



SDS

Tungsten Electrodes

Revised 03/10/2017

(Safety Data Sheet)

This Safety Data Sheet (SDS) is for welding consumables and related products and may be used to comply with OSHA's Hazard Communication standard, 29 CFR 1910.1200, Superfund Amendments and Reauthorization Act (SARA) of 1986 Public Law 99-499 and Canadian Workplace Hazardous Materials Information System (WHMIS) per Health Canada administrative policy. The OSHA standard must be consulted for specific requirements. This Safety Data Sheet complies with ISO 11014-1 and ANSI Z400.1

Section 1: Identification

Manufacturer/Supplier: American Filler Metals Company	Telephone No.: (713) 649-8785
Address: 6015 Murphy Street, Houston, TX 77033	Emergency No.: Chemtrec: (800) 424-9300
Web Site: www.amfiller.com	Classification:
Trade Name: AFM Pure Tungsten (EWP), AFM 1% Thoriated Tungsten (EWTh-1), AFM 2% Thoriated Tungsten (EWTh-2), AFM 2% Ceriated Tungsten (EWCe-2), AFM 1.5% Lanthanated (EWG), 2% Lanthanated Tungsten (EWLa-1), AFM Zirconate Tungsten (EWZr-1)	AWS A5.12 (Tungsten and Oxide Dispersed Tungsten Electrodes for Arc Welding and Cutting)

Section 2: Hazard(s) Identification

Emergency Overview: Grey metal rods with no odor.
 These products are normally not considered hazardous as shipped. Gloves should be worn when handling to prevent contaminating hands with product dust. Avoid eye contact or inhalation of dust from these products. Skin contact is normally no hazard but should be avoided to prevent possible allergic reactions. Persons with a pacemaker should not go near welding or cutting operations until they have consulted their doctor and obtained information from the manufacturer of the device.

When these products are used in a welding process, the most important hazards are heat, radiation, electric shock and welding fumes.

Heat: Spatter and melting metal can cause burn injuries and start fires.

Radiation: Arc rays can severely damage eyes or skin.

Electricity: Electric shock can kill.

Fumes: Overexposure to welding fumes may result in symptoms like metal fume fever, dizziness, nausea, dryness or irritation of the nose, throat or eyes.

Chronic overexposure to welding fumes may affect pulmonary function. Prolonged inhalation of nickel and chromium compounds above safe exposure limits can cause cancer. 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.

Thorium dioxide is a naturally occurring radioactive material which can emit alpha particles which is the basis of its designation as a carcinogen.

This designation is based upon the use of thorium dioxide in medical procedures. Industrial exposures have not been shown to produce adverse effects.

However, good practice is to avoid the inhalation of dusts and fumes.

Section 2: Hazard(s) Identification (Continued)

GHS-US Classification

• STOT RE 1	: H315	• STOT SE 1	: H335	• STOT RE 1	: H372	• Aquatic Acute 1	: H410
• Aquatic Acute 1	: H400						

GHS-US Labelling



GHS07



GHS08



GHS09

Signal Word (GHS-US): Danger

Hazard Statements (GHS-US):

- H317 - May cause an allergic skin reaction
- H319 - Causes eye irritation
- H334 - May cause allergy or asthma symptoms or breathing difficulties if inhaled
- H340 - Suspected of causing genetic defects
- H351 - Suspected of causing cancer
- H370 - Causes damage to organs (kidneys, respiratory system)
- H372 - Causes damage to organs through prolonged or repeated exposure
- H400 - Very toxic to aquatic life
- H410 - Very toxic to aquatic life with long lasting effects

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Precautionary statements (GHS-US):

- P201 - Obtain special instructions before use
- P202 - Do not handle until all safety precautions have been read and understood
- P260 - Do not breathe dust/fume/gas/mist/vapours/spray
- P261 - Avoid breathing dust/fume/gas/mist/vapours/spray
- P264 - Wash thoroughly after handling
- P270 - Do not eat, drink or smoke when using this product.
- P272 - Contaminated work clothing should not be allowed out of the workplace
- P273 - Avoid release into the environment
- P280 - Wear protective gloves
- P284 - In case of inadequate ventilation wear respiratory protection
- P308+P313 - IF exposed: Call a POISON CENTER or doctor/physician
- P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do – continue rinsing. If eye irritation persists seek medical advice/attention.
- P342+P311 - IF experiencing respiratory symptoms: Call a POISON CENTER and / or doctor / physician.
- P302+P352 - IF ON SKIN: Wash with plenty of soap and water
- P333+P313 - If skin irritation or rash occurs: Get medical advice / attention
- P363 - Wash contaminated clothing before reuse
- P308+P311 - IF exposed or concerned: Seek medical advice / attention. Collect spillage.
- P402+P404 - Store in a dry place. Store in a closed container.
- P501 - Dispose of contents and container in accordance with local regional/national international regulations.

For thoriated tungsten electrodes, store in tightly closed containers in a cool and well-ventilated area. Nobody should remain permanently or longer than necessary in close proximity to the stored thoriated tungsten electrodes as the electrodes may emit alpha, beta and gamma radiation. Additional measures should be taken to protect from such possible alpha, beta and gamma radiation. Thoriated tungsten electrodes may be incompatible with some strong acids.

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

- **Promary 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, beryllium, chromium, manganese and nickel. Other reasonably expected constituents of the fume would also include complex oxides of iron and silicon. 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: Composition/Information on Ingredients

Hazardous Ingredient	CAS	EINCSr	Hazard Classification (1)	IARC (2)	NTP (3)	OSHA List (4)
Cerium Dioxide	1306-38-3	215-150-4	No	-	-	-
Lanthanum Oxide	1312-81-8	215-200-5	No	-	-	-
Thorium Dioxide	1431-20-1	215-225-1	No	-	-	-
Tungsten	7440-33-7	2311-143-9	No	-	-	-
Zirconium Dioxide	1314-23-4	215-227-2	No	-	-	-

(1) Hazard Classification according to European Council Directive 67/548/EEC, for R-phrases, see Section 16.

(2) Evaluation according to the International Agency for Research on Cancer. / 1 - Carcinogenic to humans. / 2A - Probably carcinogenic to humans. / 2B - Possibly carcinogenic to humans.

(3) Classification according to the 11th Report on Carcinogens, published by the US National Toxicology Program. / K - Known Carcinogen / S - Suspect Carcinogen

(4) Carcinogen listing according to OSHA, Occupational Safety & Health Administration (USA).

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Section 3: Composition/Information on Ingredients (Continued)

Approximate Composition (%)							
Product	Color Code	AWS Classification	Tungsten (W)	Cerium Dioxide (CeO ₂)	Lanthanum Oxide (LaO ₂)	Thorium Oxide (ThO ₂)	Zirconium Oxide (ZrO ₂)
Pure	Green	EWP	> 99	-	-	-	-
1% Thoriated	Yellow	EWTh-1	> 98	-	-	0 ~ 2	-
2% Thoriated	Red	EWTh-2	> 97	-	-	1 ~ 2.5	-
Zirconate	Brown	EWEZr	> 99	-	-	-	< 1
2% Ceriated	Orange	EWCe-2	> 97	1 ~ 2.5	-	-	-
1.5% Lanthanated	Gold	EWLa-1.5	> 97	-	1 ~ 2	-	-

Section 4: First Aid Measures

Inhalation: If breathing has stopped, perform artificial respiration and obtain medical assistance immediately! If breathing is difficult, provide fresh air and call physician.

Eye contact: For radiation burns due to arc flash, see physician. To remove dusts or fumes flush with water for at least fifteen minutes. If irritation persists, obtain medical assistance.

Skin contact: For skin burns from arc radiation, promptly flush with cold water. Get medical attention for burns or irritations that persist. To remove dust or particles wash with mild soap and water.

Electric shock: Disconnect and turn off the power. Use a nonconductive material to pull victim away from contact with live parts or wires. If not breathing, begin artificial respiration, preferably mouth-to-mouth. If no detectable pulse, begin Cardio Pulmonary Resuscitation (CPR). Immediately call a physician.

General: Move to fresh air and call for medical aid.

Section 5: Fire and Explosion Hazard Data

Solid objects may be picked up and placed into a container. Liquids or pastes should be scooped up and placed into a container. Wear proper protective equipment while handling these materials. Do not discard as refuse. Personal precautions: refer to Section 8 Environmental precautions: refer to Section 13

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: Handle with care to avoid stings and 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 identity labels.

Storage: Keep separate from chemical substances like acids and strong bases, which could cause chemical reactions.

Section 8: Exposure Control and Personal Protection

Avoid exposure to welding fumes, radiation, spatter, electric shock, heated materials and dust.

Engineering measures: Ensure sufficient ventilation, local exhaust, or both, to keep welding fumes and gases from breathing zone and general area. Keep working place and protective clothing clean and dry. Train welders to avoid contact with live electrical parts and insulate conductive parts. Check condition of protective clothing and equipment on a regular basis.

Personal protective equipment: Use respirator or air supplied respirator when welding or brazing in a confined space, or where local exhaust or ventilation is not sufficient to keep exposure values within safe limits. Use special care when welding painted or coated steels since hazardous substances from the coating may be emitted. Wear hand, head, eyes, ear and body protection like welders gloves, helmet or face shield with filter lens, safety boots, apron, arm and shoulder protection. Keep protective clothing clean and dry. Use industrial hygiene monitoring equipment to ensure that exposure does not exceed applicable national exposure limits. The following limits can be used as guidance. For information about welding fume analysis refer to Section 10.

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Section 8: Exposure Control and Personal Protection (Continued)

Substance	CAS	OSHA PEL	ACGIH TLV
Cerium Dioxide	1306-38-3	-	-
Lanthanum Oxide	1312-81-8	-	-
Thorium Dioxide	1314-20-1	-	-
Tungsten	7440-33-7	-	5, 10 (STEL)
Zirconium Dioxide	1314-23-4	5	5, 10 (STEL)

(1) Threshold Limit Values according to American Conference of Governmental Industrial Hygienists, 2014

(2) Permissible Exposure Limits according to the Occupational Safety & Health Administration (USA)

Unless noted, all values are for 8 hour time weighted averages (TWA).

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:** Solid
- **Color:** Metallic
- **Odor:** N/A
- **Form:** Bare Electrode

Section 10: Stability and Reactivity

General: These products are intended for normal welding purposes.

Stability: These products are stable under normal conditions.

Reactivity: Contact with chemical substances like acids or strong bases could cause generation of gas.

When these products are used in a welding process, hazardous decomposition products would include those from the volatilization, reaction or oxidation of the materials listed in Section 3 and those from the base metal and coating.

The amount of fumes generated from these products varies with welding parameters and dimensions but is generally no more than 1 to 10 g/kg consumable. Fumes from these products may contain compounds of the following chemical elements: Fe, O, Mn, Cr, Ni, Si, Mo, Al, Mg, W, Zr, Th, Cs, and La. The rest is not analyzed, according to available standards. Refer to the welding product SDS for additional information on welding fumes.

Refer to applicable national exposure limits for fume compounds, including those exposure limits for fume compounds found in Section 8.

A significant amount of the chromium in the fumes can be hexavalent chromium, which has a very low exposure limit in some countries.

Manganese has a low exposure limit, in some countries that may be easily exceeded.

Reasonably expected gaseous products would include carbon oxides, nitrogen oxides and ozone. Air contaminants around the welding area can be affected by the welding process and influence the composition and quantity of fumes and gases produced.

Section 11: Toxicological Information

Inhalation of welding fumes and gases can be dangerous to your health. Classification of welding fumes is difficult because of varying base materials, coatings, air contamination and processes.

The International Agency for Research on Cancer has classified welding fumes as possibly carcinogenic to humans (Group 2B).

Acute toxicity: Overexposure to welding fumes may result in symptoms like metal fume fever, dizziness, nausea, dryness or irritation of the nose, throat or eyes.

Chronic toxicity: Overexposure to welding fumes may affect pulmonary function. Prolonged inhalation of nickel and chromium compounds above safe exposure limits can cause cancer.

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.

Thorium dioxide is a naturally occurring radioactive material which can emit alpha particles which is the basis of its designation as a carcinogen.

This designation is based upon the use of thorium dioxide in medical procedures. Industrial exposures have not been shown to produce adverse effects.

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

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

USA RCRA: These products are not considered hazardous waste if discarded.

Residues from welding consumables and processes could degrade and accumulate in soils and groundwater.

Section 14: Transport Information

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



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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. Observe any federal and local regulations. Take precautions when welding and protect yourself and others.

WARNING: Welding fumes and gases are hazardous to your health and may damage lungs and other organs. Use adequate ventilation.

ELECTRIC SHOCK can kill.

ARC RAYS and **SPARKS** can injure eyes and burn skin.

Wear correct hand, head, eye and body protection.

Canada: 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).

USA: Under the OSHA Hazard Communication Standard, these products are considered hazardous. These products contain or produce a chemical known to the state of California to cause cancer and birth defects (or other reproductive harm). (California Health & Safety Code § 25249.5 et seq.)
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)
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No ingredients listed in this section.

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.

Canadian Environmental Protection Act (CEPA): All constituents of these products are on the Domestic Substance List (DSL).

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: See Section 3 for weight percent.

No ingredients listed in this section.

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 safety data sheet. Take appropriate precautions and protective measures to eliminate or limit the associated hazard.

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. **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".

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