



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 BRAZING AND SOLDERING ALLOYS

Manufacturer - THE ESAB GROUP, INC. **Telephone No.** - 1-717-637-8911

Website: www.esabna.com **1-800-933-7070**

Address - 801 Wilson Avenue **Emergency No.** - 1-717-637-8911
Hanover, PA 17331 **(CHEMTREC)** 1-800-424-9300

Product Description: Metallic wire, rod or strip. Products with a "FC" appendage have a flux coating on the outer surface.

APPROXIMATE COMPOSITION

All-State Product Trade Name	% Ag	% Cd	% Cu	% Ni	% Zn	% Sb	Binding Flux	Boric Acid	K Cmpds	Sn
All-State 50 ③	19-60	1-30	5-50	--	--	--	--	--	--	--
All-State 50N ③	50	10-20	10-20	1-5	10-20	--	--	--	--	--
All-State 100 ③	40	--	30	2	28	--	--	--	--	--
All-State 101 ③	45	24	15	--	16	--	--	--	--	--
All-State 101 Cadmium Free ①	45	--	30	--	25	--	--	--	--	--
All-State 101FC ③	30-40	15-20	5-15	--	10-15	--	X	X	X	--
All-State 101FC Cadmium Free ①	45	--	30	--	25	--	X	X	X	--
All-State 105 ③	1-5	90-95	--	--	--	--	--	--	--	--
All-State 125 ①	25	--	43	--	30	--	--	--	--	X
All-State 155 ①	56	--	22	--	17	--	--	--	--	X
All-State 155FC ①	35-50	--	10-20	--	10-15	--	X	X	X	X
All-State 390 Solder ①	--	--	--	--	<10	--	--	--	--	X
All-State Strongset Solder 509 ③	--	80-85	--	--	10-20	--	--	--	--	--
All-State 95/5 Solder ①	--	--	--	--	--	5	--	--	--	X
All-State Bi-Metal ③	40-54	--	20-40	1-5	5-28	--	--	--	--	--
All-State Tri-Metal ③	24-26	7-9	57-58	1-2	6-10	--	--	--	--	--

NOTE: X indicates material is present
 ① See Note 1 in Section VI
 ③ See Note 3 in Section VI

THE ESAB GROUP requests the users of these products to study this Material Safety Data Sheet (MSDS) and the product label 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.

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 ³)		TWA (mg/m ³)	STEL (mg/m ³)
Antimony (Sb)	7440-36-0	*	0.5		0.5	--
Binding Flux **	--		--		--	--
Boric Acid (H ₃ BO ₃)	(10043-35-3)		10 (B ₂ O ₃)		5 (B ₂ O ₃ Respirable)	--
Cadmium (Cd)	(7440-43-9)	*	0.01 (Inhalable Fraction as Cd) 0.002 (Respirable Fraction as Cd)		0.005	--
Copper (Cu)	(7440-50-8)	*	0.2 (Fume, as Cu)		0.1 (as Cu)	--
Nickel (Ni)	(7440-02-0)	*	0.1 (Soluble)		0.1 (Soluble)	--
Potassium Bifluoride	(7789-29-9)		2.5 (as F)		2.5 (as F)	--
Potassium Fluoborate	(14075-53-7)		2.5 (as F)		2.5 (as F)	--
Potassium Penta Borate	(11128-29-3)		Not Listed		Not Listed	--
Silver (Ag)	(7440-22-4)		0.1		0.01	--
Tin (Sn)	(7440-31-5)		2		2	--
Zinc (Zn)	(7440-66-6)	*	5 (Oxide Fume), 10 (STEL)		5 (Oxide Fume)	10

NOTES: Cadmium is an OSHA regulated material. Read OSHA Standard Number: 1910.1027 App A "Substance Safety Data Sheet – Cadmium".

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.

** Binding Flux is a solution of an n-Butyl Methacrylate based Acrylic Polymer in Solvent Naphtha 100/140 (40% solids). The solvent CAS number is 6742-89-8.

III. Physical Data

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

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

Solubility in Water: Metal rod is insoluble; flux coating is slightly soluble

Odor and Appearance: Metallic wire, rod or strip. Odorless. Those ending in FC also have a flux coating that may be moderately soluble in water.

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. If these products become liquid, use CO₂ or dry chemical extinguisher. Do not use water on molten metal. Large fires may be flooded with water from a distance. Otherwise 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 "Cutting and Welding Processes," published by the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269 for additional fire prevention and protection information.

Special Fire Fighting Procedures: Use NIOSH/MSHA approved self-contained breathing apparatus and full protective clothing if involved in a fire.

Unusual Fire and Explosion Hazards: Finely divided dust may form explosive mixtures with air. Never drop water or liquids into molten solder and brazing liquid. Do not plunge damp or wet solder and brazing rods into molten metal.

Note: Soldering and brazing products that contain cadmium and the metal that is deposited by the products that contain cadmium should never be heated to extremes beyond the melting point.

Note: Do not arc weld metals that contain cadmium.

Warning: Inhaled Cadmium May Cause Death.

V. Reactivity Data

Stability: Stable (X) Unstable () Polymerization will not occur.

Incompatibility (Materials to Avoid): None currently known.

Hazardous Decomposition Products: Soldering and brazing fumes and gases 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 soldering, brazing, and 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. In addition, antimony when heated or on contact with acid emits toxic fumes including antimony hydride, and tin when heated or on contact with strong acids may produce toxic and poisonous compounds.

Reasonably expected decomposition products from normal use of these products include a complex of the oxides and fluorides 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 FUME LIMITS FOR CADMIUM, COPPER, NICKEL AND SILVER MAY BE REACHED BEFORE THE GENERAL LIMIT FOR WELDING FUMES OF 5 mg/m³ IS REACHED. MONITOR FUMES FOR CADMIUM, COPPER, NICKEL AND SILVER. 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, brazing and soldering 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. Brazing alloys are frequently used with a fluoride type flux. If applicable, flux fume should be considered in evaluation of hazards. 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 17982 "Standard for Fire Prevention During Welding, Cutting and Other Hot Work." 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 of the products is unlikely. 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 soldering, brazing and braze-welding may cause pulmonary edema, asphyxia, 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. Acute overexposure to cadmium may be immediately dangerous to life and health. Severe exposure may occur before symptoms appear. Early symptoms may include mild irritation of the upper respiratory tract, a sensation of constriction of the throat, and a metallic taste and cough. A period of 1-10 hours may precede the onset of rapidly progressing shortness of breath, chest pain, and flu-like symptoms with weakness, fever, headache, chills, sweating and muscular pain. Acute pulmonary edema develops within 24 hours. If death from asphyxia does not occur, symptoms may resolve within a week. The presence of nickel compounds in fume can cause metallic taste, nausea, tightness of chest, fever, and allergic reaction. The presence of copper and zinc in fume can cause metal fume fever. Short term symptoms may include a metallic taste in the mouth, dryness or irritation of the throat followed by coughing, shortness of breath, nausea, fever, body ache, and chills. Excessive inhalation of zinc oxide fume may produce symptoms known as zinc shakes, an acute self limiting condition without recognized complications. Symptoms usually disappear within 24 hours.

Pre-existing Medical Conditions Aggravated by Overexposure: Individuals with allergies or impaired respiratory function may have symptoms worsened by exposure to brazing 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 brazing fume, gases or dust may contribute to pulmonary irritation or pneumoconiosis. Nickel and cadmium are considered carcinogenic. Long term overexposure to nickel fumes may also cause pulmonary fibrosis and edema. Repeated or long term exposure to Cadmium, even at relatively low concentrations, may result in kidney damage and an increased risk of cancer of the lung and of the prostate. Overexposure to copper fumes may lead to copper poisoning, resulting in hemolytic anemia and liver, kidney and spleen damage. Chronic fluoride absorption can result in osseous fluorosis, increased radiographic density of the bones and mottling of the teeth. Overexposure to silver may result in argyria, a permanent pigmentation (gray to purple) of the skin and eyes. Exposure to high silver levels has resulted in respiratory problems and stomach pains.

Exposure Limits: for the ingredients are listed in Section II. The ACGIH and the 1989 OSHA TWA for welding fume is 5 mg/m³. 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: Skin contact with these products in finely divided form may cause irritation, argyria, discoloration, and contact dermatitis. 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! Administer oxygen if available.

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

Carcinogenic Assessment (NTP Annual Report, IARC Monographs, Other): Nickel must be considered a carcinogen under OSHA (29 CFR 1910.1200). IARC has indicated Nickel and its alloys are possibly carcinogenic to humans (Group 2B), but nickel compounds are reported as Carcinogenic to humans (Group 1). NTP lists nickel and nickel compounds as substances known to be a human carcinogens (Group K). In evaluating Cadmium and Cadmium compounds, IARC has determined that there is sufficient evidence of carcinogenicity to humans (Group 1). OSHA considers all cadmium and cadmium compounds to be a cancer hazard and specifically regulates cadmium. See OSHA Standard Number: 1910.1027 App A "*Substance Safety Data Sheet – Cadmium*". NTP lists cadmium and cadmium compounds as substances known to be a human carcinogens (Group K). IARC has determined that cadmium and cadmium compounds are (Group 1) carcinogenic to humans.

Antimony oxide MAK-2—substances that are considered to be carcinogenic for man because sufficient data from long-term studies or limited evidence from animal studies substantiated by evidence from epidemiological studies.

Antimony trioxide MAK-2 (see antimony oxide), IARC 2B possibly carcinogenic to humans.

❶ **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.)

❷ **WARNING:** This product contains or produces a chemical known to the State of California to cause cancer and birth defects (or other reproductive harm). (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: 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 operator to keep his head out the fumes.

Respiratory Protection: Use respirable fume respirator or air supplied respirator when welding in confined spaces or where local exhaust or ventilation does not keep exposure below the TLVs. Where respiratory protection is necessary, OSHA mandates that NIOSH and Mine Safety and Health Administration (MSHA) approved respiratory protection must 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.

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. When using products that contain cadmium, splash-proof or dust resistant goggles may be required.

Protective Clothing: 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. When using products that contain cadmium, impermeable clothing may be required to prevent skin contact.

Procedure for Cleanup of Spills or Leaks: Recyclable/solid. Vacuuming recommended for accumulated dusts. Conform with Federal, State, local and OSHA regulatory statutes.

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.

Work Practices and Hygiene Practices: In OSHA regulated cadmium use areas, employees are not permitted to smoke, eat, drink, chew gum or tobacco, or apply cosmetics while working with cadmium. Also, they are not able to carry or store tobacco products, gum, food, drinks or cosmetics in the regulated area. They are instructed to wash thoroughly after working with these products. These are good recommendations when working with any hazardous chemicals. The goal is not to get the hazardous product "on you or in you".

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.