

(Please ensure the correct person receives this MSDS)

Material Safety Data Sheet

Printing date : December 18, 2006

Reviewing on December 18, 2009 TE001

1) PRODUCT AND COMPANY DESIGNATION

Product Name: TUNGSTEN ELECTRODES
Product Brands:
Product Specification: AWS/ASME SFA 5.12 or other
Product Classification: Types EWP, EWCe, EWLa, EWTh, and EWZr
Recommended use: Gas Tungsten Arc Welding
Telephone number : (905) 501-1700
24-Hour emergency number : (905) 501-0802
Emergency response plan no : 2-0101

Supplier: BOC Canada Ltd
5860 Chedworth Way
Mississauga, Ontario L5R 0A2

Information department :
For information:1-866-385-5389

2) DETAILS OF COMPOSITION

These electrodes consist of solid tungsten or tungsten alloy rods, manufactured in short lengths and supplied in packages. The composition of the tungsten electrodes varies depending on the type of electrode supplied to different classifications of the relevant National Standards. They consist of tungsten metal containing different amounts of metal oxide powders.

Details of the contents of the tungsten electrodes covered by this data sheet are given below

TABLE 1: APPROXIMATE COMPOSITION OF TUNGSTEN ELECTRODES (Wt %)

AWS Classification	W (min.)	CeO ₂	La ₂ O ₃	ThO ₂	ZrO ₂	Other Oxides or Elements (total max)
EWP	99.5	-	-	-	-	0.5
EWCe2	97.3	1.8-2.2	-	-	-	0.5
EWLa-1.5	98.3	-	0.8-1.2	-	-	0.5
EWLa-1.5	97.8	-	1.3-1.7	-	-	0.5
EWLa-2	97.3	-	1.8-2.2	-	-	0.5
EWTh-1	98.3	-	-	0.8-1.2	-	0.5
EWTh-2	97.3	-	-	1.7-2.2	-	0.5
EWZr-1	99.1	-	-	-	0.15-0.40	0.5

Material Safety Data Sheet

Printing date : December 18, 2006

Reviewing on December 18, 2009 TE001

3) HAZARD IDENTIFICATION

There are no recognised hazards associated directly with unused electrodes prior to grinding and welding. Packaged consumables may be heavy, and should be handled and stored with care. Follow manual handling regulations.

Some low levels of dust may be produced during handling. Do not breathe the dust.

When preparing (grinding) and using these electrodes as part of the welding process additional potential hazards are likely:

GRINDING.

Toxic and radioactive dusts. Ensure adequate dust extraction, ventilation and dust disposal

WELDING

Electric shock from the welding equipment or electrode. This can be fatal.

Hot metal spatter and heat, which can cause burns to the hand and body, and may cause fire if in contact with combustible materials.

UV, IR and light radiation from the arc, which can produce 'arc eye' and possible eye damage to unprotected eyes. Wear suitable protective equipment.

Material Safety Data Sheet

Printing date : December 18, 2006

Reviewing on December 18, 2009 TE001

4) FIRST AID MEASURES

No first aid measures should be required for the unused electrodes.

During welding:

Inhalation

If breathing is difficult, bring the patient in fresh air; breathe in fresh air deeply.

For skin burns

Submerge affected area in cold water until burning sensation ceases and refer for immediate medical attention.

For eye effects such as arc eye and dusts

Irrigate eye with sterile water, cover with damp dressing and refer for immediate medical attention if irritation persists.

Ingestion

Ingestion is considered unlikely due to product form. However, if swallowed do not induce vomiting. Seek medical attention. Advice to doctor: treat symptomatically.

Electric shock

If necessary resuscitate and seek immediate medical attention

5) FIRE PREVENTION MEASURES

No specific measures required for the electrodes prior to welding.

Welding should not be carried out in the presence of flammable materials, vapours, tanks, cisterns and pipes and other containers which have held flammable substances unless these have been checked and certified safe.

Material Safety Data Sheet

Printing date : December 18, 2006

Reviewing on December 18, 2009 TE001

6) MEASURES IN CASE OF UNINTENTIONAL RELEASE

No specific actions for electrodes prior to use.

Welding in proximity to stored or used halogenated solvents may produce toxic and irritant gases. Prohibit welding in areas where these solvents are used.

7) HANDLING AND STORAGE (FOR SAFETY)

No special precautions are required for these welding electrodes.

Welding electrodes are dense materials and can give rise to a handling hazard when multiple packages are lifted or handled incorrectly or with poor lifting posture.

Good practice for handling and storage should be adopted to prevent physical injuries.

8) EXPOSURE PREVENTION / CONTROLS / PERSONAL PROTECTION

Exposure Prevention

Welders should not touch live electrical parts, and should insulate themselves from the work and the ground. Manufacturer's guidelines for the use of electrical welding machines should be observed at all times. Welders and co-workers should be educated about the health hazards associated with welding fume, and trained to keep their heads out of the fume plume.

During grinding of these electrodes, toxic and radioactive dusts may be produced. Ensure adequate dust extraction, ventilation and dust disposal during and after grinding to prevent contamination of operators and co-workers.

During welding, fumes and gases will be produced and emitted from the welding process. The content of the fume is dependent on the electrodes type and base material being welded. The amount and concentration of fume generated is dependent on factors such as current, voltage, welding practices and number of welders in a given area. By following recommended welding practices, fume production can sometimes be minimised.

When welding with the main tungsten electrodes covered by this Data Sheet, the fume will consist of tungsten oxide from the electrodes, and may contain either cerium, lanthanum, thorium or zirconium oxides (depending on the electrode type), and other complex metal oxides and silicates from the material being welded.

Gaseous ozone and nitrous oxides are also formed by arc radiation. In some cases ozone levels can be high, and additional controls may be needed.

Material Safety Data Sheet

Printing date : December 18, 2006

Reviewing on December 18, 2009 TE001

Controls

Good general ventilation, and/or local fume extraction at the arc or flame should be used to control the fumes and gases produced during welding to below their individual recognised exposure limits when measured in the welder's and co-workers' breathing zone. In addition the ventilation and extraction should also be sufficient to ensure that the total particulate fume levels are reduced below $5\text{mgm}/\text{m}^3$ when measured in the breathing zone.

In confined spaces where ventilation is not adequate, an air fed breathing system should be used. All precautions for working in confined space should be observed

Where fume levels exceed the recognised exposure limits, respiratory protection may be required in the form of a Class P2 (metal fume) respirator.

Personal Protection

Welders and co-workers in the vicinity should wear protective clothing and eye protection appropriate to arc welding as specified by local standards.

Protection of Body and Skin

Suitable clothes for welding should be worn such as non light reflective fireproof overalls, leather apron, welding helmet, leather boots spats and gloves

Protection of Hands

Welders should wear suitable hand protection such a welding gloves or gauntlets of a suitable standard. Co-workers should also wear suitable hand protection against hot metal, sparks and spatter.

Eye Protection

Welders should wear a welding helmet fitted with the appropriate optical welding filter for the operation. Suitable protective welding screens and goggles should be provided, and used by others working in the same area.

Material Safety Data Sheet

Printing date : December 18, 2006

Reviewing on December 18, 2009 TE001

9) PHYSICAL AND CHEMICAL PROPERTIES

Physical State	Solid
Colour	Generally greyish, but other colours can be present.
Form	Metallic
Odor	Odourless
PH	Not available
Vapour pressure	Not relevant
Vapour density	Not relevant
Boiling point / range	Not relevant
Melting point	~3400°C
Solubility in water	Insoluble
Density	Not available
Explosive / ignition point	Non flammable. No fire or explosion hazard exists

10) STABILITY AND REACTIVITY

There are no stability or reactivity hazards from welding electrodes as supplied. Hazardous decomposition products such as metal oxide fumes and gases (see Section 8) are produced during grinding and welding.

11) TOXICITY DATA

Welding fumes if inhaled can potentially produce several differing health effects caused by the metal containing particles and the gases produced during the welding process, both of which are present in the 'fumes'. The exact nature of any likely health effect is dependent on the consumable, material being welded, weld process, all of which affect fume quantity and composition, as well as the use of adequate ventilation, respirators, or breathing equipment as circumstances require.

Inhalation of the fumes/gases produced during welding may lead to irritation to the nose throat and eyes. The range of health effects include respiratory effects with symptoms such as asthma, impaired respiratory and lung function, chronic bronchitis, metal fume fever, pneumoconiosis, possible emphysema and acute pulmonary oedema.

Other potential health effects at elevated levels of exposure include central nervous effects possible lung cancer, bone disease, skin and fertility effects. Which of these health effects is potentially likely is related to the fume composition, and this needs to be consulted with the specific toxicity data below to assess the health risk when using any particular welding process.

Material Safety Data Sheet

Printing date : December 18, 2006

Reviewing on December 18, 2009 TE001

Unprotected skin exposed to UV and IR radiation from the welding arc may burn or redden, and UV radiation is potentially a carcinogen. UV radiation can affect the unprotected eye by producing an acute condition known as 'arc eye'.

Specific effects relevant to major particulate and gaseous fume constituents which may be produced from these electrodes, (excluding fume from filler material and the components being welded).

Tungsten

Any fume or dust given off by these electrodes will consist mainly of tungsten and tungsten oxides. Exposure to tungsten and its compounds as a dust or fume generally shows low toxicity with no long term fibrotic effects on the lung. Some lung effects observed with exposure to tungsten carbide dust have been attributed more to cobalt than to tungsten compounds.

Thorium

Thoriated electrodes contain Thorium which is radioactive. The exact amount of thorium in the fume depends on the grade of thoriated electrode used, and the welding parameters.

Using DC supply, fume levels from the tungsten electrode during welding are negligible and hence any exposure to radioactivity is also negligible. However, during electrode grinding and AC welding, fume or dust containing thorium will be emitted and exposure to radioactivity will be higher. In these circumstances extract ventilation is required to control any fume/dust emissions.

Thorium is a radioactive substance that emits beta radiation externally and alpha radiation internally. The latter radioactive properties can cause cancer of specific organs.

Zirconium

Zirconium is relatively non-toxic to humans and no adverse health effects would be expected from exposure to zirconium dust or fume.

Ozone and Nitrogen oxides.

These gases are formed due to interactions of the arc with the surrounding air. Both gases can produce eye, respiratory and lung irritation and also can produce longer term lung effects such as decreased lung capacity, chronic bronchitis, and emphysema. Of particular concern with both gases is that exposure to high levels (eg due to build up in confined spaces) can result in acute lung effects such as delayed pulmonary oedema.

Material Safety Data Sheet

Printing date : December 18, 2006

Reviewing on December 18, 2009 TE001

12) ECOLOGICAL DATA

The welding process produces particulate fumes and gases which may cause long term adverse effects in the environment if released directly into the atmosphere. Welding some materials with the electrodes covered by this data sheet can produce carbon dioxide gas, which is dangerous to the ozone layer.

13) DISPOSAL DATA

Packaging, and electrode stubs should be disposed of as general waste or recycled. No special precautions are required for this product, except for the grinding dust and stubs of thoriated electrodes, which may require special disposal.

14) TRANSPORT INFORMATION

No special requirements are necessary in transporting these products

15) REGULATION

No specific regulations apply.

16) OTHER INFORMATION

The customer should provide this Materials Safety Data Sheet to any person involved in the materials use or further distribution. BOC requests the users (or distributors) of this product to read this Materials Safety Data Sheet carefully before usage.

The information contained in this Material Safety Data Sheet relates only to the specific materials designated and may not be valid for such material used in combination with any other material or in any process. Information is given in good faith and is based on the latest information available to BOC and is, to the best of BOC's knowledge and belief, accurate and reliable at the time of preparation. However, no representation, warranty or guarantee is made as to the accuracy, reliability or completeness of the information, and BOC assumes no responsibility and disclaims any liability incurred in using this information.

The product is supplied on the condition that the user accepts the responsibility to satisfy himself as to the suitability and completeness of such information for his own particular use. Freedom from patent rights must not be assumed.