



## MATERIAL SAFETY DATA SHEET

### IRON BASE HARDFACING FLUX CORED WIRES

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#### SECTION 1 - PRODUCT IDENTIFICATION

Product Type: Iron Base Hardfacing Wires "FC-O", "FC-G", "MC-G", and "FC-S"  
Amtec Welding Products, Inc. Trade Name: Amtec 1061 Chromium Free Hardsurfacing Wire

#### SECTION 2 - HAZARDOUS INGREDIENTS

**IMPORTANT!** This section covers the material from which this product is manufactured. The fumes and gases produced during welding with this product are covered by section 5. The term "hazardous" in Hazardous Ingredients should be interpreted as a term required and defined in OSHA Hazard Communication Standard (29 CFR Part 1910.1200).

SUBSTANCE	CAS NO.	Exposure Limit (mg/m <sup>3</sup> )		
		ACGIH TLV	OSHA PEL	STEL
Boron	7440-42-8	N/E	N/E	--
Carbon black	1333-86-4	3.5	3.5	--
Calcium Carbonate	1317-65-3	N/E	15	--
Calcium Fluoride	7789-75-5	2.5 (as F)	2.5 (as F)	--
Chromium	7440-47-3			
Metal and Cr III compounds		0.5	0.5	--
Insoluble Cr VI compounds		0.01	0.005 0.1 (CL)	--
Columbium	7440-03-1	10 (ND)	5 (R - dust)	--
Copper	7440-50-8			
Dusts and mists		1	1	--
Iron Oxide	1309-37-1	5 (R)	10 (oxide fume)	--
Iron	7439-89-6	5 (oxide fume)	10 (total particulate)	--
Manganese	7439-96-5	0.2	5	3 (fume)
Molybdenum	7439-98-7			
Metal and insoluble compounds		10 (I) 3 (R)	15 15	--
Nickel	7440-02-0			
Elemental		1.5 (I)	1	--
Insoluble inorganic compounds		0.2 (I) 3 (R)	N/E 15	--
Silicon	7440-21-3	N/E	5 (R)	--
Titanium Dioxide	13463-67-7	10	15 (Total dust)	--
Tungsten	7440-33-7	5	N/E	3
Vanadium	1314-62-1	N/E	N/E	--
Zirconium oxide	7440-67-7	5 (as Zr)	5 (as Zr)	10

**NOTES:** CL = Ceiling Limit, STEL = Short Term Exposure Limit, TLV = Threshold Limit Value, ND = Nuisance Dust, PEL = Permissible Exposure Limit - OSHA(29CFR1910), N/E = Not Established (insufficient data), R = Respirable fraction, I = Inhalable fraction, -- = Not Specified

These products contain toxic chemicals subject to the reporting requirements of section 313 of Title III of SARA and 40 CFR Part 372.

#### SECTION 3 - PHYSICAL AND CHEMICAL CHARACTERISTICS

Material is a tube with fluxes and metal alloys inside.

Vapor pressure - NA

Flash Point - NA

## SECTION 4 - PHYSICAL HAZARDS

### NO HAZARDS EXIST UNTIL THIS PRODUCT IS USED IN ARC WELDING

**Nonflammable** Welding arc and sparks can ignite combustible and flammable products. Refer to American National Standard Z49.1, Safety in Welding and Cutting published by the American Welding Society, 550 N.W. LeJeune Road Miami, FL 33126 for fire prevention and protection information during the use of welding and allied procedures.

## SECTION 5 - HAZARDOUS DECOMPOSITION PRODUCTS

Welding fumes and gases cannot be classified simply. The composition and quantity of both depend on the metal being welded, the process, procedures, and electrodes used. Other conditions which also influence the composition and quantity of the fumes and gases to which workers may be exposed include: coating on the metal being welded (such as paint, plating, or galvanizing), the number of welders and volume of the work area, the quality and amount of ventilation, the position of the welder's head with respect to the fume plume, and the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapors from cleaning and degreasing activities).

When the electrode is consumed, the fume and gas decomposition products generated are different in percent and form from the ingredients listed in Section 2. Decomposition products of normal operation include those originating from the volatilization, reaction, or oxidation of the materials shown in Section 2, plus those from the base metal and coating, ect., as noted above.

Fume constituents of this product would include: fluorides, complex oxides of nickels, chromium, tungsten, iron, calcium, manganese, silicon, titanium, and molybdenum. Also, other fume constituents include nickel and nickel compounds, chromium and chromium compounds, tungsten and tungsten compounds.

The following chemicals may also be present in the fumes:

SUBSTANCE	CAS NO.	Exposure Limit (mg/m <sup>3</sup> )		
		ACGIH TLV	OSHA PEL	STEL
Calcium Fluoride	7789-75-5	2.5 (as F)	2.5 (as F)	--
Calcium Oxide	1305-78-8	2	5	--
Chromium	7440-47-3			
Insoluble Cr VI compounds		0.01	0.005 0.1 (CL)	--
Chromium Oxide	1333-82-0	0.05 (as Cr)	0.1	--
Iron Oxide	1309-37-1	5 (R)	10 (oxide fume)	--
Manganese	7439-96-5	0.2	5	3
Molybdenum	7439-98-7			
Metal and insoluble compounds		10 (I)	15	--
Nickel	7440-02-0			
Elemental		1.5 (I)	1	--
Insoluble inorganic compounds		0.2 (I)	N/E	--
Nickel (soluble)	7440-02-0	0.1	1	--
Silica (amorphous)	7631-86-9	N/E	20 mppcf	--
Titanium Dioxide	13463-67-7	10	15 (Total dust)	--

**NOTES:** CL = Ceiling Limit, STEL = Short Term Exposure Limit, TLV = Threshold Limit Value, PEL = Permissible Exposure Limit - OSHA(29CFR1910), N/E = Not Established (insufficient data), I = Inhalable fraction, mppcf = Million Particles Per Cubic Foot, -- = Not Specified

### Threshold Limit Value

The ACGIH recommended general limit for welding Fume NOC (not otherwise classified) is 5mg/m<sup>3</sup>. ACGIH - 19xx preface states "The TLV-TWA should be used as guides in the control of health hazards and should not be used as fine lines between safe and dangerous concentrations." Most welding, even with primitive ventilation does not produce exposures inside the welding helmet above 5mg/m<sup>3</sup>. Specific fume constituents may modify the TLV.

## SECTION 6 - HEALTH HAZARD

### Effects of Overexposure

Electric arc welding may create one or more of the following health hazards:

- Arc Rays can injure eyes and burn skin.
- Electric shock can kill. See section 9.
- Fumes and gases can be dangerous to your health.

### Short Term (Acute) Overexposure Effects

- Boron - Breathing moderate levels can cause irritation of the nose, throat, and eyes.
- Calcium Carbonate - Irritation of eyes, skin, cough.
- Calcium oxide - Dust or fumes may cause irritation of the respiratory system, skin and eyes.
- Carbon Black - None specified.

Chromium - Inhalation of fume with chromium (VI) compounds can cause irritation of the respiratory tract, lung damage, and asthma like symptoms. Swallowing chromium (IV) salts can cause severe injury or death. Dust on skin can cause ulcers. Eyes may be burned by chromium (VI) compounds. Allergic reactions may occur in some people.

Chromium Oxide - N/A.

Columbium - Dust or fumes may cause irritation of the respiratory system, skin and eyes due to mechanical defects.

Copper - Metal fume fever characterized by metallic taste, tightness in chest, and fever. Symptoms may last 24 to 48 hours following overexposure.

Fluorides - Fluoride compounds evolved may cause skin and eye burns, pulmonary edema, and bronchitis.

Iron, Iron oxide - None are known. Treat as a nuisance dust or fume.

Manganese - Metal fume fever characterized by chills, fever, upset stomach, vomiting, irritation of the throat and body aches. Recovery is usually complete within 48 hours of the overexposure.

Molybdenum - Irritation of the eyes, nose and throat.

Nickel, Nickel compounds - Metallic taste, nausea, tightness in chest, metal fume fever, allergic reaction.

Silica (amorphous) - Dust and fumes may cause irritation to the respiratory system, skin and eyes.

Silicon - May cause mechanical irritation to the eyes and the respiratory tract.

Titanium dioxide - Irritation of the respiratory system.

Tungsten - Dust may cause irritation of the skin and eyes. Inhalation of dust may cause airway obstructive asthma, which is reversible following exposure. Symptoms include tightening of the chest and a productive cough.

Vanadium - Respiratory effects, bronchitis, emphysema, pulmonary edema, and bronchial pneumonia.

Welding fumes - May result in discomfort such as dizziness and nausea, or dryness or irritation of nose, throat and eyes.

### Long Term (Chronic) Overexposure Effects

Boron - N/A.

Calcium Carbonate - chronic ingestion (>8 g/day) may cause blood and kidney disorders.

Calcium oxide - Prolonged overexposure may cause ulceration of the skin and perforation of the nasal septum, dermatitis and pneumonia.

Carbon Black - Lungs may be affected by repeated or prolonged exposure at very high concentrations.

Chromium - Ulceration and perforation of nasal septum. Respiratory irritation may occur with symptoms resembling asthma. Studies have shown that chromate production workers exposed to hexavalent chromium compounds have an excess of lung cancers. Chromium (VI) compounds are more readily absorbed through the skin than chromium (III) compounds. Good practice requires the reduction of employee exposure to chromium (III) and (VI) compounds.

Chromium Oxide - Prolonged contact with the skin may cause dermatitis. Fibrosis of the lungs may occur.

Columbium - No adverse long term health effects have been reported in the literature.

Copper - Copper poisoning has been reported in the literature from exposure to high levels of copper. Liver damage can occur due to copper accumulating in the liver characterized by cell destruction and cirrhosis. High levels of copper may cause anemia, jaundice, and central nervous system damage characterized by nerve fiber separation and cerebral degeneration.

Fluorides - Serious bone erosion (osteoporosis) and mottling of teeth.

Iron, Iron oxide fumes - Can cause siderosis (deposits of iron in lungs) which some researchers believe may affect pulmonary function. Lungs will clear over time when exposure to iron and its compounds ceases.

Manganese - May effect central nervous system. Symptoms may be similar to Parkinson's disease and can include slowness, changes in handwriting, gait impairment, muscle spasms, and cramps and less commonly, tremor and behavioral changes. Employees who are overexposed to manganese should be seen by a physician for early detection of neurologic problems.

Molybdenum - Prolonged overexposure may result in loss of appetite, weight loss, loss of muscle coordination, difficulty breathing and anemia.

Nickel, nickel compounds - Lung fibrosis or pneumoconiosis. Studies of nickel refinery workers indicated a higher incidence of lung and nasal cancers.

Silica (amorphous) - Research indicates that silica is present in welding fumes in the amorphous form. Long term overexposure may cause pneumoconiosis. Noncrystalline forms of silica (amorphous silica) are considered to have little fibrotic potential.

Silicon - Not specified.

Titanium dioxide - Pulmonary irritation and slight fibrosis.

Tungsten - Long term overexposure may cause pulmonary fibrosis characterized by a rapid onset of cough, sputum and dyspnea on exertion.

Vanadium - Repeated exposure may cause bronchitis, an asthma-like allergy, kidney damage, and anemia.

Welding fumes - Excess levels may cause bronchial asthma, lung fibrosis, pneumoconiosis or siderosis.

### Medical Condition Aggravated By Exposure

Preexisting respiratory or allergic conditions may occur in some workers.

## SECTION 7 - ROUTES OF ENTRY OR EXPOSURE

The primary routes of entry are the respiratory system, eyes and/or skin.

## SECTION 8 - CARCINOGENICITY

SUBSTANCE	CAS NO.	OSHA	NTP	IARC
Chromium	7440-47-3	Not listed	Yes (hexavalent compounds)	Yes (VI compounds)
Nickel	7440-02-0	Not listed	Yes (compounds)	Yes (compounds)

As designated by OSHA, the NTP Annual Report, and IARC Monographs.

Warning: This product contains or produces a chemical known to the State of California to cause cancer (California Health & Safety Code Section 25249.5 et seq.).

## SECTION 9 - PRECAUTIONS FOR SAFE HANDLING AND USE/APPLICABLE CONTROL MEASURES

Read and understand the manufacturer's instructions and the precautionary label on the product. See American National Standard Z49.1, Safety in Welding and Cutting published by the American Welding Society, and OSHA Publication 2206 (29CFR1910), US Government Printing Office, Washington D.C. 20402 for more detail on many of the following.

**VENTILATION:** Use enough ventilation, local exhaust at the arc, or both, to keep the fumes and gases below TLVs in the worker's breathing zone and the general area. Train the welder to keep his head out of the fumes.

**RESPIRATORY PROTECTION:** Use respirable fume respirator or air supplied respirator when welding in confined space or where local exhaust or ventilation does not keep exposure below TLV.

**EYE PROTECTION:** Wear helmet or use face shield with filter lens. Select shade from AWS publication F2.2. Provide protective screens and flash goggles, if necessary, to shield others.

**PROTECTIVE CLOTHING:** Wear hand, head, and body protection which help to prevent injury from radiation, sparks, and electrical shock. See ANSE Z49.1. This includes welder's gloves and a protective face shield, and may include arm protectors, aprons, hats, shoulder protection, and dark, substantial clothing. Train the welder not to touch live electrical parts and to insulate himself from work and ground.

**WASTE DISPOSAL METHOD:** Prevent waste from contamination surrounding environment. Discard any product, residue, disposable container or liner in an environmentally acceptable manner compliant with federal, state, and local regulations.

## **SECTION 10 - EMERGENCY FIRST AID PROCEDURES**

Call for medical aid. Employ first aid techniques recommended by the American Red Cross.

**AMTEC WELDING BELIEVES THIS DATA TO BE ACCURATE, BUT NO WARRANTY, EXPRESSED OR IMPLIED, IS MADE.**