

MATERIAL SAFETY DATA SHEET

For Welding Consumables and Related Products

SECTION I – IDENTIFICATION

Supplier: Midwest Alloys & Technology, Inc. (Midalloy) Address: 630 Axminister Drive, St. Louis, Missouri 63026	Emergency Telephone Number: (636) 349-6000 or (800) 776-3300
Trade Name: MASTERCOR E81T1-B2, E81T1-B2L, E81T1-Ni1, E91T1-B3, E91T1-B3L, E81T1-B6, E81T1-B8, E91T1-B9	Classification: AWS/SFA 5.29

For all manufactured welding consumables designed to meet the requirements of OSHA's Hazard Communication Standard, 29 CFR 1910.00 and Section 313 of Title III of 40 CFR 372.

SECTION II - HAZARDOUS INGREDIENTS

This section covers the materials from which the product is manufactured. The fumes and gases produced during welding with normal use of this product are covered in Section 5. The term 'Hazardous Ingredients' should be interpreted as a term required and defined in OSHA Hazard Communication Standard (29 CFR 1910.1200).

The following chemicals are subject to reporting under Title III of the Superfund Amendments and Reauthorization Act (SARA) of 1986: aluminum (fume or dust), and compounds of barium, chromium, copper, manganese and nickel. Refer to this section for the presence and concentration of these chemicals for a particular product.

SIGNIFICANT INGREDIENTS	CAS Registry No.	OSHA PEL (Mg/m ³)	ACGIH TLV Mg/M ³	% Wt.
Iron	7439-89-6	5 (Respirable Fraction)	10	75-95
Manganese	7439-96-5	5 (Ceiling Limit)	0.2	1-4
Titanium Dioxide	13463-67-7	5 (Respirable Fraction)	10	4-10
Silicon	7440-21-3	5 (Respirable Fraction)	10	0.5-3
Fluorspar	7789-75-5	2.5 (as F)	2.5 (as F)	0-2
Nickel	7440-02-0	1	1.5 (Metal)	0-4
Chromium	7440-47-3	1	0.5	0-10
Molybdenum	7439-98-7	5 (Respirable Fraction)	10	0-2
Copper	7440-50-8	1 (Dust)	1 (Dust)	0-1

SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS

Solid wire or Tubular steel sheath filled with mineral and/or metal powders.

SECTION IV – FIRE AND EXPLOSION DATA

(NON-FLAMMABLE) Welding arc and sparks can ignite combustible. Refer to ANSI Z49.1 referenced in Section 7 for precaution to be taken.

SECTION V – REACTIVITY DATA

Hazardous Decomposition Products: Welding fumes and gases cannot be classified simply. The composition and quantity of both are dependent upon 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: coatings on the metal being welded (such as paint, plating or galvanizing), the number of welders and the volume of the work area, the quality and amount of ventilation, the position of the welder's head with respect to the fume plume, as well as 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 originated from the volatilization, reaction or oxidation of the materials shown in Section 2, plus those from the base metal and coating, etc., as noted above. It is understood, however, that the elements and/or oxides to be mentioned are virtually always present as complex oxides and not as metals (See Characterization of Arc Welding Fume, from the American Welding Society). The elements or oxides listed below correspond to the ACGIH categories found in "Threshold Limit Values for Chemical Substances and Physical Agents" published by ACGIH. Reasonably expected constituents of the fume would include: complex oxides of iron, manganese, silicon and titanium. They may have fluorides present. They may also contain chromium, nickel, molybdenum and/or copper.

Ingredient	CAS No.	OSHA PEL (Mg/m ³)	ACGIH TLV (Mg/m ³)
Iron Oxide	1309-37-1	10 (as Fe)	5 (as Fe)
Manganese Compounds (as Mn)	7439-96-5	5 (Ceiling Limit, as Fume)	0.2
Titanium Dioxide	13463-67-7	5 (Respirable Fraction)	10
Silica	14808-60-7	0.1	0.025 (Respirable), A1
Fluorides		2.5 (as F)	2.5 (as F)
Nickel Compounds (Soluble)		1 (as Ni)	0.1 (as Ni)
Nickel Compounds (Insoluble)		1 (as Ni)	0.2 (as Ni), A1
Chromium Oxide (as Cr II, Cr III)		0.5 (as Cr II, Cr III)	0.5 (as Cr II, Cr III)
Chromium (insoluble, as Cr VI)		0.005	0.01, A1
Molybdenum Compounds (as Mo)	7439-98-7	5 (Respirable Fraction)	0.5 (Respirable Fraction)
Copper Compounds (as Cu)	7440-50-8	0.1 (Fume)	0.2 (Fume)

A1 – Confirmed Human Carcinogen

Gaseous reaction products may include carbon monoxide and carbon dioxide. Ozone and nitrogen oxides may be formed by radiation from the arc. One recommended way to determine the composition and quantity of fumes and gases to which workers are exposed is to take an air sample inside the welder's helmet if worn or in the worker's breathing zone. See ANSI/AWS F1.1, available from the American Welding Society, P.O. Box 351040, Miami, FL 33135. Also available from AWS is F1.3, "Evaluating Contaminants in the Welding Environment – A Sampling Strategy Guide", which gives additional advice on sampling. At a minimum materials listed in this section should be analyzed.

SECTION VI – HEALTH AND HAZARD DATA

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 7.

FUMES AND GASES can be dangerous to your health.

PRIMARY ROUTES OF ENTRY are the respiratory system, eyes and/or skin.

Short – Term (acute) Overexposure effects –

Welding Fumes – May result in discomfort such as dizziness, nausea or dryness or irritation of the nose, throat or eyes.

Iron, Iron Oxide – None or known. Treat as a nuisance dust or fume.

Manganese – Metal fume fever characterized by chills, fever, upset stomach, vomiting, irritation of throat and aching of body.

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

Nickel, Nickel Compounds – Metallic taste, nausea, tightness in chest, fever, allergic reactions.

Chromium – Inhalation of fume with chromium VI compounds can cause irritation of the respiratory system, lung damage and asthma-like symptoms. Swallowing chromium VI salts can cause severe injury or death. Dust on the skin can form ulcers. Eyes may be burned by chromium VI compounds. Allergic reactions are likely in some people from chromium compounds.

Copper – Metal fume fever can be caused by fresh copper oxide.

Barium – Aching eyes, rhinitis, frontal headache, wheezing, laryngeal spasms, salivation or anorexia.

Silica – None are known.

Molybdenum – None are known. Treat as a nuisance dust or fume.

Titanium Dioxide – None are known. Treat as a nuisance dust or fume.

Aluminum, Aluminum Oxide – None are known. Treat as a nuisance dust or fume.

Magnesium, Magnesium Oxide – None are known. Treat as a nuisance dust or fume.

Long – Term (chronic) Overexposure effects –

Welding Fume – Excess levels may cause bronchial asthma, lung fibrosis, pneumoconiosis, or 'siderosis'.

Iron, Iron Oxide – Siderosis or deposits of iron in lungs, which is believed to affect pulmonary function. Lungs will clear in time when exposure to

Iron fumes and its compounds ceases. Iron and magnetite (Fe₃O₄) are not regarded as fibrogenic materials.

Manganese – Central nervous system effects referred to as 'manganism'. Symptoms include muscular weakness and tremors. Behavioral changes and changes in handwriting may also appear. Employees overexposed to manganese should receive quarterly medical examinations for early detection of manganism.

Fluorides – Serious bone erosion (Osteoporosis) and mottling of teeth.

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

Chromium – Ulceration and perforation of the nasal septum. Respiratory irritation may occur with symptoms resembling asthma. Studies have shown that chromate production workers exposed to chromium VI compound 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.

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

Barium – Exposure to soluble barium compounds may cause nervous disorders and may have deleterious effects on the heart, circulatory and muscular system.

Silica – Overexposure to respirable crystalline silica may result in silicosis. Respirable crystalline silica is a known human carcinogen.

Molybdenum – Treat as a nuisance dust. Little adverse effect on lungs. Does not produce significant organic disease or toxic effect when exposures are kept under reasonable control.

Aluminum, Aluminum Oxide – Treat as a nuisance dust. Little adverse effect on lungs. Does not produce significant organic disease or toxic effect when exposures are kept under reasonable control.

Magnesium, Magnesium Oxide – Treat as a nuisance dust. Little adverse effect on lungs. Does not produce significant organic disease or toxic effect when exposures are kept under reasonable control.

Emergency and First Aid Procedures

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

Eyes and Skin: If irritation or flash burns develop after exposure, consult a physician.

Carcinogenicity

Hexavalent chromium compounds are listed as known human carcinogens by IARC and NTP. Nickel compounds are listed as known human carcinogens by IARC. Nickel and certain nickel compounds are reasonably anticipated to be human carcinogens by NTP. Crystalline silica is listed as a known human carcinogen by IARC and NTP. Welding fumes (non-specific) are listed by IARC as possibly carcinogenic to humans.

California Proposition 65

These products contain or produce chemicals known to the State of California to cause reproductive toxicity and cancer. (California Health and Safety Code, Section 25249.5 et seq.)

SECTION VII – Precautions for Safe Handling and Use / Applicable Control Measures

Read and understand the manufacturer's instructions and the precautionary label on the product. Refer to ANSI Z49.1 published by the American Welding Society.

VENTILATION: Use enough ventilation, local exhaust at the arc or both to keep fumes and gases below TLV's 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 spaces or where local exhaust or ventilation does not keep exposure below TLV.

PROTECTIVE CLOTHING: Wear head, hand and body protection that help prevent injury from radiation, sparks, and electrical sparks. At a minimum this includes welder's gloves and a protective face shield, and may include arc protectors, aprons, hats, shoulder protection, as well as dark, non-synthetic clothing. Train the welder not to touch live electrical parts and to insulate himself from the work and ground.

PROCEDURE FOR CLEAN UP OF SPILLS AND LEAKS: (Not Applicable)

WASTE DISPOSAL METHOD: 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.

Special Precautions – IMPORTANT – Maintain exposure below the PEL/TLV. Use industrial hygiene monitoring to ensure that your use of this material does not create exposures that exceed the PEL/TLV. Always use exhaust ventilation.