



MATERIAL SAFETY DATA SHEET

SILVER BASED (CADMIUM BARING) BRAZING ALLOY

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: SILVER (CADMIUM-BARING) BRAZING ALLOYS
Product Specification: BS 1845 (1984), BS EN 1044 (1999) or Other.
Product Classification and Brands: Easyflo 1, Easyflo 2, Easyflo 3, Mattibraze 34, Argoswift, Fluxcoat 20, Fluxcoat 30, Fluxcoat 35, Fluxcoat 42, Argoflo.
Recommended use: Oxy-fuel Brazing
Supplier: Afrox
Address: P.O.Box 207, Germiston. 1400
Telephone number: 086020202
Telefax: (011) 821- 3006.

2. DETAILS OF COMPOSITION

These rods consist of a bare solid silver based alloys, supplied in straight cut lengths.

Specific details of the composition of the common rod types covered by this data sheet are given below.

TABLE 1: COMPOSITION OF SOLID RODS (WT %)

BS Classification	Alloy	Ag	Cu	Zn	Cd	Ni	Other
BSEN 1044 Ag 301	Easyflo no 1	50	15	16	19	-	-
BSEN 1044 Ag 303	Easyflo no 2	42	17	16	25	-	-
BSEN 1044 Ag 351	Easyflo no 3	50	15.5	15.5	16	3	-
BSEN 1044 Ag 305	Mattibraze 34	34	25	20	21	-	-
BSEN 1044 Ag 306	Argoswift	30	28	21	21	-	-

3. HAZARDS IDENTIFICATION

There are no recognised hazards associated directly with unused brazing consumables prior to use. Packaged consumables may be heavy, and should be handled and stored with care. FOLLOW MANUAL HANDLING REGULATIONS.

When using these rods as part of the brazing process additional potential hazards are likely:

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

Radiation from the brazing flame, which can produce skin burns and possible eye damage to unprotected eyes.

WEAR SUITABLE PROTECTIVE EQUIPMENT.

Fumes produced from the brazing consumable, material being brazed, and the brazing flame:

- Particulate fume such as complex metal oxides and silicates from the weld materials.
- Gaseous fume such as carbon monoxide and dioxide from the oxidation of carbon in the components and from the flame combustion products.
- 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 brazing 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.

4. FIRST AID MEASURES

No first aid measures should be required for the unused rod consumables. During brazing:

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

For irritation from radiation 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.

5. FIRE PREVENTION MEASURES

No specific measures required for the brazing consumable prior to brazing. Brazing 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.

6. MEASURES IN CASE OF UNINTENTIONAL RELEASE

No specific actions for brazing consumable prior to use. Brazing 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 brazing consumables.

Brazing rods are dense materials and can give rise to a handling hazard when bulk packs and 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

Operators should not touch hot parts of the consumable, the torch assembly or the components being brazed, and should avoid contact with the brazing flame. Manufacturer's guidelines for the use of gas cylinders, gas control equipment and gas welding/brazing equipment should be observed at all times.

Operators and co-workers should be educated about the health hazards associated with welding/brazing fume, and trained to keep their heads out of the fume plume.

During brazing, fumes and gases will be produced and emitted from the brazing process. The content of the fume is dependent on the brazing rod type and base material being brazed. The amount and concentration of fume generated is dependent on factors such as gas flow settings, flame size and type, brazing practices and number of operators brazing in a given area. By following recommended welding/brazing practices, fume production can sometimes be minimised.

For the silver based brazing rods covered by this data sheet, the main constituents of the fume when brazing pure copper will be copper fume and copper oxides, but depending on the type of brazing consumable used, may also contain zinc, manganese, nickel, silver and tin, mainly in the form of complex oxides.

Carbon monoxide and carbon dioxide can also be present due to oxidation of carbon in the components, and to the flame combustion products.

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.

TABLE 2: HAZARDOUS FUME COMPONENTS

Welding fume component	CAS No.	OEL ¹	STEL ¹
		8hr TWA	15min TWA
Copper, fume	7440-50-8	0.2	
Manganese and its inorganic compounds (as Mn)	7439-96-5	1	3
Zinc oxide, fume	1314-13-2	5	10
Nickel and its inorganic compounds			
Water soluble		0.1	
Water insoluble		0.5	
Silver compounds (as Ag)		0.01	
Tin compounds, inorganic (as Sn)	7440-31-5	2	4
Indium		0.1	
Cobalt		0.1	
Carbon Dioxide	124-38-9	5000ppm	15000ppm
Carbon Monoxide	630-08-0	30ppm	200ppm

Units are in mgm/m³ except when stated otherwise

These fume exposure limits indicate that several of the fume constituents have low exposure limits. This, together with the fact that some of these constituents can be present in the fume in large percentages, may mean that additional controls are required beyond the 5mgm/m³ total fume exposure limits normally used for welding fume and allied process.

The fume constituents which may need extra controls are copper, zinc, manganese, nickel, silver, and carbon monoxide.

THE ADVICE ON FUME EXPOSURE CONTROL GIVEN ABOVE IS ONLY VALID WHEN BRAZING CLEAN UNCOATED COPPER UNDER THE MANUFACTURERS RECOMMENDED BRAZING PARAMETERS, AND IS BASED ON REASONABLY EXPECTED FUME LEVELS. ACTUAL FUME LEVELS WILL VARY IN PRACTICE, AND MAY BE HIGHER OR LOWER, DEPENDING ON THE BRAZING PARAMETERS AND OTHER CONDITIONS.

ADDITIONAL FUME MAY ARISE WHEN THESE RODS ARE USED TO BRAZE CONTAMINATED BASE MATERIALS, COATED OR PLATED STEELS, OTHER METALS AND ALLOYS, OR WHEN INCORRECT BRAZING CONDITIONS ARE USED.

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 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

Good general ventilation, and/or local fume extraction at the flame should be used to control the fumes and gases produced during brazing to below their individual recognised exposure limits when measured in the operator'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. Refer to OHS Act No.85 Of 1993 General Safety Regulation 9. For further information see the American National Standard Z49.1 Safety in Welding and Cutting and (SABS 10238) Welding and Thermal Processes – Health and Safety.

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

Brazing equipment operators and co-workers in the vicinity should wear protective clothing and eye protection appropriate to oxy-fuel gas welding/brazing as specified by local standards.

Protection of Body and Skin

Suitable clothes for welding/brazing should be worn such as non light reflective fireproof overalls, leather apron, suitable head protection, leather boots, spats and gloves.

Protection of Hands

Brazing personnel 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

Brazing personnel should wear brazing goggles fitted with the appropriate optical 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 silver coloured, but some alloys may have a copper tinge

Form: Metal solid rod

Odour: Odourless

PH: Not available

Vapour pressure: Not relevant

Vapour Density: Not relevant

Boiling point / range: Not relevant

Melting Point: 600-900°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 brazing rods as supplied. Hazardous decomposition products such as metal oxide fumes and gases (see Section 8) are produced during brazing.

11. TOXICITY DATA

Brazing fumes if inhaled can potentially produce several differing health effects caused by the metal containing particles and the gases produced during the brazing process, both of which are present in the 'fumes'. The exact nature of any likely health effect is dependent on the consumable, material being brazed, brazing 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 brazing 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 brazing process. Unprotected skin exposed to radiation from the brazing flame may burn or redden. Discomfort in burning provides adequate warning before any skin damage occurs. Infrared radiation from the brazing flame can affect the unprotected eye, and may cause eye cataracts and possible necrosis of the retina.

Specific effects relevant to major particulate and gaseous fume constituents produced when brazing with these rods

Copper and Zinc

Copper and zinc in welding/brazing fume is the main cause of any metal fume fever observed during welding/brazing. 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.

Manganese

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 Parkinsons 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.

Tin

Tin (inorganic) generally exhibits low toxicity to humans, but if inhaled as a dust or fume can cause a benign pneumoconiosis – known as stannosis. This condition shows no massive fibrosis, no evidence of disability or complicating factors.

Nickel

The main health effects of nickel are skin dermatitis (nickel 'itch') and it being classified as a potential human lung carcinogen. It may also cause nasal cancer.

Silver

The main health effect of silver is argyria caused by absorption through inhalation or skin contact. Argyria is recognised by skin pigmentation resulting in a grey slate-like colour of the face. No other significant long term health effects are normally present.

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 use of these brazing rods, these gases are mainly formed through oxidation of any carbon in the components, and from the flame combustion products.

12. ECOLOGICAL DATA

The brazing process produces particulate fumes and gases which may cause long term adverse effects in the environment if released directly into the atmosphere. Brazing fumes from the normal use of the brazing rods covered by this data sheet can produce carbon dioxide gas, which is dangerous to the ozone layer.

13. DISPOSAL DATA

Packaging and rod scrap 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. REGULATIONS

- OHS Act No 85 of 1993 General Safety Regulation 9.
- SABS 0238 (SANS 10238) Welding and Thermal Cutting Processes – Health and Safety.

16. OTHER INFORMATION

The customer should provide this Materials Safety Data Sheet to any person involved in the materials use or further distribution. Afrox requests the users (or distributors) of this product to read this Materials Safety Data Sheet carefully before usage. Further information can be obtained from the American National Standard z49.1 Safety in Welding and Cutting.

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.

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