MATERIAL SAFETY DATA SHEET

PLEASE CAREFULLY READ AND UNDERSTAND THIS MATERIAL SAFETY DATA SHEET BEFORE USING THIS PRODUCT

For Welding Consumables and Related Products

May be used to comply with OSHA's Hazards Communication Standard, 29 CFR 1910.1200. Standard must be consulted for specific requirements.

SECTION I (IDENTIFICATION)

Manufacturer/Supplier Name: UNIWELD PRODUCTS, INC. Emergency Phone No.: (954) 584-2000
2850 Ravenswood Road
Fort Lauderdale, FL 33312

Product Name(s): **GROUP "A": E6010, E6011, E6012, E6013, E6022, E7014, E7024-1**
GROUP "B":E7018, E7018-1, E7018M, UNIPIPE-6,7,8, UNI-6011, UNI-7014, UNI-7018, UNI-7018AC 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, UNI-7024, UNI-11018M

Product Classification: **GROUP "A": SHIELDED METAL ARC WELDING (SMAW) CARBON STEEL**
GROUP "B": SHIELDED METAL ARC WELDING (SMAW) LOW HYDROGEN CARBON STEEL
GROUP "C": SHIELDED METAL ARC WELDING (SMAW) LOW HYDROGEN, LOW ALLOY STEEL

SECTION II (HAZARDOUS INGREDIENTS/IDENTITY INFORMATION)

Important: This section covers the materials from which these products are manufactured. The fumes and gases produced during normal use of these products are covered by Section V. The term "Hazardou s Materials" should be interpreted as a term required and defined in OSHA Hazard Communication Standard 26 CFR 1910.1200 and it does not necessarily imply the existence of hazard. The chemicals or compounds reportable by Section 313 of SARA are marked by the symbol #.

INGREDIENT	GROUP A % WEIGHT	GROUP B % WEIGHT	GROUP C % WEIGHT	CAS NO.	EXPOSURE LIMIT (mg/m³)	
					OSHA PEL	ACGIH TLV
IRON+	70-90	60-80	60-90	7439-89-6	5 R* 10 (Oxide Fume)	3 R* 5 (Oxide Fume) {A4}
#MANGANESE	1-5	1-5	1-5	7436-96-5	5 CL ** (Dust) 1,3 SREL *** (Fume)	0.2 (Dust & Fume)
##ALUMINUM OXIDE	<5	N/A	N/A	1344-28-1	5 R*	10 {A4}
CALCIUM CARBONATE	N/A	3-10	5-10	1317-65-3	5 R* 5 (as CaO)	10 2 (as CaO)
CELLULOSE	<5	<2	N/A	9004-34-6	5 R*	10
MICA	<5	N/A	N/A	12001-26-2	3 R*	3 R*
SILICA++ (Amorphous Silica Fume)	<5	<5	<5	14808-60-7 69012-64-2	0.1 R* 0.8	0.1 R* ◆◆ 2 R*
SILICON	N/A	<2	<5	7440-21-3	5 R*	10
TITANIUM DIOXIDE	<10	<10	<5	13463-67-7	5 R*	10 {A4}
FLUORSPAR	N/A	1-12	5-15	7789-75-5	2.5 (as F)	2.5 (as F) {A4}
#CHROMIUM (1)	N/A	N/A	<9	7440-47-3	1 (Metal) 0.5 (Cr II&III Compounds) 0.1 CL** (Cr VI Compounds)	0.5 (Metal) {A4} 0.5 (Cr III Compounds){A4} 0.05 (Cr VI Sol. Compounds){A1}
#NICKEL (2)	N/A	N/A	<5	7440-02-0	1 (Metal) 1 (Soluble Compounds) 1 (Insoluble Compounds)	1.5 (Metal){A5} 0.1 (Soluble Compounds) {A4} 0.2 (Insoluble Compounds) {A1}
MOLYBDENUM	N/A	N/A	<1	7439-98-7	5 R*	5 (Soluble Compounds) ◆
MAGNESIUM CARBONATE	<2	<5	N/A	546-93-0	5 R*	10
SILICATE BINDERS	<10	<10	<10	N/A	N/A	N/A

(1) Group C - Not present in E7018-A1; E8018-C1 and C2; and E10018-D2.
(2) Group C - Not present in E7018-A1; E8018-B2, B2L; E9018-B3, B3L; and E10018-D2.
* - Respirable Fraction. ** - Ceiling Limit. *** - Short Term Exposure Limit.
{A1} - Confirmed Human Carcinogen 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. ◆ - 1999 ACGIH listed under Notice of Intended Changes. Limits of 10 mg/m3 (inhalable fraction) and 3 mg/m3 (respirable fraction) for elemental/metal and insoluble compounds and 0.5 mg/m3 (respirable fraction) for soluble compounds are proposed and should be considered as trial limits. A3 - "Confirmed Animal Carcinogen with Unknown Relevance to Humans". ◆◆ - 1999 ACGIH listed under Notice of Intended Changes. A2 - "Suspected Human Carcinogen". Limits of 0.05 mg/m3 (respirable fraction) are proposed and should be considered as trial limits.
The exposure limit for welding fume has been established at 5 mg/m3 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 III (PHYSICAL DATA)

Not applicable

SECTION IV (FIRE AND EXPLOSION HAZARD DATA)

Nonflammable. Welding arc and spark can ignite combustibles. Refer to American National Standard Z-49.1 for fire prevention during welding.

SECTION V (REACTIVITY DATA)

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. **Most fume ingredients are present as complex oxides and compounds and not as pure metals.**

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 welds and volume of the work area, quality and amount of ventilation, 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 percentage and composition from the ingredients listed in Section II. Fume and gas decomposition products, not the ingredients in the electrode, are important. Decomposition products generated in normal operations include those originating from the volatilization, reaction, or oxidation of the materials shown in Section II plus those from the base metal, 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 (Characterization of Arc Welding Fume: American Welding Society). The elements or oxides listed below correspond to the ACGIH categories located in "TLV Threshold Limit Values for Chemical Substances and Physical Agents in the workroom Environment."

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 quantity of fumes 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.) At a minimum, materials listed in this section should be analyzed for the following:

SECTION VI (HEALTH HAZARD DATA)

Threshold Limit Value: The ACGIH recommended general limit for welding fume NOC (Not Otherwise Classified) 5 mg/m2. ACGIH 1984-85 preface states, "The TVL-TWA should be used as guides in the control of health hazards and should not be used as firm lines between safe and dangerous concentrations." See Section V for specific fume constituents which may modify this TVL.

Effects of Overexposure:

FUMES AND GASES can be dangerous to your health. Primary route of exposure is inhalation of fumes. Preexisting respiratory or allergic conditions may be aggravated in some individuals.

▽ **WARNING: DO NOT BREATHE FUMES!**

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.
▽ **WARNING: DO NOT BREATHE FUMES!**
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 nose, throat or eyes.
IRON, IRON OXIDE - 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 overexposure.
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 of the respiratory system, skin and eyes.
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 chest, metal fume fever, allergic reaction.
MOLYBDENUM - Irritation of the eyes, nose and throat.
MAGNESIUM, MAGNESIUM OXIDE - Overexposure to the oxide may cause metal fume fever characterized by metallic taste, tightness of chest and fever. Symptoms may last 24 to 48 hours following overexposure.

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 lungs) which some researchers believe may affect pulmonary function. Lungs will clear in time when exposure to iron and its compounds ceases. Iron and magnetite (Fe3O4) are not regarded as 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 neurologic problems.
ALUMINUM OXIDE - Pulmonary fibrosis and emphysema.
CALCIUM OXIDE - Prolonged overexposure may cause ulceration of the skin and perforation of the nasal septum, dermatitis and pneumonia.
MICA - Prolonged overexposure may cause scarring 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.
FLUORIDES - Serious bone erosion (Osteoporosis) and mottling of teeth.
CHROMIUM - Ulceration and perforation of nasal septum. 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.
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Persons with preexisting 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 & 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).

▽ **WARNING: CALIFORNIA PROPOSITION 65:** This product, when used for welding, soldering, brazing, cutting and other metal working or flame processes, produces fumes, particulates, residues and other by-products which contain chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. ▽ **WARNING:** This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

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. (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), US Government Printing Office, Washington, DC 20402 for more details on the following):

VENTILATION: Use enough ventilation, local exhaust at the arc, or both, to keep the fumes and gases below the TLV's in the worker's breathing zone and the general area. Train the welder to keep his head out of the fumes.

▽ **WARNING: DO NOT BREATHE FUMES!**

RESPIRATORY PROTECTION: Use NIOSH approved or equivalent respirable fume respirator or air supplies 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 #14. Adjust if needed by selecting the next lighter 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 Z-49.1. 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 substantial clothing. Train the welder not to touch live electrical parts and to insulate himself from work and ground.

PROCEDURE FOR CLEANUP OR 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 and in full compliance with federal, state and local regulations.

SPECIAL PRECAUTIONS: IMPORTANT. MAINTAIN EXPOSURE BELOW PEL/TLV. USE INDUSTRIAL HYGIENE 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 Z-49.1. The American Welding Society, P.O. Box 351040, Miami FL 33135: OSHA (29 CFR 1910), US Dept. of Labor, Washington, DC 20210.

Uniweld Products, Inc. believes this data to be accurate and to reflect qualified expert opinion regarding current research.
Uniweld Products, Inc. cannot make any expressed or implied warranty as to this information.

Effective Date: January, 2008