

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): UNI-1035, UNI-1035FC, UNI-1045, UNI-1045FC, UNI-1056, UNI-1056FC
 Product Classification: SILVER BRAZING ALLOY

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 "Hazardous 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	CAS NO.	EXPOSURE LIMITS IN AIR					
		ACGIH TLV		OSHA PEL		IDLH mg/m ³	OTHER mg/m ³
		TLV mg/m ³	STEL mg/m ³	TLV mg/m ³	STEL mg/m ³		
COMPONENT 1: METAL WIRE OR RODS							
COPPER (Exposure limits are for copper fume, dust, and mists)	7440-50-8	0.2 (fume) 1 (dust & mists)	NE	0.1 (fume) 1 (dust & mists)	NE	100	NIOSH RELS: TWA 1 = (dust); 0.1 (fume) DFG MAKs: TWA = 0.1 fume-Respirable fraction); 1 (dusts & mists-inhalable fraction) PEAK = 2 MAK, 30 min., average value Carcinogen: EPA-D (dusts & mists)
LITHIUM	7439-93-2	NE	NE	NE	NE	NE	NE
MANGANESE (exposure limits are for Manganese, elemental, inorganic compound, and fume, as Manganese)	7439-96-5	0.2	NE	1 (Vacated 1989 PEL)	5 (ceiling) 3 (vacated 1989 PEL)	500	NIOSH RELS: TWA = 1 STEL = 3 DFG MAK: TWA = 0.5 (Inhalable Fraction) PEAK = 10 MAK 30 min., average value DFG MAK Pregnancy Risk Classification: C Carcinogen: EPA-D
NICKEL, Elemental metal	7440-02-0	1.5, A5 (Inhalable Fraction) (Not Suspected as a Human Carcinogen)	NE	1	NE	10	NIOSH REL: TWA = 0.015 Carcinogen: IARC-2B, MAK-1, NIOSH-X, NTP-R, TLV-A5
SILVER	7440-22-4	0.1	NE	0.01	NE	10	NIOSH REL TWA = 0.01 (dust) DFG MAKs: TWA = 0.01 (Inhalable Fraction) PEAK = 2 MAK, 5 min., momentary value (Inhalable Fraction) Carcinogen: EPA-D
TIN	7440-31-5	2	NE	2	NE	100	NIOSH REL: TWA = 2
ZINC (Exposure limits are for Zinc oxide, fume)	7440-66-6	5 (fume) 10 (dust)	10 (fume)	5 (fume) 5 (total dust) 15 dust, respirable dust) 5 (dust respirable dust, Vacated 1989 PEL)	10 (fume, Vacated 1989 PEL)	NE	NIOSH RELS: TWA = 5 (dust & fume) STEL = 10 (fume), 15 (ceiling, 15 min., dust) DFG MAK: TWA = 1.5 (Respirable Fraction) Carcinogen: EPA-D
COMPONENT 2: FLUX COATING ON RODS							
BORIC ACID	10043-35-3	NE	NE	NE	NE	NE	NE
PROPRIETARY FLUORIDE COMPOUND (Exposure limits are for inorganic, solid Fluoride compounds, as F; 7789-75-5)	Proprietary	2.5, A4 (Not Classifiable as a Human Carcinogen)	NE	NE	NE	NE	DFG MAKs: TWA = 2.5 (Inhalable Fraction) PEAK = 5 • MAK 30 min., average value Carcinogen: IARC-3, TLV-A4
METHACRYLATE/ALIPHATIC & NAPHTHENIC HYDROCARBON COMPOUND	Proprietary	NE	NE	NE	NE	NE	NE
WATER	7332-77-0	NE	NE	NE	NE	NE	NE

NE = Not Established. C = Ceiling Limit.

NOTE (1): The ACGIH has an established exposure limit for Brazing Fumes, Not Otherwise Classified. The Threshold Limit Value is 5 mg/m³. NIOSH classifies brazing fumes as carcinogens.

NOTE (2): All WHMIS required information is included. It is located in appropriate sections based on the ANSI Z400.1-1993 format.

SECTION III (PHYSICAL DATA)

The following information is for elemental copper:

RELATIVE VAPOR DENSITY (air = 1): Not applicable.
 SPECIFIC GRAVITY @ 20°C (water = 1): 8.94
 SOLUBILITY IN WATER: Insoluble. pH: Not applicable.
 BOILING POINT: 2595°C (4703°F)
 COEFFICIENT OF OIL/WATER DISTRIBUTION (PARTITION COEFFICIENT): Not applicable.

EVAPORATION RATE (nBuAc = 1): Not applicable.
 FREEZING/MELTING POINT: 1083°C (1981°F)
 VAPOR PRESSURE: Approximately zero.
 ODOR THRESHOLD: Not applicable.

The following information is for elemental silver:

RELATIVE VAPOR DENSITY (air = 1): Not applicable.
 SPECIFIC GRAVITY @ 20°C (water = 1): 10.49
 SOLUBILITY IN WATER: Insoluble. pH: Not applicable.
 BOILING POINT @ 24 mm Hg: Approx. 2212°C (4014°F)
 COEFFICIENT OF OIL/WATER DISTRIBUTION (PARTITION COEFFICIENT): Not applicable.

EVAPORATION RATE (nBuAc = 1): Not applicable.
 FREEZING/MELTING POINT: 960.5°C (1760.9°F)
 VAPOR PRESSURE, mm Hg @ 1284°C: Approximately zero.
 ODOR THRESHOLD: Not applicable.

The following information is for elemental zinc:

RELATIVE VAPOR DENSITY (air = 1): Not applicable.

SPECIFIC GRAVITY @ 20°C (water = 1): 7.14

SOLUBILITY IN WATER: Insoluble.

VAPOR PRESSURE, mm Hg @ 487°C: 1

ODOR THRESHOLD: Not applicable.

COEFFICIENT OF OIL/WATER DISTRIBUTION (PARTITION COEFFICIENT): Not applicable.

EVAPORATION RATE (nBuAc = 1): Not applicable.

FREEZING/MELTING POINT: 419°C (786°F)

pH: Not applicable.

BOILING POINT: 907°C (1665°F)

APPEARANCE, ODOR AND COLOR: These products are odorless, solid rods that have a metallic luster, which may have a flux coating. HOW TO DETECT THIS SUBSTANCE (warning properties): The appearance is a distinctive characteristic of these products.

SECTION IV (FIRE AND EXPLOSION HAZARD DATA)

FLASH POINT: Not flammable.

AUTOIGNITION TEMPERATURE: Not flammable.

FLAMMABLE LIMITS (in air by volume, %):

Lower (LEL): Not applicable.

Upper (UEL): Not applicable.

FIRE EXTINGUISHING MATERIALS:

Water Spray: YES

Halon: YES

Dry Chemical: YES

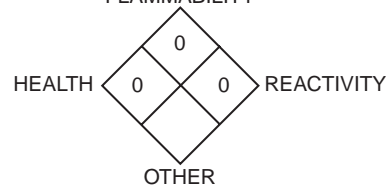
Carbon Dioxide: YES

Foam: YES

Other: Any "ABC" Class

NFPA RATING

FLAMMABILITY



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. 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."

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) is 5 mg/m³. ACGIH 1984-85 preface states, "The TLV-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 TLV.

Contact with Skin or Eyes: Contact of the rod form of these products with the skin is not anticipated to be irritating. Contact with the rod form of these products can be physically damaging to the eye. Fumes generated during brazing operations may be irritating to the skin and eyes.

SKIN ABSORPTION: In some situations, one of the decomposition products of the flux coating may be hydrogen fluoride. Hydrogen fluoride can penetrate the skin and produce burns that may not be immediately painful or visible; the burns impact the lower layers of skin and bone tissue. Hydrogen fluoride exposures involving 20 percent of the body or more can be fatal through systemic fluoride poisoning.

Effects of Overexposure:

ACUTE: The chief acute health hazard associated with these products would be the potential for irritation of contaminated skin and eyes when exposed to fumes during brazing operations. Inhalation of large amounts of particulates generated by these products during metal processing operations may be physically irritating and cause deposits of dust in nasal passages. Inhalation of dusts and fumes of Copper, Manganese, and Zinc (constituents of these products) can cause metal fume fever. Symptoms can include a metallic or sweet taste in the mouth, sweating, shivering, headache, throat irritation, fever, chills, thirstiness, muscle aches, nausea, vomiting, weakness, fatigue, and shortness of breath. Contact with the molten material will burn contaminated skin or eyes. If particulates or fumes, generated during brazing operations, are ingested (i.e., through poor hygiene practices), nausea, vomiting, diarrhea, stomach ache, degeneration of blood and liver cells, gastrointestinal bleeding, decreased urine output, listlessness, rapid heartbeat, convulsions, and coma may occur. Severe ingestion overexposure may be fatal. Depending on the duration of overexposure, dusts or particulates generated by the flux coating on the flux coated products may be irritating or damaging to the entire respiratory tract, eyes, and skin. In some situations, one of the flux coating's decomposition products may be hydrogen fluoride. Hydrogen fluoride can penetrate the skin and produce burns that may not be immediately painful or visible; the burns impact the lower layers of skin and bone tissue. If dusts or particulates generated by the flux coating on the flux coated products are swallowed, they may burn the mouth, throat, esophagus, and other tissues of the digestive system.

▽ WARNING: DO NOT BREATHE FUMES!

PREEXISTING MEDICAL CONDITIONS: Individuals with impaired pulmonary functions or illness may have symptoms exacerbated by fume irritants.

SHORT-TERM (ACUTE) OVEREXPOSURE to brazing fumes may result in discomfort such as dizziness, nausea, or dryness or irritation of the nose, throat or eyes. Copper and zinc fumes may cause metal fume fever. Short term symptoms may include a metallic taste in the mouth, dryness or irritation of the throat followed by coughing, shortness of breath, nausea, fever, body ache, and chills.

LONG TERM (CHRONIC) OVEREXPOSURE: Chronic skin overexposure to the fumes of these products during brazing operations may produce dermatitis (red, inflamed skin). Chronic skin overexposure to dusts or particulates generated by the flux coating on the flux coated products may cause borism (dry skin, eruptions, and gastrointestinal disturbances) or pustular dermatitis (visible collections of pus). Chronic ingestion of the fluoride component of the flux coating may cause osseous fluorosis (increased radiographic density of the bones). Symptoms of chronic ingestion of dusts or particulates generated by the flux coating on the flux coated products may include kidney damage, asthma, and pain in the joints and muscles. **TARGET ORGANS:** For fumes: Skin, eyes, respiratory system.

COPPER CONCENTRATION: Dust and mist respirator.

SILVER (METAL DUST AND SOLUBLE COMPOUNDS, AS SILVER): Full-facepiece respirator with high-efficiency particulate filter(s), full-facepiece Self-Contained Breathing Apparatus (SCBA), or full-facepiece SAR.

ZINC OXIDE Dust, mist, and fume respirator or SAR.

Emergency and First Aid procedures: Remove from dust or fume exposure. If breathing has stopped, perform artificial respiration. Summon medical aid immediately.

Other health considerations: Brazing alloys are frequently used with fluoride type flux. If applicable, flux fume should be considered in evaluation of hazards.

SUSPECTED CANCER AGENT: Components of these products are listed as follows:

COPPER: EPA-D (Not Classifiable as to Human Carcinogenicity)

MANGANESE: EPA-D (Not Classifiable as to Human Carcinogenicity)

PROPRIETARY FLUORIDE COMPOUND (as a Fluoride Compound): IARC-3 (Unclassifiable as to Carcinogenicity in Humans), ACGIH TLV-A4 (Not Classifiable as a Human Carcinogen)

NICKEL, ELEMENTAL, METAL: IARC-2B (Possibly Carcinogenic to Humans), MAK-1 (Substances which Cause Cancer in Man), NIOSH-X, (Carcinogen Defined with no Further Categorization); NTP-R (Reasonably Anticipated to be a Human Carcinogen), ACGIH TLV-A5 (Not Suspected as a Human Carcinogen)

SILVER: EPA-D (Not Classifiable as to Human Carcinogenicity)

ZINC: EPA-D (Not Classifiable as to Human Carcinogenicity (inadequate human and animal evidence of carcinogenicity or no data available))

CARCINOGENICITY: Nickel should be considered a possible carcinogen per 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.

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.