BOC Canada Limited
5860 Chedworth Way
Mississauga, Ontario L5R 0A2
www.boccanada.com

Material Safety Data Sheet

Printing date : December 18, 2006 Reviewing on December 18, 2009 GC001
(Please ensure the correct person receives this MSDS)

1) PRODUCT AND COMPANY DESIGNATION

Product Name: GOUGING CARBON ELECTRODES
Product Brands:
Product Specification:
Product Classification:
Recommended use: Carbon Arc Gouging
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 graphite rods coated with a protective copper coating, manufactured in short lengths and supplied in packages.

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

TABLE 1: APPROXIMATE COMPOSITION OF CARBON GOUGING ELECTRODES (WT %)

Component	Chemical Symbol	Amount	CAS Number
Fixed carbon (graphite)	Chemical Symbol	> 95%	7440-44-0
Copper	Cu	< 5%	74440-50-8

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3) HAZARD IDENTIFICATION

There are no recognised hazards associated directly with unused electrodes prior to gouging. 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 using these electrodes as part of the gouging process additional potential hazards are likely:

Gouging:

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

Noise produced from the gouging process. Wear ear protection

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.

Fumes produced from the electrodes, material being gouged and the arc radiation:

- Particulate fume such as metal oxides from the electrodes, and complex metal oxides and silicates from the weld materials.
- Gaseous fume such as ozone and nitrogen oxides from the action of arc radiation on the atmosphere.
- Short term inhalation of these fumes and gases may lead to irritation of the nose, throat and eyes.
- Long term overexposure or inhalation of high levels of fumes may result in harmful effects to the respiratory system, central nervous system and lungs.
- Local extraction and /or ventilation should be used to ensure that all hazardous ingredients in the fume are kept below their individual occupational exposure standards in the welder's and other workers' breathing zones.

NOTE: If gouging is performed on plated or coated materials such as galvanized steel, excessive fume may be produced which contains additional hazardous components, and may result in metal fume fever and other health effects.

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4) FIRST AID MEASURES

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

During gouging:

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 gouging.

Gouging 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.

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6) MEASURES IN CASE OF UNINTENTIONAL RELEASE

No specific actions for electrodes prior to use.

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

7) HANDLING AND STORAGE (FOR SAFETY)

No special precautions are required for these welding electrodes.

Gouging 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

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/gouging fume, and trained to keep their heads out of the fume plume.

During gouging, high noise levels are produced. The noise levels for each particular process gouging process should be quantified, and the appropriate ear protection should be made available for the operators and their co-workers.

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

When gouging with the electrodes covered by this Data Sheet, the fume from the electrodes will consist of carbon, copper and copper oxide particles and dust, and carbon monoxide and carbon dioxide gas. However, the fume will also contain complex metal oxides and silicates from the materials being gouged. Consult the Safety Data Sheets for the materials being gouged. 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.

The individual exposure limits (when specified) for the constituents mentioned above are given below.

Fume exposure should be controlled to below the recognised exposure limit for each of the individual constituents, and to below 5 mgm/m3 for the total particulate fume.

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The only accurate way to determine the composition and quantity of fumes and gases to which workers are exposed is to take air samples from inside the welders operators helmet, if worn, or in the worker's breathing zones.

Individual fume measurements should be made in these cases using recognised sampling and analysis standards. Based on the results of these measurements, additional fume controls may be required to ensure that all the fume constituents are controlled below their exposure limits.

Controls
Where possible, gouging should be performed in a sound proof area, or in an area remote from other workers to minimise their exposure to the noise levels produced by the gouging process.

Good general ventilation, and/or local fume extraction at the arc should be used to control the fumes and gases produced during gouging 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 5mgm/m3 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
Gouging equipment operators and co-workers in the vicinity should wear protective clothing ear and eye protection appropriate to arc welding/gouging as specified by local standards.

Ear Protection
Noise is the main hazard associated with the use of this product. Gouging equipment operators and co-workers should wear appropriate ear protection for the noise levels produced

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

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Eye Protection
Gouging equipment operator 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.

9) PHYSICAL AND CHEMICAL PROPERTIES

Physical State	Solid
Colour	Generally copper coated rod with grey core.
Form	Metal Tubular rod
Odor	Odourless
PH	Not available
Vapour pressure	Not relevant
Vapour density	Not relevant
Boiling point / range	Not relevant
Melting point	Copper coating:~1100ºC, graphite: :~3000ºC
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 gouging electrodes as supplied.

Hazardous decomposition products such as metal oxide fumes and gases (see Section 8) are produced during gouging.

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11) TOXICITY DATA

Gouging 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 gouged and the gouging process parameters, 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 gouging 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 specific gouging operation.

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 gouging with these electrodes, (excluding fume from components being welded).

Copper

Copper (and zinc) in fume is the main cause of any metal fume fever observed during welding. Metal fume fever is a delayed respiratory effect produced by inhalation of fume. Symptoms include sweating, chills, fever, muscle aches and high temperature. These acute symptoms normally alleviate.

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.

Carbon monoxide and carbon dioxide

Carbon monoxide (CO) is a chemical asphyxiant and its toxicity is due to its affinity for oxygen carrying blood haemoglobin causing fatigue, weakness, dizziness and eventual unconsciousness and possible death. Carbon dioxide (CO2) is mainly an asphyxiant but can exert some toxic properties by increasing pulse and heart rate. During the normal uses of these electrodes, these gases can be produced by oxidation of carbon in the electrodes and the components being gouged.

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12) ECOLOGICAL DATA

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

13) DISPOSAL DATA

Packaging, and electrodes stub should be disposed of as general waste or recycled. No special precautions are required for this product.

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.