# SAFETY DATA SHEET
# CE 005 Hard facing flux cored wire

AFROX
A Member of The Linde Group

**Version number:** 1

**Replaces SDS:** 2009-11-23
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## Not for sale in the US

## 1. IDENTIFICATION OF THE SUBSTANCE / MIXTURE AND OF THE COMPANY / UNDERTAKING

*1.1 Product identifier*

**Trade name** HARDFACING FLUX CORED WIRE

(Duracor 59-0)

**Article-no**

| *Product Packaging Data* | *Diameter (mm)* | *Spool Mass (kg)* | *Spool Type* | *Item Number* |
|---|---|---|---|---|
| ***Duracor 59-0*** | 2,8 | 25 | Spool | W071728 |
| | 2,8 | 250 | Drum | W071729 |

*1.2 Relevant identified uses of the substance or mixture and uses advised against*

**Article type** SMAW Hardfacing electrodes Classification: DIN 8555

**Use** Arc welding

*1.3 Details of the supplier of the safety data sheet*

**Supplier** Afrox

Street address 23 Webber Street, Selby
Johannesburg, 2001
South Africa

Telephone +27 (0) 11 490 0400

Fax +27 (0) 860 020201

**Email** Customer.service@afrox.linde.com

*1.4 Emergency telephone number*

**Available outside office hours** Yes

**Emergency phone number** 0860 02 02 02

Other

**Additional product information** **Web site: www.afrox.co.za**

## 2. HAZARDS IDENTIFICATION

*2.1 Classification of the substance or mixture*

Not applicable

*2.2 Label elements*

Not applicable

*2.3 Other hazards*

This product contains: Nickel as classified as sensitising and limited evidence of carcinogenic effect. The form of this product does not contribute to a hazard classification of the product.
When the product is used in the welding process the most important hazards are:
Overexposure to fumes and gases from welding can be dangerous to health.
Watch out for splatter, hot metal and slag. It may cause skin burn and cause fire.
Arc rays can injure eyes and burn skin. Electric shock can kill. Avoid touching live electrical parts.

## 3. COMPOSITION / INFORMATION ON INGREDIENTS

*3.1 Substances*

This product is a mixture and please refer to Section 3.2

*3.2 Mixtures*

| **Stainless steel core** | **%C** CAS Number 7440-44-0 | **%Si** CAS Number 7440-21-3 | **%Mn** CAS Number 7439-96-5 | **%Cr** CAS Number 7440-47-3 | **%Ni** CAS Number 7440-02-0 | **%Mo** CAS Number 7439-98-7 | **%Fe** CAS Number 7439-89-6 |
|---|---|---|---|---|---|---|---|
| Ranges | .02-.0.09 | 0.1max | 0.35-0.60 | 0.04max | 0.06max | 0.02 max | balance |

| **Flux coating** | | **CAS No.** |
|---|---|---|
| Limestone and/or Calcium Carbonate | 0-35 | 1317-65-3 |
| Mica (total inhalable dust) (respirable dust) | 0-10 | 12001-26-2 |
| Kaolin (respirable dust) | 0-10 | 1332-58-7 |
| Graphite (total inhalable dust) (respirable dust) | 0-5 | 7440-44-0 |
| Mineral Silicates (total inhalable dust) (respirable dust) | 0-20 | 1332-58-7 1344-95-2 |
| Inorganic Fluorides (as F) | 0-30 | 16984-48-8 |
| Manganese and its Inorganic compounds (as Mn) | 0-30 | 7439-96-5 and others |
| Aluminium (total inhalable dust) (respirable dust) | 0-5 | 7429-90-5 |
| Rutile/ Titanium oxide (total inhalable dust) (respirable dust) | 0-40 | 13463-67-7 |
| Nickel and its inorganic compounds (soluble, as Ni) (insoluble, as Ni) | 0-5 | 7440-02-0 |

| | | |
|---|---|---|
| Silicon and Silicon alloys, (as Si)<br>(total inhalable dust)<br>(respirable dust) | 0-10 | 7440-21-3 |
| Molybdenum compounds (as Mo)<br>(soluble compounds)<br>(insoluble compounds) | 0-8 | 7439-98-7 |
| Chromium<br>Chromium III compounds<br>Chromium VI compounds | 0-40 | 7440-47-3 |
| Cobalt | 0-2 | 7440-36-0 |
| Silicate Binders | 0-35 | 1344-09-8 |
| Ferro Vanadium | 0-6 | |
| Ferro Boron | 0-23 | |
| Others | | |

## 4. FIRST AND MEASURES

*4.1 Description of first aid measures*

| | |
|---|---|
| **Inhalation** | IF INHALED: If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing. Call a physician if symptoms occur. |
| **Skin contact** | Burns should be treated by a doctor. |
| **Eye contact** | IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Burns from radiation, see doctor. |
| **Ingestion** | Contact a doctor if more than an insignificant amount has been swallowed. |

*4.2 Most important symptoms and effects, both acute and delayed*

| | |
|---|---|
| **Inhalation** | Inhalation of vapours may cause irritation of the respiratory system in very susceptible persons. |

*4.3 Indication of any immediate medical attention and special treatment needed*

Not applicable

## 5. FIRE-FIGHTING MEASURES

*5.1 Extinguishing media*

| | |
|---|---|
| **Suitable extinguishing media** | Carbon dioxide (CO2), powder or diffuse jet of water. In case of major fire: Extinguish fire with diffuse jet of water or foam. |

*5.2 Special hazards arising from the substance or mixture*

Not applicable

*5.3 Advice for fire fighters*

| | |
|---|---|
| **Special protective equipment for fire fighters** | Wear self contained breathing apparatus |

## 6. ACCIDENTAL RELEASE MEASURES

*6.1 Personal precautions, protective equipment and emergency procedures*

General ventilation and local fume extraction must be adequate to keep fume concentrations within safe limits. Use respiratory equipment when welding in a confined space. Wear protective clothing and eye protection appropriate to arc welding. Skin contact should be avoided to prevent possible allergic reactions.

*6.2 Environmental precautions*

Try to prevent the material from entering drains or water courses.

*6.3 Methods and material for containment and cleaning up*

Not applicable

*6.4 Reference to other sections*

For *Personal protection* see section 8. For *Disposal* see section 13. For *Environmental precautions* see section 12. For *Precautions for safe handling* see 7.1.

## 7. HANDLING AND STORAGE

*7.1 Precautions for safe handling*

| | |
|---|---|
| **Preventive handling precautions** | Ensure adequate ventilation for the welder and others. Use respiratory equipment when welding in a confined space. Wear protective clothing and eye protection appropriate to arc welding. Remove all flammable materials and liquids before welding. |
| **General hygiene** | Wash hands before breaks and immediately after handling the product. |

*7.2 Conditions for safe storage, including any incompatibilities*

Store welding consumables inside a room without humidity. Do not store welding consumables directly on the ground or beside walls. Store away from chemical substances like acids which could cause chemical reactions.

*7.3 Specific end use(s)*

Welding process.

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

*8.1 Control parameters*

| Welding fume component | CAS No. | WEL 8hr TWA | STEL 15min TWA |
|---|---|---|---|
| Iron oxide fume (as Fe) | 1309-37-1 | 5 | 10 |
| Manganese and its inorganic compounds (as Mn) | 7439-96-5 | 0.5 | |
| Copper<br>(fume)<br>(dust and mist) | 7440-50-8 | <br>0.2<br>1 | |
| Nickel and its inorganic compounds<br>(water soluble)<br>(water insoluble) | | <br>0.1<br>0.5 | |
| Silica, amorphous<br>(total inhalable dust)<br>(respirable dust) | - | <br>6<br>2.4 | |
| Titanium dioxide<br>(total inhalable dust)<br>(respirable dust) | 13463-67-7 | <br>10<br>4 | |
| Calcium Oxide | 1305-78-8 | 2 | |
| Calcium Silicate<br>(total inhalable dust)<br>(respirable dust) | 1344-95-2 | <br>10<br>4 | |
| Fluoride, inorganic (as F) | 16984-48-8 | 2.5 | |
| Carbon Monoxide | 630-08-0 | 30ppm | 200ppm |
| Carbon Dioxide | 124-38-9 | 5000ppm | 15000ppm |
| Nitrogen dioxide ($NO_2$) | 10102-44-0 | 0.5 ppm | 0.95 ppm |
| Ozone ($O_3$) | 10028-15-6 | | 0.2 ppm |
| Nitrogen monoxide (NO) | 10102-43-9 | 0.5 ppm | 0.63 ppm |

*8.2 Exposure controls*

| | |
|---|---|
| **Technical precaution measures** | General ventilation and local fume extraction must be adequate to keep fume concentrations within safe limits. |
| **Eye / face protection** | Wear eye protection appropriate for welding. |
| **Safety gloves** | Skin contact should be avoided to prevent possible allergic reactions. |
| **Other skin protection** | Wear body protection which helps to prevent injury from radiation, sparks and electric shock. |
| **Respiratory protection** | Use respiratory equipment when welding in a confined space. Wear protective clothing and eye protection appropriate to arc welding. |

## 9. PHYSICAL AND CHEMICAL PROPERTIES

*9.1 Information on basic physical and chemical properties*

| | |
|---|---|
| **Appearance, colour** | Grey |
| **Appearance, physical state** | Rod |
| **Auto-ignition temperature** | Not applicable |
| **Auto-inflammability** | Not auto-flammable |
| **Decomposition temperature** | Not applicable |
| **Evaporation rate** | Not applicable |
| **Explosive properties** | Not explosive |
| **Flammability (solid gas)** | Not applicable |
| **Flash point** | Not applicable |
| **Form** | Fast |
| **Initial boiling point and boiling range** | Not applicable |
| **Melting point / Freezing point** | Not applicable |
| **Odour** | Odourless |
| **Odour threshold** | Not applicable |
| **Oxidising properties** | Not applicable |
| **Partition coefficient: n-octanol / water** | Not applicable |
| **pH value** | Not applicable |
| **Relative density** | Not applicable |
| **Solubility** | Not applicable |
| **Solubility in water** | Insoluble |
| **Upper / lower flammability or explosive limits** | Not applicable |
| **Vapour density** | Not applicable |
| **Vapour pressure** | Not applicable |
| **Viscosity** | Not applicable |

*9.2 Other information*

Not applicable

Other

| | |
|---|---|
| **Density** | 0 |

## 10. STABILITY AND REACTIVITY

*10.1 Reactivity*

Not applicable

*10.2 Chemical stability*

Stable at normal conditions.

*10.3 Possibility of hazardous reactions*

Not applicable

*10.4 Conditions to avoid*

None under normal conditions

*10.5 Incompatible materials*

Not applicable

*10.6 Hazardous decomposition products*

Welding fumes and gases. Additional fume may arise from coatings and contaminants on the base material.

| Welding fume component | CAS No. | Classification (67/548EEC) | CLP (1272/2008) | |
|---|---|---|---|---|
| **Aluminium oxide (Al)** | **1344-28-1** | - | - | - |
| **Barium (Ba)** | **7440-39-3** | - | - | - |
| **Bismuth oxide (Bi)** | **12640-40-3** | - | - | - |
| **Calcium (Ca)** | **1305-78-8** | - | - | - |
| **Cobalt oxide (Co)** | **1307-96-6** | **R22: Harmful if swallowed**<br>**R43: May cause sensitisation by contact** | **Acute tox 4 (oral)**<br>**Skin sens. 1** | **H302**<br>**H317** |
| **Chromium III compounds (as Cr)** | **24613-89-6** | **R45: May cause cancer**<br>R35: Causes severe burns<br>R43: May cause sensitisation by skin contact | Carc. 1B<br>Skin Corr. 1A<br>Skin Sens. 1 | **H350**<br>H314<br>H317 |
| **Copper oxide (Cu)** | **1317-38-0** | - | - | - |
| **Iron oxide (Fe)** | **1332-37-2** | - | - | - |
| **Potassium (K)** | **7440-09-7** | **R34: Causes burns** | **Skin Corr. 1B** | **H314** |
| **Lithium (Li)** | **7439-93-2** | **R34: Causes burns** | **Skin Corr. 1B** | **H314** |
| **Magnesium oxide (Mg)** | **1309-48-4** | - | - | - |
| **Manganese (Mn)** | **7439-96-5** | - | - | - |
| **Molybdenum (Mo)** | **7439-98-7** | **Molybdenum trioxide**<br>**R36/37: Irritating to eyes and respiratory system**<br>**R40: Limited evidence of carcinogenic effect** | **Molybdenum trioxide**<br>Carc. 2<br>Eye Irrit. 2<br>STOT SE 3 | <br>H351<br>H319<br>**H335** |

| | | | | | |
|---|---|---|---|---|---|
| **Sodium (Na)** | **7440-23-5** | **R34: Causes burns** | **Skin Corr. 1B** | **H314** | **1.1 to** |
| **Nickel (Ni)** | **7440-02-0** | **R40: Limited evidence of carcinogenic effect**<br>**R43: May cause sensitisation by skin contact**<br>**R48/23: Toxic danger of serious damage to health by prolonged exposure through inhalation**<br>**R52/53: Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment** | **Carc. 2**<br>Skin sens 1<br>STOT RE 1 | **H351**<br>H317<br>H372 | **0.2** |
| **Lead (Pb)** | **7439-92-1** | - | - | - | **<0.1** |
| **Silicon (Si)** | **7440-21-3** | - | - | - | **7.4 to** |
| **Titanium dioxide (Ti)** | **13463-67-7** | - | - | - | **0.8 to** |
| **Vanadium (V)** | **7440-62-2** | - | - | - | **<0.1** |
| **Zinc (Zn)** | **7440-66-6** | - | - | - | **<0.1** |
| **Fluoride (F-)** | **16984-48-8** | - | - | - | **3.1 to** |
| **Chromium (VI) (Cr (VI))** | **1333-82-0** | **R45: May cause cancer**<br>**R46: May cause heritable genetic damage**<br>**R24/25Toxic in contact with skin and if swallowed**<br>**R26: Very Toxic by inhalation**<br>**R35: Causes severe burns**<br>**R42/43: May cause sensitisation by inhalation and skin contact**<br>**R48/23: Toxic danger of serious damage to health by prolonged exposure through inhalation**<br>**R62 Possible risk of impaired fertility** | **Carc 1A**<br>**Muta 1B**<br>Repr. 2<br>Acute tox 2 (inhal)<br>Acute tox 3 (oral/dermal)<br>STOT RE 1<br>Skin corr 1A<br>Resp sens 1<br>Skin Sens 1<br>STOT SE 3 (C≥1%) | H350<br>H340<br>H361f<br>H330<br>H311<br>H301<br>H372<br>H314<br>H334<br>H317<br>H335 | **1.5 to** |
| **Nitrogen dioxide (gas)** | **10102-44-0** | **R26: Very toxic by inhalation**<br>**R34: causes burns** | Acute tox 2 (Inhal)<br>Skin Corr 1B<br>STOT SE 3 (C≥0.5%) | **H330**<br>**H314**<br>**H335** | **0.000** |
| **Nitrogen monoxide (gas)** | **10102-43-9** | - | - | - | **0.000** |
| Welding fume component | CAS No. | Classification (67/548EEC) | CLP (1272/2008) | | Conce fu |
| **Aluminium oxide (Al)** | **1344-28-1** | - | - | - | **1.0 to** |

| | | | | | |
|---|---|---|---|---|---|
| **Barium (Ba)** | **7440-39-3** | - | - | - | **<0.1** |
| **Bismuth oxide (Bi)** | **12640-40-3** | - | - | - | **<0.1** |
| **Calcium (Ca)** | **1305-78-8** | - | - | - | **1.0 to** |
| **Cobalt oxide (Co)** | **1307-96-6** | **R22: Harmful if swallowed**<br>**R43: May cause sensitisation by contact** | **Acute tox 4 (oral)**<br>**Skin sens. 1** | **H302**<br>**H317** | **<0.1** |
| **Chromium III compounds (as Cr)** | **24613-89-6** | **R45: May cause cancer**<br>R35: Causes severe burns<br>R43: May cause sensitisation by skin contact | Carc. 1B<br>Skin Corr. 1A<br>Skin Sens. 1 | **H350**<br>H314<br>H317 | **9.6 to** |
| **Copper oxide (Cu)** | **1317-38-0** | - | - | - | **<0.1** |
| **Iron oxide (Fe)** | **1332-37-2** | - | - | - | **42.1 t** |
| **Potassium (K)** | **7440-09-7** | **R34: Causes burns** | **Skin Corr. 1B** | **H314** | **4.2 to** |
| **Lithium (Li)** | **7439-93-2** | **R34: Causes burns** | **Skin Corr. 1B** | **H314** | **<0.1** |
| **Magnesium oxide (Mg)** | **1309-48-4** | - | - | - | **<0.1** |
| **Manganese (Mn)** | **7439-96-5** | - | - | - | **<0.1** |
| **Molybdenum (Mo)** | **7439-98-7** | **Molybdenum trioxide**<br>**R36/37: Irritating to eyes and respiratory system**<br>**R40: Limited evidence of carcinogenic effect** | **Molybdenum trioxide**<br>Carc. 2<br>Eye Irrit. 2<br>STOT SE 3 | <br>H351<br>H319<br>**H335** | **<0.1** |
| **Sodium (Na)** | **7440-23-5** | **R34: Causes burns** | **Skin Corr. 1B** | **H314** | **1.1 to** |
| **Nickel (Ni)** | **7440-02-0** | **R40: Limited evidence of carcinogenic effect**<br>**R43: May cause sensitisation by skin contact**<br>**R48/23: Toxic danger of serious damage to health by prolonged exposure through inhalation**<br>**R52/53: Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment** | **Carc. 2**<br>Skin sens 1<br>STOT RE 1 | **H351**<br>H317<br>H372 | **0.2** |
| **Lead (Pb)** | **7439-92-1** | - | - | - | **<0.1** |
| **Silicon (Si)** | **7440-21-3** | - | - | - | **7.4 to** |
| **Titanium dioxide (Ti)** | **13463-67-7** | - | - | - | **0.8 to** |
| **Vanadium (V)** | **7440-62-2** | - | - | - | **<0.1** |
| **Zinc (Zn)** | **7440-66-6** | - | - | - | **<0.1** |
| **Fluoride (F-)** | **16984-48-8** | - | - | - | **3.1 to** |

| | | | | | |
|---|---|---|---|---|---|
| **Chromium (VI) (Cr (VI))** | **1333-82-0** | **R45: May cause cancer**<br>**R46: May cause heritable genetic damage**<br>**R24/25Toxic in contact with skin and if swallowed**<br>**R26: Very Toxic by inhalation**<br>**R35: Causes severe burns**<br>**R42/43: May cause sensitisation by inhalation and skin contact**<br>**R48/23: Toxic danger of serious damage to health by prolonged exposure through inhalation**<br>**R62 Possible risk of impaired fertility** | **Carc 1A**<br>**Muta 1B**<br>Repr. 2<br>Acute tox 2 (inhal)<br>Acute tox 3 (oral/dermal)<br>STOT RE 1<br>Skin corr 1A<br>Resp sens 1<br>Skin Sens 1<br>STOT SE 3 (C≥1%) | H350<br>H340<br>H361f<br>H330<br>H311<br>H301<br>H372<br>H314<br>H334<br>H317<br>H335 | **1.5 to** |
| **Nitrogen dioxide (gas)** | **10102-44-0** | **R26: Very toxic by inhalation**<br>**R34: causes burns** | Acute tox 2 (Inhal)<br>Skin Corr 1B<br>STOT SE 3 (C≥0.5%) | **H330**<br>**H314**<br>**H335** | **0.000** |
| **Nitrogen monoxide (gas)** | **10102-43-9** | - | - | - | **0.000** |

| **Analysis wt %** | |
|---|---|
| Al 0.1 to 1.2 | Ni 0.1 to 0.2 |
| Ca 0.1 to 11.6 | Pb 0.1 to 1.8 |
| Fe 11.9 to 54.9 | Si 2.1 to 16.3 |
| K 0.6 to 23.8 | Ti 0.1 to 3.2 |
| Li 0.1 to 0.8 | Zn 0.1 to 3.5 |
| Na 0.5 to 8.7 | |

## 11. TOXICOLOGICAL INFORMATION

*11.1 Information on toxicological effects*

Conditions to avoid: none in the form supplied

When welding, fumes and gases generated can be dangerous to health.

**Acute toxicology** Excessive exposures may affect human health, as follows: Aspiration may cause pulmonary

| | |
|---|---|
| | oedema and pneumonitis Short-term overexposure can cause dizziness, nausea and irritation of the nose, throat or eyes. |
| **Irritation** | Not applicable |
| **Corrosive effects** | Not applicable |
| **Sensitisation** | May cause sensitisation by skin contact |
| **Mutagenicity** | Not applicable |
| **Carcinogenicity** | Welding fumes are possibly carcinogenic to humans |
| **Repeated dose toxicity** | Not applicable |
| **Reproductive toxicity** | Not applicable |

## 12. ECOLOGICAL INFORMATION

*12.1 Toxicity*

The welding process can effect the environment if fume is released directly into the atmosphere. Residues from welding consumables could degrade and accumulate into soils and ground water.

| | |
|---|---|
| **Acute fish toxicity** | LC50 Fish 96h:<br>Manganese: 2,91 mg/l<br>Aluminiumoxide: >100 mg/l Salmo trutta |
| **Acute algae toxicity** | IC50 Algae 72h:<br>Manganese: 0,55 mg/l<br>Aluminiumoxide: >100 mg/l Selenastrum capricornatum (green algae) |
| **Acute crustacean toxicity** | EC50 Daphnia 48h:<br>Manganese: 5,2 mg/l<br>Aluminiumoxide: >100 mg/l Daphnia magna (Water flea) |

*12.2 Persistence and degradability*

Not applicable

*12.3 Bio accumulative potential*

Bioconcentration factor (BCF):

Iron: 140000

Manganese: 59052

*12.4 Mobility in Soil*

Not applicable

*12.5 Results of PBT and vPvB assessment*

Not applicable

*12.6 Other adverse effects*

Not applicable

## 13. DISPOSAL CONSIDERATIONS

*13.1 Waste treatment methods*

| | |
|---|---|
| **Disposal considerations** | Dispose of any product, residue or packing material according to national and local regulations. Spent ;fume extraction filters shall be disposed of as dangerous waste. |

Other

| | |
|---|---|
| **Waste code (EWC)** | 12 01 13 – welding waste |

## 14. TRANSPORT INFORMATION

*14.1 UN number*

Not applicable

*14.2 UN proper shipping name*

Not applicable

*14.3 Transport hazard class(es)*

Not applicable

*14.4 Packing group*

Not applicable

*14.5 Environmental hazards*

Not applicable

*14.6 Special precautions for user*

Not applicable

*14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code*

Not applicable

Other

| | |
|---|---|
| **Dangerous goods** | No |

## 15. REGUATORY INFORMATION

*15.1 Safety, health and environmental regulations / legislation specific for the substance or mixture.*

| | |
|---|---|
| ***EU regulations*** | *The product does not need to be labelled in accordance with EC directives or respective* |

| | |
|---|---|
| | *national laws.* |
| ***National regulations*** | *EH40/2005 Workplace exposure limits* |
| | *The Waste Regulations 2011 No. 988* |
| | *Local laws and regulations should be carefully observed.* |

*15.2 Chemical safety assessment*

*Not applicable*

## 16. OTHER INFORMATION

| | |
|---|---|
| **References to key literature and data sources** | Regulation (EC) No 1907/2006 of the European Parliament and of the Council, (REACH). |
| | Regulation (EC) No 1272/2008 of the European Parliament and of the Council. |
| | EH40/2005 Workplace exposure limits. |
| | The Waste regulations 2011 No.988 |
| | C&L Inventory database |
| | Annex VI CLP Regulation (EC) 1272/2008 |
| **Phrase meaning** | H314 – Causes severe skin burns and eye damage |
| | H350 – May cause cancer. |

Other

| | |
|---|---|
| **Manufacturer's notes** | *Read this Safety Data Sheet carefully and become aware of hazards implied and the safety information.* |

End of Document