

SAFETY DATA SHEET (SDS) Carbon Steel Gas Welding Rods

Please ensure that this SDS is received by the appropriate persons

Review Date: 29/08/2023 v01

Emergency: 0860 02 02 02


Document Number: AFX-SDS-0089

1. PRODUCT AND COMPANY IDENTIFICATION

Product Synonym	Copper Coated Welding Rods
Product Specification	A5.2, CARBON AND LOW ALLOY Bare Gas Welding Rods
Product Classification and Brands	The following Afrox rods and electrodes are covered by this SDS: Afrox CCR
Recommended use:	Oxy Fuel Gas welding of Carbon steel
Product Code	W000040 1.6mm 5Kg W000041 3.2mm 5Kg W000045 2.5mm 5Kg
Company Identification	African Oxygen Limited Grayston Office Park, Building 7 128 Peter Road Sandown, Sandton, 2196 Tel. No: (011) 490-0400 Fax No: (011) 490-0530 Email: customer.service@afrox.linde.com www.afrox.com
Emergency Numbers	0860 02 02 02 (Afrox)

2. HAZARD IDENTIFICATION

Classification	Classification under South African Hazardous Chemical Substances Regulations subsequently amended. (HCS) Classification under the Globally Harmonized System of classification and labelling of chemicals (GHS)
<p>There are no recognised hazards associated directly with unused welding consumables prior to welding. Packaged consumables may be heavy and should be handled and stored with care. Follow manual handling regulations. Wire wound on reels or spools or supplied in bulk packages can be coiled under tension. Take care to avoid the wire uncoiling rapidly when released. Wear gloves and eye protection. When using these consumables as part of the welding process additional potential hazards are likely:</p> <p>Electric shock from the welding equipment or electrode. This can be fatal. Hot metal spatter and heat from the electric arc and the welding flame, which can cause burns to the hand and body, and may cause fire if in contact with combustible materials.</p> <p>UV, IR and light radiation from the arc, which can produce 'arc eye' and possible eye damage to unprotected eyes. Wear suitable protective equipment.</p> <p>Fumes produced from the welding consumable, material being welded, the arc radiation and the welding flame:</p> <ul style="list-style-type: none"> • Particulate fume such as 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, and carbon 	

<p>monoxide and dioxide from oxidation of carbon in the components, and from the flame combustion products.</p> <ul style="list-style-type: none"> • 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. <p>NOTE: If welding is performed on plated or coated materials such as galvanised steel, excessive fume may be produced which contains additional hazardous components, and may result in metal fume fever and other health effects</p>	
Emergency Overview	Colour: Copper/Bronze metal Odour: None Taste: None Physical State: Metal solid Form: wire
Adverse Health Effects	Welding fumes will cause irritation
Chemical Hazards	None
Biological Hazards	None
Vapour Inhalation	Welding fumes and gases may be dangerous to health Overexposure to welding fumes may affect pulmonary function Overexposure to manganese and manganese compounds above safe exposure limits can cause irreversible damage to the central nervous system, include the brain, symptoms of which may include slurred speech, lethargy, tremor, muscular weakness, psychological disturbances and spastic gait
GHS Classification	Specific target organ toxicity-Single exposure Hazard - Category 3 Specific target organ toxicity — Repeated exposure Hazard Category 1
GHS Pictogram	
GHS Signal Words	Danger
GHS Hazard Statements	H336: May cause drowsiness or dizziness H335: May cause respiratory irritation H372: Causes damage to organs through prolonged or repeated exposure

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GHS Precautionary Statements	<p>Prevention: -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 / vapors -P271: Use only outdoors or in a well-ventilated area -P264: Wash hands and exposed skin thoroughly after handling -P270: Do not eat, drink or smoke when using this product -P280: Wear protective gloves/protective clothing/eye protection/face protection -P284: In case of inadequate ventilation, wear respiratory protection.</p> <p>Response: -P304+P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing -P312: Call a poison center/doctor if you feel unwell -P314: Get medical advice/attention if you feel unwell</p> <p>Storage: -P403+P233: Store in a well-ventilated place. Keep container tightly closed -P405: Store locked up</p> <p>Disposal: -P501: Dispose of contents/container in accordance with local / regional / national / international regulations</p>
Other Hazards that do not result in classification	None

ERG No	Not available
Hazard class	Not applicable
Hazchem Warning	Not applicable

4. FIRST AID MEASURES

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
Ingestion	Ingestion is considered unlikely due to product form Do Not induce vomiting, get immediate medical attention
Inhalation	If fumes generated by welding with this product occurs and breathing is difficult, provide fresh air and call physician. If breathing has stopped, perform artificial respiration and obtain medical assistance immediately
Electric shock	Disconnect and turn off the power. Use a non-conductive 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.

3. COMPOSITION OF INGREDIENTS

These rods are made from solid Carbon steel alloys, either in bulk packs, or supplied in straight cut lengths. The composition of the alloys varies depending on the classification.
Details of the contents of the wire and rod consumables covered by this data sheet are given below.

TABLE 1: COMPOSITION OF SOLID RODS (WT %)

Typical Composition	C	Mn	Si	Cu	Cr	Ni	Mo	Al
CCR	0.08	0.5	<0.10	<0.3	<0.20	<0.30	<0.20	<0.02
R60	0.12	1.00	0.12	0.12				

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media	Material will not burn. In case of fire in the surroundings: use appropriate extinguishing agent
Unsuitable extinguishing media:	None
Specific Hazards	Product is not flammable Welding arcs and sparks can ignite combustible and flammable materials
Special fire fighting procedures:	None
Special protective equipment for firefighters:	Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces a self-contained breathing apparatus

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and	No specific measures required for the welding consumable prior to welding. Welding should not be carried out in the presence of flammable materials, vapours, tanks, cisterns and pipes and other
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Chemical name	Carbon steel	
Chemical family	Carbon steel	
CAS No	Iron	7439-89-6
	Copper	1317-38-0
	Manganese	7439-96-5
UN No	Not available	

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emergency procedures:	containers which have held flammable substances unless these have been checked and certified safe
Measures in case of unintentional release	No specific actions for welding consumable 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 Spill and leak response is not applicable
Environmental Precautions	Avoid release into the environment. Avoid dispersal of spilled material and contact with soil, ground and surface water drains and sewers
Methods and material for containment and cleaning up:	If spilled it may be picked-up by hand if safe to do so and removed to a licenced waste site

7. HANDLING AND STORAGE

Safe 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. Do not eat, drink and smoke in work areas
Conditions for safe storage, including any incompatibilities	Keep separate from acids and strong bases to prevent possible chemical reactions. Store in a cool and dry place to prevent corrosion

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Occupational Exposure Hazards (HCS)	Welding fume component	CAS No.	OEL1 - 8hr TWA Mg/m3
	Iron oxide fume (as Fe)	1309-37-1	10
	Manganese and its inorganic compounds (as MN)	7439-96-5	0.2
	Copper, fume	7440-38-0	0.4
General	Welders should not touch live electrical parts, and should insulate themselves from the work and the ground. Welders should not touch hot parts of the consumable, the torch assembly or the components being welded, and should		

	<p>avoid contact with the welding flame. Manufacturer's guidelines for the use of electrical welding machines, gas cylinders, gas control equipment and gas welding equipment should be observed at all times.</p> <p>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 welding, fumes and gases will be produced and emitted from the welding process. The content of the fume is dependent on the wire or rod type, shielding gas (if used) and base material being welded. The amount and concentration of fume generated is dependent on factors such as current, voltage (when electric arc welding), gas flow settings, flame size and type (when gas welding), welding practices and number of welders in a given area. By following recommended welding practices, fume production can sometimes be minimised</p> <p>For the solid Carbon Steel Gas Welding Rods covered by this data sheet, the main constituents of the fume will be Iron, manganese, magnesium and copper oxides and silicates, mainly in the form of complex compounds. There will also be smaller amounts of other complex metal oxides and silicates</p> <p>Gaseous ozone and nitrous oxides are also formed by arc radiation, and carbon monoxide and carbon dioxide can also be present due to oxidation of carbon in the components, and from the flame combustion products. In some cases ozone levels can be high, and additional controls may be needed.</p> <p>Fume Composition data for the main solid Carbon steel wires and rods are given below. Fume exposure should be controlled to below the recognised exposure limit for each of the individual constituents, and to below 5 mg/m³ for the total particulate fume.</p>
Engineering Control Measures	<p>Engineering control measures are preferred to reduce exposures. General methods include mechanical ventilation, process or personal enclosure, and control of process conditions. Administrative controls and personal protective equipment may also be required</p> <p>A Risk assessment should be conducted to evaluate the suitability of PPE to the task being performed</p>

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Personal Protection	Welders and co-workers in the vicinity should wear protective clothing and eye protection appropriate to the welding process being used, as specified by local standards.
Eyes	Wear helmet or use face shield with filter lens. As a rule of thumb, start with a shade that is too dark to see the weld zone. Then go to the next lighter shade which gives sufficient view of the weld zone. Provide protective screens, if necessary, to shield others
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.
Body protection:	Wear head, hand 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 substantial clothing. Train the welder not to touch live electrical parts and to insulate himself from work and ground
Feet	Wear safety shoes while handling containers

Explosive properties:	Non-flammable. No fire or explosion hazard exists
Oxidising Properties:	Not applicable
Density:	Not available
Molecular weight	Not available

10. STABILITY AND REACTIVITY

Reactivity & Stability	This Product is stable under normal conditions. Contact with acids or strong bases may cause generation of gas
Chemical stability	Stable under normal conditions
Possibility of hazardous reactions	None
Conditions to avoid	None
Incompatible Materials	None
Hazardous Decomposition of Products	Metallic oxides, Carbon oxides (CO/CO ₂). Arc radiation can support the production of ozone and nitrogen oxides

11. TOXOLOGICAL INFORMATION

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. 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 produced when welding with these wires and rods

Aluminium

Aluminium has been associated with a type of lung pneumoconiosis named 'Shavers disease' and a possible causative agent of Alzheimer's disease. In both cases any association with this and welding fume exposure is unproven

Iron

Iron oxide is generally considered a nuisance material and unlikely to cause any significant health effects. The fume

9. PHYSICAL AND CHEMICAL PROPERTIES

Chemical Name	Copper Coated
Chemical Symbol	CCR
Physical state	Solid
Form:	Solid Steel Rod with a copper colouring
Colour:	Generally white metallic or light grey
Odour:	Odourless
Odour Threshold:	None
pH:	Not available
Melting Point:	~1300°C
Boiling Point:	Not relevant
Sublimation Point:	Not relevant
Critical Temp. (°C):	Not applicable
Flash Point:	Not applicable
Evaporation Rate:	Not applicable
Flammability (gas):	Non-Flammable
Flammability limit - upper (%):	None
Flammability limit - lower(%):	None
Vapour pressure:	Not relevant
Vapour density (air=1)	Not relevant
Relative density:	Not relevant
Solubility in Water:	Insoluble
Partition coefficient (n-octanol/water):	Not relevant
Autoignition Temperature:	Not applicable
Decomposition Temperature:	Not applicable
Viscosity	
Kinematic viscosity:	No data available
Dynamic viscosity:	Not applicable

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particles however accumulate in the lungs and lead to a benign pneumoconiosis called siderosis

Manganese

Manganese compounds are found in aluminium alloy welding fumes. Manganese is mainly a systemic chronic toxin, although exposure to high particulate concentrations can cause some respiratory irritation.

Overexposure or inhalation of excessive amounts of manganese has been shown to affect pulmonary function, blood and may cause irreversible central nervous system damage (manganism) which resembles Parkinson's disease. Symptoms of manganism include tremors, impaired speech, facial expression changes, slow clumsy movements and eventually impaired walking. The symptoms are typically not apparent for several years

Silica

Silica is found in welding fumes produced by aluminium alloy wires and rods and is produced mainly as amorphous silica. This form of silica has not been associated to any significant degree with lung pneumoconiosis which is associated with crystalline forms of silica

Chromium

Chromium can exist in differing forms in welding fume and this can determine the potential health effects. Chromium can produce respiratory effects such as nasal ulceration and possible lung cancer. It can also cause contact skin dermatitis. The most toxic form of chromium is hexavalent chromium (Cr6+) which is classified as a human carcinogen. The other main form of chromium found in welding fumes (Cr3+) is considerably less toxic and is not classified as a carcinogen. Both types of chromium can be found in the fume from some of these wires and rods

Copper and Zinc

Copper and zinc in welding 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 within 24-48 hours

Ozone and Nitrogen oxides

In electric arc welding, 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 wires and rods, these gases can be produced by oxidation of carbon in the components and from the flame combustion products

12. ECOLOGICAL INFORMATION

Toxicity	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 fumes from the normal use of the Carbon steel rods covered by this data sheet can produce oxides of nitrogen gas, which is dangerous to the ozone layer. Residues from welding consumables and processes could degrade and accumulate in the soil and groundwater.
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13. DISPOSAL CONSIDERATIONS

Disposal Methods	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. Packaging and wire/rod scrap should be disposed of as general waste or recycled. No special precautions are required for this product
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14. TRANSPORT INFORMATION

Road Transportation

UN No.	Not available
Shipping Name	Copper Coated Gas Welding Rods
ERG No.	Not specified
Class	Not specified
Subsidiary Risk	Not available
Hazchem Warning	Not available

Sea Transportation

IMDG	Not available
Shipping Name	Copper Coated Gas Welding Rods
ERG No.	Not specified
Class	Not specified
Subsidiary Risk	Not specified
Label	Not specified

Air Transportation

ICAO/IATA Code	Not available
Class	Not specified
Packing Group:	Not specified
Packaging instructions	Cargo: not specified Passenger: not specified

15. REGULATORY INFORMATION

National legislation OHSact and Regulations 85 of 1993	
SANS 11014:2010 Edition 1	Safety data sheet for chemical products - Content and order of sections
SANS 10228:2012 Edition 6	The identification and classification of dangerous goods for transport by road and rail modes

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SANS 10234:2019 Edition 2	Globally Harmonized System of classification and labelling of chemicals (GHS)
SUPPLEMENT TO SANS 10234 Edition 1	List of classification and labelling of chemicals in accordance with the Globally Harmonized System (GHS)
SANS 10238	Welding and Thermal Cutting Process

16. OTHER INFORMATION

- Ensure all national/local regulations are observed.
- Ensure users and relevant persons understand the asphyxiation hazard
- Regularly check supplier's information sources for updated versions of SDS's

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Bibliography

Compressed Gas Association, Arlington, Virginia
 Handbook of Compressed Gases - 3rd Edition
 Matheson Gas Data Book - 6th Edition
 SANS 11014 - Safety data sheet for chemical products:
 Content and order of sections
 SANS 10234 - List of classification and labelling of chemicals in accordance with the Globally Harmonized System (GHS)
 SANS 10265 – Classification and Labelling of Dangerous Substances
 OHSAct No 85 Of 1993 - General Safety Regulations 9.
 SANS 10238 - Welding and Thermal Cutting Processes – Health and Safety

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