



MSDS#103
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WELDCOTE METALS
842 Oak Grove Rd.
Kings Mountain, NC 28086
704-739-4115
EMERGENCY: 800-424-9300

Material Safety Data Sheet

For U.S. manufactured welding consumables and related products.
May be used to comply with OSHA's Hazard Communications Standard, 29 CFR 1910.1200 and Superfund Amendments and Reauthorization Act (SARA) of 1986 Public Law 99-499. Standard must be consulted for specific requirements.

EMERGENCY NO.: 1-800-341-5215

Section 1 - Identification

EMERGENCY NUMBER (CHEMTREC) 1-800-424-9300

Trade Name	Specification	Product Type
TYPE I: E71T-GS	AWS A5.20	Carbon steel electrodes for flux cored arc welding <u>without external gas shielding</u>
TYPE II: E70T-1, E70T-5, E71T-1,1M, E71T-1	AWS A5.20	Carbon steel electrodes for flux cored arc welding with external gas shielding

Section 2 - 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.

Ingredient	% Weight	CAS No.	OSHA PEL (mg/m ³)	ACGIH TLV (mg/m ³)
TYPE I:				
Iron	80-95	7439-89-6	5 (Respirable Fraction)	10
Manganese	0.5-2	7439-96-5	5 (Ceiling Limit)	0.2
Titanium Dioxide	0-3	13463-67-7	5 (Respirable Fraction)	10
Silicon	0-2	7440-21-3	5 (Respirable Fraction)	10
Fluorspar	2-12	7789-75-5	2.5 (as F)	2.5 (as F)
Aluminum	1-5	7429-90-5	5 (Respirable Fraction)	10
Magnesium	1-3	7439-95-4	5 (Respirable Fraction)	10
Barium Fluoride (present only in 701 & 700GS)	1-5	7787-32-8	0.5 (as Ba)	0.5 (as Ba)
TYPE II:				
Iron	75-95	7439-89-6	5 (Respirable Fraction)	10
Manganese	1-4	7439-96-5	5 (Ceiling Limit)	0.2
Titanium Dioxide	4-10	13463-67-7	5 (Respirable Fraction)	10
Silicon	0.5-3	7440-21-3	5 (Respirable Fraction)	10
Fluorspar	0-2	7789-75-5	2.5 (as F)	2.5 (as F)
Nickel	0-4	7440-02-0	1	1.5 (Metal)
Chromium	0-10	7440-47-3	1	0.5
Molybdenum	0-2	7439-98-7	5 (Respirable Fraction)	10
Copper	0-1	7440-50-8	1 (Dust)	1 (Dust)

Section 3 — Physical/Chemical Characteristics

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

Section 4 — Fire and Explosion Hazard Data

Non flammable: Welding arc and sparks can ignite combustibles. See Z49.1 referenced in Section 7.

Section 5 — 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 originating 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. Types I, II, may have fluorides present. Type II alloys may also contain chromium, nickel, molybdenum and/or copper.

Ingredient	CAS No.	OSHA PEL (mg/m³)	ACGIH TLV (mg/m³)
TYPE I:			
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	60676-86-0	0.1	2 (Respirable, Fume)
Fluorides		2.5 (as F)	2.5 (as F)
Magnesium Oxide	1309-48-4	5 (Respirable Fraction)	10
Aluminum Oxide	1344-28-1	5 (Respirable Fraction)	5 (Fume)
Barium Compounds (present only in 701 & 700GS)	7440-39-3	0.5 (soluble, as Ba)	0.5 (as Ba)
TYPE II:			
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	60676-86-0	0.1	2 (Respirable, Fume)
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), Al
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)		0.1 (Ceiling Limit, as Cr VI)	0.01, Al
Molybdenum Compounds (as Mo)	7439-98-7	5 (Respirable Fraction)	10
Copper Compounds (as Cu)	7440-50-8	0.1 (Fume)	0.2 (Fume)

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, PO 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 6 — Health Hazard Data

The exposure level for welding fume has been established at 5 mg/m³ with ACGIH's TLV. See Section 5 for specific fume constituents which may modify the TLV.

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 are 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. Treat as a nuisances dust or fume.

Molybdenum- None are known. Treat as a nuisances dust or fume.

Titanium Dioxide- None are known. Treat as a nuisances dust or fume.

Aluminum, Aluminum Oxide- None are known. Treat as a nuisances dust or fume.

Magnesium, Magnesium Oxide- None are known. Treat as a nuisances 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- Treat as nuisance dust. Little adverse effect on lungs. Does not produce significant organic disease or toxic effect when exposures are kept under reasonable control.

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.

Welding fumes are listed as possibly carcinogenic to humans by IARC.

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 7—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, P.O. Box 351040, Miami, FL 33135 and OSHA Publication 2206 (29 CFR 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 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 NIOSH approved or equivalent 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. As a rule of thumb begin with Shade Number 14. Adjust if needed by selecting the next lighter and/or darker shade number. Provide protective screens and flash goggles, if necessary, to protect others.

Protective Clothing- Wear hand, head and body protection which help to prevent injury from radiation, sparks and electrical shock. See ANSI Z49.1. 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, non-synthetic clothing. Train the welder not to touch live electrical parts and to insulate himself from the work and ground.

Procedure for Cleanup of Spills or Leaks- Not applicable.

Waste Disposal- Prevent waste from contaminating the surrounding environment. Discard any product, residue, liner or disposable container 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. Refer to the following sources for important additional information:

ANSI Z49.1 from the American Welding Society, P.O. Box 351040, Miami, FL 33135

OSHA 29 CFR 1910 from the U.S. Dept. of Labor, Washington, D.C. 20210

Weldcote Metals believes this data to be accurate and to reflect qualified expert opinion regarding current research. However, Weldcote Metals can not make any expressed or implied warranty as to this information.