

# MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing,  
Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

## SECTION I

MANUFACTURER'S NAME THERMACOTE-WELCO COMPANY		EMERGENCY TELEPHONE NO. 704-739-6421
ADDRESS York Road, Hwy. 161 P.O. B 112 Kings Mountain, NC		
CHEMICAL NAME AND SYNONYMS WELCO 3SMW	TRADE NAME AND SYNONYMS 3SMW	
CHEMICAL FAMILY	FORMULA	

## SECTION II. HAZARDOUS INGREDIENTS\*

**IMPORTANT!** This section covers the materials from which this product is manufactured. The fumes and gases produced during welding with normal use of this product are covered in Section V.

Material (CAS No.)	Weight %	Exposure Limit	
		1984/85 TLV-TWA	(OSHA PEL)
	Less Than		
Carbon (1333-86-4)	.20	3.5 mg/m <sup>3</sup>	
Manganese (7439-96-5)	2.50	5.0 mg/m <sup>3</sup>	
Silicon (7440-89-6)	1.00	10 mg/m <sup>3</sup>	Total Dust
Molybdenum (7439-98-7)	3.00	5 mg/m <sup>3</sup>	
Chromium (7440-47-3)	35.00	.5 mg/m <sup>3</sup>	
Nickel (7440-02-0)	25.00	.1 mg/m <sup>3</sup>	
Titanium (7440-32-6)	1.50	10 mg/m <sup>3</sup>	TiO <sub>2</sub> as Ti (15 mg/m <sup>3</sup> )
Tantalum (7440-25-7)	1.00	5 mg/m <sup>3</sup>	
Columbium (7440-03-1)	1.00	5 mg/m <sup>3</sup>	(NOC)
Iron (7439-89-6)	Bal.	5 mg/m <sup>3</sup>	as Fe <sub>2</sub> O <sub>3</sub> as Fe (10 mg/m <sup>3</sup> )

\*The term "hazardous" should be interpreted as a term required and defined in the OSHA Hazard Communications Standard (29CFR 1910.1200) and does not necessarily imply the existence of any hazard.

## SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	SPECIFIC GRAVITY (H <sub>2</sub> O=1)
VAPOR PRESSURE (mm Hg.)	PERCENT, VOLATILE BY VOLUME (%)
VAPOR DENSITY (AIR=1)	EVAPORATION RATE (_____ = 1)
SOLUBILITY IN WATER	
APPEARANCE AND ODOR	

## SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	Lel	Uel
EXTINGUISHING MEDIA			
SPECIAL FIRE FIGHTING PROCEDURES			
UNUSUAL FIRE AND EXPLOSION HAZARDS			

Non-flammable. Welding arc and sparks can ignite combustible and flammable products. See ANSI Z49.1 "Safety in Welding and Cutting" (referenced in Section VII) for fire prevention and protection information.

**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 II. Decomposition products of normal operation include those originating from the volatilization, reaction, or oxidation of the materials shown in Section II, plus those from the base metal and coating, etc., as noted above.

Reasonably expected fume constituents of this product would include:

Primarily complex oxides of Iron, Chromium, and Nickel. Secondly oxides of Manganese, Silicon, Molybdenum, Titanium, Tantalum, Columbium.

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 "Method for Sampling Airborne Particles Generated by Welding and Allied Processes" available from the American Welding Society, P. O. Box 351040, Miami, FL 33135.

**SECTION VI. HEALTH HAZARD DATA**

**THRESHOLD LIMIT VALUE:** The ACGIH 1984-85 recommended limit for welding fume, not otherwise classified (NOC) is 5 mg/m<sup>3</sup>. TLV-TWA's should be used as a guide in the control of health hazards and not as fine lines between safe and dangerous concentrations. See Section V for specific fume constituents which may modify this TLV-TWA.

**EFFECTS OF OVEREXPOSURE:** Electric arc welding or oxy-fuel gas processes may create one or more of the following hazards:

- **FUMES & GASES** can be dangerous to your health. Primary route of entry is by inhalation.

Short term (acute) overexposure to welding fumes may result in discomfort such as dizziness, nausea, or dryness or irritation of the nose, throat, or eyes.

Long term (chronic) overexposure to welding fumes can lead to siderosis (iron deposits in lung) and affect pulmonary function.

- **ARC RAYS** can injure eyes and burn skin. **HEAT RAYS** (infrared radiation from flame or hot metal) can injure eyes.
- **ELECTRIC SHOCK** can kill.
- **NOISE** can damage hearing.
- **CARCINOGENIC ASSESSMENT:**

Nickel and Chromium must be considered possible carcinogens under OSHA (29CFR1910.1200). IARC has indicated Nickel, Chromium and certain of their compounds are probably carcinogenic for humans, but the compounds cannot be specified precisely. These conclusions were drawn from operations different from welding. Regardless, exposure level must be kept below those levels specified in Section II.

- **EMERGENCY FIRST AID PROCEDURES:** Call for medical aid. Employ first aid techniques recommended by the American Red Cross. **IF BREATHING IS DIFFICULT**, give oxygen. Call a physician. **IN CASE OF ELECTRICAL SHOCK** disconnect and turn off power. **IF NOT BREATHING**, begin artificial respiration, preferably mouth-to-mouth. If no detectable pulse, begin external heart massage. **Immediately call a physician. IN CASE OF ARC BURN call a physician.**

**SECTION VII. PRECAUTIONS FOR SAFE HANDLING AND USE**

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; OSHA Publication 2206 (29CFR1910), U. S. Government Printing Office, Washington, D.C. 20402

- **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. 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. Select as per OSHA 29 CFR 1910.134.
- **EYE PROTECTION:** Wear helmet or use face shield with filter lens. As a rule of thumb, start with a shade that is too dark to see the weld zone and then go to the next lighter shade (See ANSI Z49.1). Provide protective screens and flash goggles, if necessary, to shield others.
- **PROTECTION 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 substantial clothing. Train the welder not to touch live electrical parts and to insulate himself from work and ground.
- **WASTE DISPOSAL:** Discard any product, residue, disposable container or liner in an environmentally acceptable manner, in full compliance with federal, state, and local regulations.

**THERMACOTE WELCO CO.**  
Hwy. 161 — York Rd. — Box 681  
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704/739-6421

**Material Safety Data Sheet**  
**Welding Products**  
**WELDING ELECTRODES**

**SECTION 1 - Product Identification**

This MSDS covers all Thermacote Welco welding products identified as:  
**WELDING ELECTRODE Super-Missileweld**  
Trade name and nominal composition are listed in Section 2-A

**SECTION 2 - Hazardous Ingredients\***

**IMPORTANT**

This section covers the materials contained in the product as shipped.  
The fumes and gases produced during welding are covered in Section 6.

Ingredient	CAS No.	PEL <sup>(1)</sup>	TLV <sup>(2)</sup>	Ingredient	CAS No.	PEL <sup>(1)</sup>	TLV <sup>(2)</sup>
Barium Carbonate (BaCO <sub>3</sub> )	513-77-9	0.5	0.5	Iron (Fe)	7439-89-6	NONE	NONE
Calcium Carbonate (CaCO <sub>3</sub> )	1317-65-3	NONE	10	Manganese (Mn)	7439-96-5	C5	C5
Calcium Fluoride (CaF <sub>2</sub> )	7789-75-5	2.5 (as F)	2.5 (as F)	Molybdenum (Mo)	7439-98-7	15	10
Chromium (Cr)	7440-47-3	1	0.5	Nickel (Ni)	7440-02-0	1	1
Cobalt (Co)	7440-48-4	0.1	0.05	Silicon Dioxide (SiO <sub>2</sub> )	60676-86-0	0.1	0.1
Copper (Cu)	7440-50-8	1	1	Sodium Aluminum Fluoride (Na <sub>3</sub> AlF <sub>6</sub> )	15096-52-3	2.5 (as F)	2.5 (as F)
				Titanium Dioxide (TiO <sub>2</sub> )	13463-67-7	15	10

**SECTION 2-A - Tradename and Nominal Composition**

Wt.% of combined wire and flux 1% or greater, Ni & Cr 0.1 or greater

COMPOSITION RANGE CODE — 1 - 10% - A, 11 - 30% - B, 31 - 60% - C, 61 - 100% - D

PRODUCT NAME	BaCO <sub>3</sub>	CaCO <sub>3</sub>	CaF <sub>2</sub>	Cr	Co	Cu	Fe	Mn	Mo	Ni	SiO <sub>2</sub>	Na <sub>3</sub> AlF <sub>6</sub>	TiO <sub>2</sub>
SMW		A		B			C	A		A	A	A	A

**SECTION 3 - Physical Data**

Welding electrodes are solid alloy wire which is flux coated.

**SECTION 4 - Fire and Explosion Data**

Nonflammable; however, welding arcs and sparks can ignite flammable liquids and vapors and combustible solids.

Notes: \*As defined by OSHA (29CFR1910.1200) or certain state regulations.

1 Permissible Exposure Limit - (mg/m<sup>3</sup>) - OSHA (29CFR1910.)

2 Threshold Limit Value - (mg/m<sup>3</sup>) - American Conference of Governmental Industrial Hygienists (current as of MSDS revision date).

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## SECTION 5 - Health Hazard Information

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**Exposure Limits:** Section 2 lists specific hazardous ingredients and exposure limits. Section 6 lists exposure limits for hazardous reaction products that might be formed by welding and high temperature cutting. **IMPORTANT** - Determine actual exposure by industrial hygiene monitoring.

### POSSIBLE SIGNS AND SYMPTOMS OF EXPOSURE TO DUST, WELDING FUME AND GASES

#### SHORT TERM EXPOSURE:

Metallic taste; nausea; tightness of chest; fever; irritation of eyes, nose, throat and skin; loss of consciousness/death due to welding gases or lack of oxygen.

#### LONG TERM EXPOSURE

Adverse effects may result from long time exposure to welding fume, gases, or dusts. These effects may include skin sensitization, neurological damage, and respiratory disease such as bronchial asthma, lung fibrosis or pneumoconiosis. Nickel and chromium must be considered possible carcinogens under OSHA (29CFR1910.1200). The International Agency for Research on Cancer has indicated that nickel and certain nickel compounds are probably carcinogenic for humans, but that the specific compounds which may be carcinogenic cannot be specified precisely. This conclusion was based on experience in certain nickel refining operations. Chromium has also been listed by IARC because of "sufficient evidence for the carcinogenicity of chromium and certain chromium compounds". The studies forming the basis for the conclusion were from operations different from the production or welding of nickel and chromium alloys. Recent epidemiological studies of workers melting and working alloys containing nickel/chromium have found no increased risk of cancer. Nevertheless, exposures **MUST** be maintained below the levels specified in section 2 and section 6.

**AGGRAVATION** of preexisting respiratory or allergic conditions may occur in some workers.

#### EMERGENCY AND FIRST AID

Remove from exposure and obtain prompt medical attention. If victim is unconscious, administer oxygen. If not breathing, resuscitate immediately.

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## SECTION 6 - Reactivity Information

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#### Hazardous Reaction Products:

Fumes and gases from welding and high temperature cutting cannot be classified simply. The composition and quantity of both depend on the metal being welded, the process, procedures, and electrodes used. The constituents of the fume are generally different from the ingredients listed in Section 2 and may include oxides of the metals, chromates, fluorides, and complex metallics. The gases may include carbon monoxide, ozone, and oxides of nitrogen. Chlorinated solvents may be decomposed by the arc into toxic gases such as phosgene. The following exposure limits apply to those fumes and gases which may be found in the welding or high temperature cutting environment.

Substance	PEL	TLV	Substance	PEL	TLV
Aluminum fume (Al)	NONE	5.0	Manganese fume (Mn)	C5.0	1.0
Carbon monoxide (CO)	50ppm	50ppm	Molybdenum (soluble) (Mo)	5.0	5.0
Chromium (Chromates)	0.1	0.05	Nickel (soluble) (Ni)	1.0	0.1
Cobalt fume (Co)	0.1	0.05	Nitrogen dioxides (NO <sub>2</sub> )	C5.0ppm	3ppm
Copper fume (Cu)	0.1	0.2	Ozone (O <sub>3</sub> )	0.1ppm	0.1ppm
Fluorides (as F)	2.5	2.5	Phosgene (COCl <sub>2</sub> )	0.1ppm	0.1ppm
Iron oxide fume (as Fe)	10.0	5.0			

(PEL/TLV values are mg/m<sup>3</sup> except where indicated as ppm)

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## SECTION 7 - Spill or Leak Procedures

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Vacuum residue from cutting, grinding, or welding operations into suitable container. Dispose of in accordance with EPA or local regulations

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## SECTION 8 - Special Protection Information

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#### Respiratory Protection:

Necessary when permissible exposure limits may be exceeded during cutting, grinding, or welding. Use air-supplied respirator in confined spaces. — Use only NIOSH approved respirator in accordance with 29CFR1910.134

#### Ventilation:

Use local exhaust when cutting, grinding, or welding. **IMPORTANT** - maintain exposures below the limits in Section 2 and 6. Confined spaces require special attention to provision of adequate ventilation.

**Eye Protection and Protective Clothing:** Required when cutting, grinding, or welding. Wear gloves, face protection, and flame retardant clothing. Do not expose skin. Select welding lense shade from AWS publication F2.2.

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## SECTION 9 - Special Precautions

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**IMPORTANT** - Maintain exposures below the PEL/TLV. Use industrial hygiene air monitoring to ensure that your use of this material does not create exposures which exceed PEL/TLV. Always use exhaust ventilation. Refer to the following sources for important additional information:

ANSI Z49.1 The American Welding Society  
P. O. Box 28100, Miami, FL 33133

OSHA( 29CFR1910), U.S. Dept. of Labor  
Washington, D.C. 20210