



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

MSDS NO: ZIRCONIUM
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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: ZIRCONIUM – Zirc 702 - Zr2	Specification Classification: AWS A5.24 ERZr2

SECTION II – IDENTITY INFORMATION and HAZARDOUS MATERIALS*

IMPORTANT: This section covers the materials from which the product is manufactured. The fumes and gases produced during welding/brazing with the normal uses 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.

Alloy Ingredients	CAS No.	Exposure Limit (mg/m ³)	
		OSHA PEL	ACGIH TLV
Zirconium (Zr) >94 %	7440-67-7	5	5, 10**
Hafnium (Hf) 4.5 %	7440-58-2	0.5	0.5
Zr + Hf 99% min.			

Notes: Single values are maximum, except where noted 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 III - PHYSICAL DATA

As shipped these are odorless, silvery to white- bluish, solid rods that are nonflammable, non-explosive, non-reactive and non-hazardous

Melting point of 3375° F (387° C) Boiling Point of 6471° F (1314° C) Specific Gravity of 6.51
(Above info based on Zr metal)

SECTION IV – FIRE AND EXPLOSION HAZARD DATA

Non-Flammable: Welding arc and sparks can ignite combustibles. See Z-49.1 referenced in Section VI. NIOSH/MSHA self contained breathing apparatus and full fire protective clothing should be used for fire fighting. DO NOT USE WATER with any molten alloy or metal use Dry sand, dry powder. Zr Metal: Combustible, but solid form is difficult to ignite; however, powder form may ignite SPONTANEOUSLY and can continue burning under water.

SECTION V – REACTIVITY DATA

Hazardous Decomposition Products

Welding and brazing fumes and gases cannot be classified simply. The composition and quantity of these fumes and gases are dependent upon the metals, the procedures followed and the alloys 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 workers in operation and the volume of the work area, the quality and amount of ventilation, the position of the operator'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 alloy 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 filler 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 Zirconium and base metal elements. Other complex oxides may be present when using fluxes. Gaseous reaction products may include carbon monoxide and carbon dioxide Ozone and nitrogen oxides may be formed by the radiation from the arc or flame. 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.

Stability: As shipped these products are stable. Dust explosion possible if in powder or granular form, mixed with air.

SECTION VI– ENTRY DATA

Common Entry: During the welding processes inhalation of welding fumes may give the most common route of over exposure. Contact with skin, eyes, ingestion or injection should not be a source for exposure with proper protection.

SECTION VII– Threshold Limit Value

The ACGIH recommended general limit for welding fume NOC (Not otherwise classified) is 5 mg/m³. 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." Read all other sections for specific fume constituents, which may modify this TLV.

SECTION VIII– HEALTH HAZARD DATA

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. Chromium (VI) compounds present in the fume may cause abdominal pain, diarrhea, muscular weakness and convulsions. Continued inhalation could cause loss of consciousness and death. Chromium (VI) compounds present in the fume may cause severe irritation of the bronchial tubes and lungs. Ingesting Chromium (VI) salts may cause injury of death. Chromium (VI) compounds may burn eyes. Chromium compounds may cause allergic reactions in some people. Nickel oxides present in the fume may cause tightness around the chest, fever and allergic reactions in some people. Long-term (chronic) over-exposure to welding fumes can lead to siderosis (iron deposits in lung) and is believed to affect pulmonary function. Repetitive exposure to fluoride fumes and/or gases may cause excessive calcification of the bones and ligaments of the ribs, pelvis and spinal column. Constant inhalation of chromium (VI) compounds may cause an ulceration and perforation of the nasal septum as well as liver and kidney damage. Repetitive overexposure to nickel oxides may lead to lung fibrosis or pneumoconiosis. Workers exposed to chromium (VI) compounds and/or nickel oxides have a higher incidence of lung and nasal cancers. Chromium and nickel 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. Carcinogenicity & California Proposition 65 listed in Section X

SECTION IX- Emergency and First Aid Procedures

Remove to fresh Air. Call for medical assistance. Use first aid procedures recommended by the American Red Cross. If breathing is difficult or not breathing – give oxygen or use CPR (cardiopulmonary resuscitation) by trained personnel. Consult a physician if irritation of the eyes and skin or flash burns develops after exposure.

SECTION X- TOXICOLOGICAL INFORMATION

Acute toxicity: Overexposure or inhalation of large amounts of welding fumes may cause symptoms such as metal fume fever, dizziness, nausea, dryness and irritation of your nose, throat or eyes as well as other lung disease.

Chronic toxicity: Overexposure or prolonged inhalation of large amounts of welding fumes with chromium compounds may cause cancer. Other overexposure or prolonged inhalation of large amounts of welding fumes symptoms related may include damage to the central nervous system, respiratory system, skin and could affect organs such as pancreas and liver

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

California Proposition 65

These products may contain or produce 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.)

SECTION XI –SAFE HANDLING AND STORAGE

Handling: Do not eat or drink while using these products and ensure proper ventilation is used.

Storage: Store in a cool dry place. Avoid extreme temperatures and incompatible items as potassium nitrate, oxidizers: also it may react violently with borax, carbon tetrachloride when heated. Reacts explosively when heated with alkali metal hydroxides. Note: Fine powder may be stored completely immersed in water

SECTION XII –DISPOSAL & WASTE

Waste Disposal Method: Recycle when possible. Discard any un-wanted product, residues, containers, or liners in a suitable disposal container in an environmentally acceptable manner approved by Federal, State and Local regulations

SECTION XIII– CONTROL MEASURES AND PERSONAL PROTECTION

Read and understand the manufacturer's instructions and precautionary label on this product and your employer's safety practices. See 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 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 contract the skin or wet clothing and gloves. The welders should insulate themselves from the work and ground.

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SECTION XIV– OTHER INFORMATION

Approval Date: 10-29-2009 Download the most current MSDS and product information @ www.weldingwire.com

NFPA CODES : FIRE: 0 HEALTH: 2 REACTIVITY: 0

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.