

U.S. DEPARTMENT OF LABOR  
Occupational Safety and Health Administration

Form Approved  
OSHA No. 44-R-1387

# 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<br>THERMACOTE-WELCO COMPANY                             |         | EMERGENCY TELEPHONE NO.<br>704-739-6421 |
| ADDRESS<br>HWY. 161, YORK ROAD POB 112 KINGS MOUNTAIN, NORTH CAROLINA 28086 |         |   |
| CHEMICAL NAME AND SYNONYMS  |         | TRADE NAME AND SYNONYMS<br>WELCO 180    |
| CHEMICAL FAMILY   | FORMULA |   |

## SECTION II - HAZARDOUS INGREDIENTS

Important! This section covers the materials from which these products are manufactured. The fumes and gases produced when welding with normal use of these products are covered in Section V.

| <u>Hazardous Compounds</u> | <u>CAS. NO.</u> | <u>OSHA PEL</u><br>mg/m <sup>3</sup> | <u>ACGIH TLV</u><br>mg/m <sup>3</sup> | <u>CARCINOGENICITY</u> | <u>WT. %</u> |
|----------------------------|-----------------|--------------------------------------|---------------------------------------|------------------------|--------------|
| Manganese                  | 7439-96-5       | 5 CLG                                | 5 CLG                                 | 0                      | 0 - 3        |
| Silicon                    | 7440-21-3       | None                                 | 5                                     | 0                      | 0 - 2        |
| Chromium                   | 7440-47-3       | 1                                    | 0.5                                   | Positive               | 15 -30       |
| Molybdenum                 | 7439-98-7       | 15                                   | 10                                    | 0                      | 0 - 8        |
| Iron                       | 7439-89-6       | 5                                    | 5                                     | 0                      | 50 -75       |
| Tungsten                   | 7440-33-7       | None                                 | 5                                     | 0                      | 0 -13        |
| Graphite                   | 7782-42-5       | None                                 | 15 mppcf                              | 0                      | 0 - 2        |
| Fluoride                   | 7789-75-5       | 2.5                                  | 2.5(asF)                              | 0                      | 0 - 2        |

CLG: Ceiling Limit

## SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS

Not applicable

#### SECTION IV - FIRE AND EXPLOSION HAZARD DATA

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(Nonflammable) Welding arc and sparks can ignite combustibles and flammables. Refer to American National Standard Z49.1, for fire prevention during the use of welding and allied procedures.

#### SECTION V - REACTIVITY DATA

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##### Hazardous Decomposition Products

Exposure limit: Welding fumes and gases cannot be classified simply. The composition and quantity of both are dependent upon the metal being welded, the process, procedure 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 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. Fume and gas decomposition products, and not the ingredients in the electrode, are important. The concentration of a given fume or gas component may decrease or increase by many times the original concentration in the electrode. Also, new compounds not in the electrodes may form. 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 these products would include: primarily fluorides and complex oxides of iron and silicon; secondarily complex oxides of chromium, manganese, molybdenum and tungsten.

The present OSHA PEL for hexavalent chromium ( $Cr^{+6}$ ) is  $0.05 \text{ mg/m}^3$  which will result in a significant reduction from the  $5 \text{ mg/m}^3$  general welding fume (NOC) level. The limit of  $0.05 \text{ mg/m}^3$  for hexavalent chromium in these electrodes comes from the limit shown in OSHA Table Z-2, which is for  $0.1 \text{ mg}$  of  $CrO_3$  which calculates to  $0.05 \text{ mg}$  of  $Cr^{+6}/\text{m}^3$ . It applies to soluble chromates of the types found in covered stainless electrode fumes and other chromium containing welding materials.

Gaseous reaction products may include carbon monoxide and carbon dioxide. Ozone and nitrogen oxides may be formed by the 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 from inside the welder's helmet if worn or in the worker's breathing zone. See AWS F1.1 and AWS F1.2-1985, available from the American Welding Society, P.O. Box 351040, Miami, FL 33135.

#### SECTION VI - HEALTH HAZARD DATA

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Electric arc welding or oxy fuel welding may create one or more of the following health hazards;

FUMES AND GASES - can be dangerous to your health. COMMON ENTRY IS BY INHALATION.

SHORT TERM (ACUTE) - over exposure to welding fumes may result in discomfort such as dizziness, nausea, or dryness or irritation of nose, throat, or eyes.

Chromates present in the fume can cause irritation of the respiratory system, damage to lungs and asthma-like symptoms.

Fluorides can cause pulmonary edema bronchitis.

LONG TERM (CHRONIC) - over exposure to welding fumes can lead to siderosis (iron deposits in the lung) and affect pulmonary function.

Long term over exposure to manganese compounds may affect the central nervous system. Symptoms include muscular weakness and tremors similar to Parkinson's disease. Behavioral changes and changes in handwriting may also appear. Employees exposed to manganese compounds should get quarterly medical examinations for early detection of manganism.

Studies have shown that production workers exposed to hexavalent chromium compounds have an increased incidence of lung cancers. Chromates may cause an ulceration and perforation of the nasal septum. Liver damage and allergic skin rash have been reported. Chromium VI compounds are required by OSHA to be considered carcinogenic.

Repeated over exposure to fluoride fumes may cause serious bone erosion and excessive calcification of the bones and ligaments of the ribs, pelvis, and spinal column. Fluorides may also cause skin rash.

Threshold Limit Value - The ACGIH 1985-86 recommended limit for welding fume not otherwise classified (NOC) is  $5\text{mg}/\text{m}^3$ . 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.

Arc Rays can injure eyes and burn skin.

Heat Rays (infrared radiation from flame or hot metal) can injure eyes.

Electrical Shock can kill.

Noise can damage hearing.

Carcinogenicity Chromium and its compounds are on the IARC (International Agency for Research on Cancer) list and the NTP (National Toxicology Program) list as posing a carcinogenic risk to humans.

Emergency and First Aid Procedures Call for medical aid. Employ first aid techniques recommended by the American Red Cross.

SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE/APPLICABLE CONTROL MEASURES

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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 (29CFR1910), U. S. Government Printing Office, Washington, D.C. 20402 for more details on any 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 fume.

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.

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. Then go the next lighter shade which gives sufficient view of the weld zone. Provide protective screens and flash goggles, if necessary to shield others.

Protective Clothing Wear head, hand 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.

Procedure for Cleanup of Spills or 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.

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# MATERIAL SAFETY DATA SHEET

Revised: 10/5/84

## SECTION I

|   |                        |  |
|---|------------------------|--|
| MANUFACTURER'S NAME<br><u>Theramacote - WELCO</u>   |                        | EMERGENCY TELEPHONE NO.<br><u>704-739-6421</u> |
| ADDRESS (Number, Street, City, State, and ZIP Code)<br><u>HWY 161, YORK RD., KINGS MOUNTAIN, N.C. 28086</u> |                        |  |
| CHEMICAL NAME AND SYNONYMS<br><u>N.A.</u>   |                        | TRADE NAME AND SYNONYMS<br><u>WELCO - 200</u>  |
| CHEMICAL FAMILY<br><u>Alloy of Silver, Copper, Zinc, Tin</u>  | FORMULA<br><u>N.A.</u> |  |

## SECTION II - HAZARDOUS INGREDIENTS

| PAINTS, PRESERVATIVES, & SOLVENTS                     | % | TLV (Units) | ALLOYS AND METALLIC COATINGS | %  | TLV (Units)                          |
|---|---|-------------|------------------------------|----|--------------------------------------|
| PIGMENTS  |   |             | Ag - CAS #7440-22-4 (2, 4)   | 56 | .01 mg/m <sup>3</sup> as Ag          |
| CATALYST  |   |             | Cu - " #7440-50-8 (2, 4)     | 22 | .1 mg/m <sup>3</sup> as Cu           |
| VEHICLE   |   |             | Zn - " #7440-66-6 (5)        | 17 | .5 mg/m <sup>3</sup> as Zn Oxide Fur |
| SOLVENTS  |   |             | Sn - " #7440-31-5 (4)        | 5  | .2 mg/m <sup>3</sup> as Sn           |
| ADDITIVES   |   |             |                              |    |                                      |
| OTHERS  |   |             |                              |    |                                      |
| HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES |   |             |                              | %  | TLV (Units)                          |
|   |   |             |                              |    |                                      |
|   |   |             |                              |    |                                      |
|   |   |             |                              |    |                                      |
|   |   |             |                              |    |                                      |

## SECTION III - PHYSICAL DATA

|                         |            |   |      |
|-------------------------|------------|---|------|
| BOILING POINT (°F.)     | N.A.       | SPECIFIC GRAVITY (H <sub>2</sub> O = 1) | 9.49 |
| VAPOR PRESSURE (mm Hg.) | N.A.       | PERCENT VOLATILE BY VOLUME (%)          | N.A. |
| VAPOR DENSITY (AIR = 1) | N.A.       | EVAPORATING RATE (_____ = 1)            | N.A. |
| SOLUBILITY IN WATER     | Negligible |   |      |
| APPEARANCE AND ODOR     |            |   |      |

## SECTION IV - FIRE AND EXPLOSION HAZARD DATA N.A.

|  |                  |     |     |
|--|------------------|-----|-----|
| FLASH POINT (Method used)  | FLAMMABLE LIMITS | Lel | Uel |
| EXTINGUISHING MEDIA  |                  |     |     |
| SPECIAL FIRE FIGHTING PROCEDURES<br>At high temperatures this alloy could melt and continuous heating could produce metal vapor. |                  |     |     |
| UNUSUAL FIRE AND EXPLOSION HAZARDS   |                  |     |     |
|  |                  |     |     |

(Continued on reverse side)