.1200. IARC has indicated that chromium and nickel & certain of its compounds are probably carcinogenic for humans, but the compounds cannot be specified precisely. These conclusions were drawn from operations different from welding. Regardless, exposure level must be kept below those levels specified in Section II.

### **Carcinogenicity**

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

### **California Proposition 65**

These products contains or produces chemicals known to the State of California to cause cancer, and/or birth defects (or other reproductive harm). (Health and Safety Code section 25249.5 et seq.)

**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 develops after exposure.

## 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, Superintendent of Documents, P.O. Box 37954, Pittsburg, Pa 15250-7954 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 implies any warranty with respect to this information.

Download the most current MSDS and product information @ [www.weldingwire.com](http://www.weldingwire.com)