



# MATERIAL SAFETY DATA SHEET

## For Welding Consumables and Related Products

MSDS No.:  
TMN-H-001  
Revised:05/02/06

### SECTION 1- IDENTIFICATION

|   |                                 |
|---|---------------------------------|
| Manufacturer/Supplier Name:<br>Tien Tai / Hobart Welding Products   | Telephone No.<br>1-800-626-9420 |
| Address 1635 W. Spencer St. Appleton, WI 54912  |                                 |
| Product Type<br>"Group A" Shielded Metal Arc Welding (SMAW) Carbon Steel<br>"Group B" Shielded Metal Arc Welding (SMAW) Low Hydrogen Carbon Steel<br>"Group C" Shielded Metal Arc Welding (SMAW) Low Hydrogen Low Alloy Steel |                                 |

Trade Name For:

Group A: E6010, E6011, E6012, E6013, E6022, E7014, E7024-1

Group B: E7018, E7018-1, E7018M

Group C: E7010-P1, E7018-A1, E7018-G, E8010-P1, E8018-B2, E8018-B2L, E8018-B6, E8018-B8, E8018-C1, E8018-C2, E8018-C3, E8018-G, E9010-P1, E9015-B9, E9018-B3, E9018-B3L, E9018-M, E10018-D2, E10018-M, E11018-M, E12018-M

### Section 2-Hazardous Ingredients IMPORTANT

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

| HAZARDOUS INGREDIENTS  | % WEIGHT |         |         | CAS NO.                  | EXPOSURE LIMIT (mg/m <sup>3</sup> )   |   |
|--|----------|---------|---------|--------------------------|---|---|
|  | Group A  | Group B | Group c |                          | OSHA PEL  | ACGIH TLV   |
| IRON+  | 70-90    | 70-90   | 60-90   | 7439-89-6                | 5 R*<br>10(Oxide Fume)  | 3 R*<br>5(Oxide Fume) {A4}  |
| #MANGANESE   | <5       | <5      | <5      | 7439-96-5                | 5 CL** (Dust)   | 0.2**   |
| ##ALUMINUM OXIDE   | <5       | --      | --      | 1344-28-1                | 1,3 STEL *** (Fume)   | (Dust & Fume)<br>10 {A4}  |
| CALCIUM CARBONATE  | --       | <10     | <10     | 1317-65-3                | 5 R*<br>5 (as CaO)  | 10<br>2 (as CaO)  |
| CELLULOSE  | <5       | <2      | --      | 9004-34-6                | 5 R*  | 10  |
| MICA   | <5       | --      | --      | 12001-26-2               | 3 R*  | 3 R*  |
| SILICA++<br>(Amorphous Silica Fume)  | <5       | <5      | <5      | 14808-60-7<br>69012-64-2 | 0.1 R*<br>0.8   | 0.1 R*<br>2 R*  |
| SILICON  | --       | <2      | <5      | 7440-21-3                | 5 R*  | 10  |
| TITANIUM DIOXIDE   | <15      | <5      | <5      | 13463-67-7               | 5 R*  | 10 {A4}   |
| FLUORSPAR  | --       | <10     | 5-15    | 7789-75-5                | 2.5 (as F)  | 2.5 (as F) {A4}   |
| #CHROMIUM (1)  | --       | --      | <9      | 7440-47-3                | 1 (Metal)<br>0.5 (Cr II Compounds) {A4}   | 0.5 (Metal) {A4}<br>0.5 (Cr III Compounds) {A4}   |
| #NICKEL (2)  | --       | --      | <5      | 7440-02-0                | 0.1 CL** (Cr VI Compounds)<br>1 (Metal)<br>1 (Soluble Compounds)<br>1 (Insoluble Compounds) | 0.05 (Cr VI Soluble Compounds) {A1}<br>1.5 (Metal) {A5}<br>0.1 (Soluble Compounds) {A4}<br>0.2 (Insoluble Compounds) {A1} |
| MOLYBDENUM (2)   | --       | --      | <1      | 7439-98-7                | 5 R*  | 0.5 R*(Soluble Compounds) {A3}•<br>10 1*(Elemental/Metal and Insoluble)<br>3 R*(Elemental/Metal and Insoluble)            |
| MAGNESIUM CARBONATE  | <2       | <5      | --      | 546-93-0                 | 5 R*  | 10  |
| SILICATE BINDERS<br>(1)Group C - Not present in E7018-A1;E8018-C1 and C2; and E10018-D2<br>(2)Group C - Not present in E7018-A1;E8018-B2,B2L;E9018-B3,B3L; and E10018-D2 | <10      | <10     | <10     | --                       | Not Established   | Not Established   |

R\* - Respirable Fraction. I\* - Inhalable Fraction. \*\* - Ceiling Limit. \*\*\* - Short Term Exposure Limit.  
 {A1} - Confirmed Human Carcinogen per ACGIH. {A3} - Confirmed Animal Carcinogen with Unknown Relevance to Humans per ACGIH.  
 {A4} - Not Classifiable as a Human Carcinogen per ACGIH. {A5} - Not Suspected as a Human Carcinogen per ACGIH.  
 + - As a nuisance particulate covered under "Particulates Not Otherwise Regulated" by OSHA or "Particulates Not Otherwise Classified" by ACGIH.  
 ++ - Crystalline silica is bound within the product as it exists in the package. However, research indicates silica is present in welding fume in the amorphous (noncrystalline) form. # - Reportable material under Section 313 of SARA. ## - Reportable material under Section 313 of SARA only in fibrous form.  
 • - 2002 ACGIH listed under Notice of Intended Changes. A2 - "Suspected Human Carcinogen".  
 •• - 2002 ACGIH listed under Notice of Intended Changes. Limits of 0.03mg/m<sup>3</sup> (respirable fraction) are proposed and should be considered as trial limits.

The exposure limit for welding fume has been established at 5mg/m<sup>3</sup> with OSHA's PEL and ACGIH's TLV. The individual complex compounds within the fume may have lower exposure limits than the general welding fume PEL/TLV. An Industrial Hygienist, the OSHA Permissible Exposure Limits For Air Contaminants (29 CFR 1910.1000), and the ACGIH Threshold Limit Values should be consulted to determine the specific fume constituents present and their respective exposure limits.

### SECTION 3 - Physical/Chemical Characteristics

Welding consumables applicable to this sheet are solid and nonvolatile as shipped.

|                        |     |                                       |     |
|------------------------|-----|---------------------------------------|-----|
| Boiling Point          | N/A | Specific Gravity (H <sub>2</sub> O=1) | N/A |
| Vapor Pressure (mm Hg) | N/A | Melting Point                         | N/A |
| Vapor Density (AIR=1)  | N/A | Evaporation Rate<br>(Butyl Acetate=1) | N/A |
| Solubility in Water    | N/A |                                       |     |
| Appearance and Odor    | N/A |                                       |     |

## SECTION 4 - Fire and Explosion Hazard Data

Welding consumables applicable to this sheet as shipped are nonreactive, nonflammable, nonexplosive and essentially nonhazardous until welded. Welding arcs and sparks can ignite combustibles and flammable products. See American National Standard Z49.1 referenced in Section 7.

|                           |     |                  |     |     |     |     |     |
|---------------------------|-----|------------------|-----|-----|-----|-----|-----|
| Flash Point (Method Used) | N/A | Flammable Limits | N/A | LEL | N/A | UEL | N/A |
|---------------------------|-----|------------------|-----|-----|-----|-----|-----|

Extinguishing Media See below

Special Fire Fighting Procedures See below

### Unusual Fire and Explosion Hazards

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 5 - Reactivity Data

|           |        |          |     |                                 |
|-----------|--------|----------|-----|---------------------------------|
| Stability | Stable | Unstable | No  | Conditions to Avoid             |
|           |        | Stable   | Yes | None unless otherwise specified |

Incompatibility (Metals to Avoid) None

### Hazardous Decomposition Products

Welding fumes and gases cannot be classified simply. The composition and quality of both are dependant upon the metal being welded, the Process, procedure and electrode used. Most fume ingredients are present as complex oxides and compounds and not as pure metals. Other conditions which also influence the composition and quality 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, ect., as noted above. Reasonably expected constituents of the fume would include; Primarily complex iron oxides and fluorides. Secondarily complex oxides of calcium, manganese, aluminum, chromium, nickel, silicon, molybdenum, magnesium, and titanium. Monitor for the materials identified in section 2. Fumes from the use of this product may contain fluorides, manganese, calcium oxide, chromium and nickel compounds, mica, and amorphous silica fume whose exposure limits are lower than the 5 mg/m3 PEL/TLV for general welding fume.

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 quality 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, from AWS is F1.3 "Evaluating Contaminants in the Welding environment A Sampling Strategy Guide", which gives additional advice on sampling.)

## SECTION 6 - Health Hazard Data

### Effects of Overexposure:

**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** as the respiratory system, eyes and / or skin.

### Short Term (Acute) Overexposure Effects:

**Welding Fumes** May result in discomfort such as a dizziness, nausea or dryness of irritation of nose, throat or eyes. **Iron, Iron Dioxide** None are known. Treat as nuisance dust or fume. **Manganese** Metal fume fever characterized by chills, fever, upset stomach, vomiting, irritation of the throat and aching of body. Recovery is generally complete within 48 hours of the over exposure. **Aluminum Oxide** irritation of the respiratory system. **Calcium Oxide** Dust or fumes may cause irritation of the respiratory system, skin and eyes. **Mica** Dust may cause irritation to the respiratory system. **Silica (Amorphous)** Dust and fumes may cause irritation of the respiratory system, skin and eyes. **Titanium Dioxide** irritation of respiratory system. **Fluorides** Fluoride compounds evolved may cause skin and eye burns, pulmonary edema and bronchitis. **Chromium** Inhalation of fume with chromium (VI) compounds can cause irritation of the respiratory tract, lung damage and asthma-like symptoms. Swallowing chromium (VI) salts can cause severe injury or death. Dust on skin can form ulcers. Eyes may be burned by chromium (VI) compounds, Allergic reactions may occur in some people. **Nickel, Nickel Compounds** Metallic taste, nausea, tightness in the chest, metal fume fever, allergic reaction. **Molybdenum** Irritation of eyes, nose and throat. **Magnesium, Magnesium Oxide** Overexposure to the oxide may cause metal fume fever characterized by metallic taste, tightness of the chest and fever. Symptoms may last 24 to 48 hours following exposure.

### Long Term (Chronic) Overexposure Effects:

**Welding Fumes** Excess levels may cause bronchial asthma, lung fibrosis, pneumoconiosis or "siderosis." **Iron, Iron Oxide Fumes** Can cause siderosis (deposits of iron in the lungs) which some researchers believe may effect pulmonary function. Lungs will clear in time when exposure to iron and its compounds cease. Iron and magnetite (Fe3O4) are regarded s fibrogenic materials. **Manganese** Long-term overexposure to manganese compounds may affect the central nervous system. Symptoms may be similar to Parkinson's disease and can include slowness, changes in handwriting, gait impairment, muscle spasms and cramps and less commonly, tremor and behavioral changes. Employees who are overexposed to manganese compounds should be seen by a physician for early detection of neurological problems. **Aluminum Oxide** Pulmonary fibrosis and emphysema. **Calcium Oxide** Prolonged overexposure may cause ulceration of the sin and perforation of the nasal septum, dermatitis and pneumonia. **Mica** Prolonged overexposure may cause searing of the lungs and pneumoconiosis characterized by cough, shortness of breath, weakness and weight loss. **Silica (Amorphous)** Research indicates that silica is present in welding fume in the amorphous form. Long term overexposure may cause pneumoconiosis. Noncrystalline forms of silica ( amorphous silica) are considered to have little fibrotic potential. **Titanium Dioxide** Pulmonary irritation and slight fibrosis. **Chromium** Ulceration and perforation of nasal seprum. Respiratory irritation may occur with symptoms resembling asthma. Studies have shown that chromate production workers exposed to hexavalent chromium compounds 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. **Nickel, Nickel Compounds** Lung fibrosis or pneumoconiosis. Studies of nickel refinery workers indicated a higher incidence of lung and nasal cancers. **Molybdenum** Prolonged overexposure may result in loss of appetite, weight loss, loss of muscle coordination, difficulty in breathing and anemia. **Magnesium, Magnesium Oxide** No adverse long term health effects have been reported in the literature.

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**Medical conditions aggravated by exposure:**

Persons with pre-existing impaired lung functions (asthma-like conditions).

**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:**

Chromium VI and nickel compounds must be considered as carcinogens under OSHA (29 CFR 1910.1200). Chromium VI compounds are classified as IARC Group 1 and NTP Group 1 carcinogens. Nickel compounds are classified as IARC Group 1 and NTP Group 2 carcinogens. Welding fumes must be considered as possible carcinogens under OSHA (29 CFR 1910.1200).

**California proposition 65:**

For Group B and C products: 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 Section 25249.5 et. Seq.) For Group B and C products: 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 Section 25249.5 et seq.)

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**SECTION 7 - 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 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 CFR 1910), U.S. Government Printing Office, Washington, DC. 20402 for more detail on any of the following.

**Ventilation:**

Use enough ventilation, local exhaust at the arc or both to keep the fumes and gases below PEL/TLVs 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 PEL/TLVs.

**Medical conditions aggravated by exposure:**

Persons with pre-existing impaired lung functions (asthma-like conditions).

**Eye protection:**

Wear helmet or use face shield with filter lens. As a rule of thumb begin with a 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 shield others.

**Protective clothing:**

Wear hand, head and body protection which help to prevent injury from radiation, sparks and electrical shock. See ANSI Z491.1. 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 work and ground.

**Procedure for cleanup of spills or leaks:**

Not applicable

**Waste disposal:**

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/TLVs. Use industrial hygiene monitoring to ensure that your use of this material does not create exposures which exceed PEL/TLVs. Always use exhaust ventilation. Refer to the following sources for important additional information: ANSI Z491.1 from the American Welding Society, P.O. Box 351040, Miami, FL 33135 and OSHA (29 CFR 1910) from the U.S. Department of Labor, Washington, DC 20210. Hobart Welding Products believes this data to be accurate and to reflect qualified expert opinion regarding current research. However, Hobart Welding Products cannot make any expressed or Implied warranty as to this information.

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**SECTION 8 - Control Measures**

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**Respiratory Measures:** Use restorable fume respiratory or air supplied respirator when in confined space or local exhaust does not keep exposure below recommended exposure limit. **Ventilation :**Use enough local ventilation, and local exhaust at ARC to keep fumes and gases from workers breathing zone and general area. Train worker to keep head out of fumes. **Protective Gloves:** See other protective equipment.

**Eye Protection :**Wear helmet, face shield with filter lens, protective screens, flash goggles to shield others, start with shade too dark then go to lighter shade which gives sufficient view of weld zone. **Other protective Equipment :**Hand, head, body protection to prevent injury from radiation, sparks and electrical shock. **Work/Hygienic Practices** Do not touch live electrical parts and insulate from work and ground. For maximum safety: be certified for, and wear a respirator at all times when welding or brazing.