

NFPA Ratings

Fire 0

Health 2

Reactivity 0

Special

Hazard Ratings  
4 = Extreme  
3 = High  
2 = Moderate  
1 = Slight  
0 = Insignificant

# Material Safety Data Sheet

(Essentially Similar to U.S. Department of Labor Suggested  
Form For Hazard Communication Compliance)

## I. Product Identification

**Product Type** - ALL-STATE AIR CARBON ARC GOUGING ELECTRODES

**Manufacturer** - THE ESAB GROUP, INC.

**Website:** [www.esabna.com](http://www.esabna.com)

**Telephone No.** - 1-717-637-8911

1-800-933-7070

**Address** - 801 Wilson Avenue  
Hanover, PA 17331

**Emergency No.** - 1-717-637-8911  
(CHEMTREC) 1-800-424-9300

**Product Description:** These carbon electrodes are a nonfiller metal electrode used in arc welding and cutting, consisting of a carbon or graphite rod which may be plain or coated with copper.

### NOMINAL CHEMICAL COMPOSITION (Wt. %)

All-State Arc Gouging Electrode Product Trade Names	Carbon & Graphite	Copper
DC-COPPER COATED ❶	<85	15-30
DC-PLAIN ❶	100	--

❶ See Note in Section VI

## II. Hazardous Ingredients

**IMPORTANT:** This section covers the materials from which this product is manufactured. The fumes and gases produced during normal use of these products are covered in Section V. The term **HAZARDOUS** should be interpreted as a term required and defined by Laws, Statutes or Regulations, and does not necessarily imply the existence of any hazard when the products are used as directed by **THE ESAB GROUP**.

Material	(CAS No.)	SARA	ACGIH TLV		OSHA - PEL	
			TWA (mg/m <sup>3</sup> )		TWA (mg/m <sup>3</sup> )	STEL (mg/m <sup>3</sup> )
Carbon (C)	(7440-44-0)		3.5 (Carbon Black)		3.5 (Carbon Black)	--
Copper (Cu)	(7440-50-8)	*	0.2 (Fume)		0.1 (Fume)	--
Graphite (C)	(7782-42-5)		2 (Respirable Dust)		2.5 (Respirable Fraction)	--

**NOTE:** In the ingredients table, an asterisk (\*) after the CAS number indicates a toxic chemical subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 (SARA) and 40 CFR Part 372.

**THE ESAB GROUP** requests the users of these products to study this Material Safety Data Sheet (MSDS) and the product labels and become fully aware of the product hazards and safety information. To promote the safe use of these products a user should (1) notify and train its employees, agents and contractors concerning the information on this MSDS and any product hazards and safety information, (2) furnish this same information to each of its customers for these products, and (3) request that such customers notify and train their employees and customers, for these products, of the same product hazards and safety information.

### III. Physical Data

As shipped, these products are nonflammable, nonexplosive, nonreactive, and nonhazardous.

**Physical State:** Gas ( ) Liquid ( ) Solid (X)

**Odor and Appearance:** Plain and copper coated carbon and graphite rods. Odorless.

### IV. Fire & Explosion Hazard

**Flammable/Explosive:** NO (X) YES ( )

**Under What Conditions:** Only the packaging for this product will burn.

**Extinguishing Media:** This product will not burn. However, welding arcs and sparks can ignite combustible and flammable materials. Use the extinguishing media recommended for the burning materials and fire situation. See ANSI Z49.1 "Safety in Welding and Cutting" and "Safe Practices" Code: SP, published by the American Welding Society, P. O. Box 351040, Miami, FL 33135, and NFPA 51B "Standard for Fire Prevention During Welding, Cutting and Other Hot Work" published by the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269 for additional fire prevention and protection information.

### V. Reactivity Data

**Stability:** Stable (X) Unstable ( ) Hazardous polymerization will not occur.

**Incompatibility** (Materials to Avoid): None currently known.

**Concentration Limits for Expected Hazardous Decomposition Products:**

Material	(CAS No.)	ACGIH TLV (1999)		OSHA - PEL (1993)	
		TWA (ppm)	STEL(ppm)	TWA (ppm)	STEL (ppm)
Carbon Dioxide	(124-38-9)	5000	30,000	5000	---
Carbon Monoxide	(630-08-0)	25	---	50	---
Nitrogen Dioxide	(10102-44-0)	3	5	---	5
Nitrous Oxide	(10024-97-2)	50	---	---	---
Ozone	(10028-15-6)	0.05 (heavy work)	---	0.1	---
Welding Fume		5 mg/m <sup>3</sup>	---	---	---

**Hazardous Decomposition Products:** Fumes and gases from carbon arc gouging cannot be classified simply. The composition and quantity of both are dependent upon the material being worked, the process, procedures and consumables used. Other conditions which also influence the composition and quantity of the fumes and gases to which workers may be exposed include: coatings on the material being worked (such as paint, plating or galvanizing), the number of welding operations and the volume of the work area, the quality and amount of ventilation, the position of the workers head with respect to the fume plume, as well as the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapors from cleaning or painting activities). When the materials are consumed, the fume and gas decomposition products generated are different in percent and form from the ingredients listed in Section II. Decomposition products of normal operation include those originating from the volatilization, reaction or oxidation of the ingredients, plus those from the material being worked and the coatings etc. noted above.

**Reasonably expected decomposition products** from normal use of these products include a complex of the oxides of the materials listed in Section II, as well as carbon monoxide, carbon dioxide, ozone and nitrogen oxides (refer to "Characterization of Arc Welding Fume" available from the American Welding Society). The only way to determine the true identity of the decomposition products is by sampling and analysis. The composition and quantity of the fumes and gases to which a worker may be overexposed can be determined from a sample obtained from inside the welder's helmet, if worn, or in the workers breathing zone. See ANSI/AWS F1.5, "Methods for Sampling and Analyzing Gases from Welding and Allied Processes," and ANSI/AWS F1.1 "Method for Sampling Airborne Particles Generated by Welding and Allied Processes", available from the American Welding Society.

### VI. Physical and Health Hazard Data

Electric arc working may create one or more of the following health or physical hazards. Fumes and gases can be dangerous to your health. Electric shock can kill you. Arc rays can injure eyes and burn skin. Noise can damage hearing. An additional detailed description of the Health and Physical Hazards and their consequences may be found in ESAB's publications F52-529 "Precautions and Safe Practices for Electric Welding and Cutting" and F2035 "Precautions and Safe Practices for Gas Welding, Cutting and Heating." You may obtain copies from your local supplier or by writing to the address in Section I.

**Route of overexposure:** The primary route of entry of the decomposition products is by inhalation. Skin contact, eye contact, and ingestion are possible. Absorption by skin contact is unlikely. The carbon arc cutting (CAC) process produces a high noise level and creates a significant risk for hearing impairment. Ear protection is required. See ANSI Z49.1 "Safety in Welding, Cutting and Allied Processes". When these products are used as recommended by **THE ESAB GROUP**, and ventilation maintains exposure to the decomposition products below the limits recommended in this section, overexposure is unlikely.

**Effects of acute (short-term) overexposure** to the gases, fumes and dusts may include irritation of the eyes, lungs, nose and throat. Some toxic gases associated with welding may cause pulmonary edema, asphyxiation, and death. Acute overexposure may include signs and symptoms such as watery eyes, nose and throat irritation, headache, dizziness, difficulty in breathing, frequent coughing, or chest pain. Copper fumes may cause metal fume fever, the symptoms of which are metallic taste, dryness or irritation of the throat, nausea, fever, body aches and chills.

**Pre-existing Medical Conditions Aggravated by Overexposure:** Individuals with allergies or impaired respiratory function may have symptoms worsened by exposure to welding fumes. However, such reaction cannot be predicted due to the variation in composition and quantity of the decomposition products.

**Effects of chronic (long-term) overexposure** to air contaminants may lead to their accumulation in the lungs, a condition which may be seen as dense areas on chest X-rays. The severity of the change is proportional to the length of the exposure. The changes seen are not necessarily associated with symptoms or signs of reduced lung function or disease. In addition, the changes on X-rays may be caused by non-work factors such as smoking, etc. Long term exposure to welding and allied processes gases, dusts and fumes may contribute to pulmonary irritation or pneumoconiosis. Overexposure to copper fumes may lead to copper poisoning, resulting in hemolytic anemia and liver, kidney and spleen damage.

As noted in Section V, Carbon Arc Cutting will cause the base material to emit fumes and gases. The gouging and cutting of carbon steel carbon steel will create fumes and gases that contain the elements manganese and iron. Overexposure to manganese compounds may affect the central nervous system, symptoms of which are languor, sleepiness, muscular weakness, emotional disturbances, and spastic gait. The effect of manganese on the nervous system is irreversible. Inhalation of too much iron oxide fume over a long time can cause siderosis, sometimes called "iron pigmentation" of the lung, which can be seen on a chest x-ray but causes little or no disability. The cutting of stainless steel will create fumes and gases that will also contain the elements nickel and chromium. Nickel and chromium (in some forms) are considered carcinogenic. Long term overexposure to nickel fumes may also cause pulmonary fibrosis and edema.

**Exposure limits** for the ingredients are listed in Section II. The exposure limits for the expected hazardous decomposition products are listed in Section V. The ACGIH and the 1989 OSHA TWA for welding fume is 5 mg/m<sup>3</sup>. At times, the limit for a particular hazardous chemical is reached before the limit for welding fumes. TLV-TWAs should be used as a guide in the control of health hazards and not as firm lines between safe and excessive concentrations. As noted in Section V, the fume from welding, brazing, soldering and allied processes is a mixture of many components. Therefore, a statutory computation of the *equivalent exposure* is required. The *equivalent exposure* value for the fume mixture from the welding or from an allied process shall always be less than one. When these products are used as recommended by **THE ESAB GROUP**, and the preventive measures taught in this MSDS are followed, overexposure to hazardous substances will not occur.

**Emergency First Aid Measures:** In case of emergency, call for medical aid. Employ first aid technique recommended by the Red Cross. **If BREATHING IS DIFFICULT**, give oxygen and call for a physician. **FOR ELECTRIC SHOCK**, disconnect and turn off the power. If not breathing, begin artificial respiration, preferably mouth-to-mouth. If no detectable pulse, begin Cardio Pulmonary Resuscitation (CPR). Immediately call a physician. **FOR ARC BURN**, apply cold, clean compresses and call a physician.

**Eye Contact:** Flush with water for at least fifteen minutes to remove all residue. If irritation persists, obtain medical assistance.

**Skin Contact:** Promptly flush with soap and water to remove all residue. If irritation persists, consult a physician.

**Inhalation:** Remove to fresh air. If breathing has stopped, perform artificial respiration and obtain medical assistance immediately!

**Ingestion:** Call a physician or your Poison Control Center IMMEDIATELY! Advise of Section II.

**Carcinogenic Assessment (NTP Annual Report, IARC Monographs, Other):**

Carbon Black: IARC-2B possibly carcinogenic to humans; NIOSH-Ca potential occupational carcinogen, with no further categorization; TLV-A4 not classifiable as a human carcinogen (but cause for concern).

**⚠ WARNING:** This product, when used for welding or cutting, produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code §25249.5 et seq.)

## VII. Precautions for Safe Handling and Use/Applicable Control Measures

Read and understand the manufacturer's instructions and the precautionary label on this product. See American National Standard Z-49.1, "Safety in Welding and Cutting," published by the American Welding Society, P. O. Box 351040, Miami, FL 33135 and OSHA Publication 2206 (29 C.F.R. 1910), U.S. Government Printing Office, Washington, D.C. 20402 for more detail on many of the following:

**Ventilation:** The air jet in air carbon arc gouging tends to dilute the fumes and gases in the arc zone; however, the general work area may become unsafe if the fumes and gases are allowed to accumulate. Avoid arc work in the presence of chlorinated hydrocarbon vapors. Phosgene may be produced from interaction with the radiant energy of the arc. Avoid arc working of parts coated with phosphate residues (anti-rust, cleaning preparations). Use enough ventilation, local exhaust at the arc, or both, to keep the exposure within legal limits. In the worker's breathing zone and the general area, the fumes and gases must be kept below the TLVs and the *equivalent exposure* must compute to less than one. 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. Where respiratory protection is necessary, NIOSH approved respiratory protection should be used. The selection of the appropriate respiratory protection (dust respirator, etc.) should be based on the actual or potential airborne contaminants and their concentrations present. However, at least a NIOSH approved type TC-21-C dust mask is recommended.

**Eye Protection:** Wear helmet or use face shield with filter lens. As a rule of thumb, start with a shade which 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 and flash goggles, if necessary, to shield others. Wear safety glasses or goggles when handling this material to prevent eye contact. Do not wear contact lenses in any environment where dust or fumes are present. Readily available eye baths are recommended in areas where operations may produce fumes and dusts

**Ear Protection:** Hearing protection required. Noise levels should be monitored. If sound levels exceed TLV's for noise (85 dBA for 8 hr. TWA, or C-weighted peak level of 140 dB, see 29 CFR 1910), hearing protection must be worn.

ACGIH TLVS for Noise duration per day:

Hours	24	16	8	4	2	1			
Level dBA	80	82	85	88	91	94			
Minutes	30	15	7.5	3.75	1.88	0.94			
Level dBA	97	100	103	106	109	112			
Seconds	28.1	14.1	7.0	3.5	1.8	0.88	0.44	0.22	0.11
Level dBA	115	118	121	124	127	130	133	136	139

**Protective Clothing and Equipment:** Wear head, hand and body protection which help to prevent injury from radiation, sparks and electrical shock. See ANSI Z-49.1. 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.

**Hygienic Work Practices:** Avoid contact to eyes, skin, and mucous membranes. Avoid inhalation of vapors. Wash thoroughly after handling and use. Do not smoke, eat, drink, chew gum or tobacco, or apply cosmetics within the working area. Do not carry or store tobacco products, gum, food, drinks or cosmetics into the working area. Otherwise follow the standards of good industrial hygiene practices.

**Procedure for Cleanup of Spills or Leaks:** NOT APPLICABLE

**Waste Disposal Methods:** Prevent waste from contaminating surrounding environment. Discard any product, residue, disposable container, or liner in an environmentally acceptable manner, in full compliance with Federal, State, and Local regulations.

The opinions expressed in this MSDS are those of qualified experts within **THE ESAB GROUP**. We believe that the information contained herein is current as of the date of this MSDS. Since the use of this information and these opinions and the conditions of use of these products are not within the control of **THE ESAB GROUP**, it is the user's obligation to determine the conditions of safe use of these products.