



# Copper & Copper Alloys

## SAFETY DATA SHEET

This Material Safety Data Sheet (MSDS) is for welding consumables and related products and may be used to comply with OSHA's Hazard Communication standard, 29 CFR 1910.1200, and Superfund Amendments and Reauthorization Act (SARA) of 1986 Public Law 99-499. The OSHA standard must be consulted for specific requirements. This Safety Data Sheet complies with European Commission Directive 89/106/EEC, 91/155/EEC, ISO 11014-1 and ANSI Z400.1.

### SECTION 1 – IDENTIFICATION

Manufacturer/Supplier Name: Unibraise  
 Address: 1050 Penne Crest Houston TX USA 77055  
 Website: [www.unibraise.com](http://www.unibraise.com)  
 Telephone No: (713) 869-6000  
 Emergency No: (800)364-6900

Product Type: **Copper and Copper Alloys**  
 AWS Specification: AWS A5.6, A5.7, A5.8/ASME 5.6, 5.7, 5.8  
 Trade Name AWS Classification: Naval Bronze (RBCuZn-A), Nickel Bronze (RBCuZn-B), Low Fuming Bronze (RBCuZn-C), Nickel Silver (RBCuZn-D), Silicon Bronze (ERCuSi-A), Deoxidized Copper (ERCu), Phos-Bronze C (ERCuSn-C), Aluminum Bronze A1 (ERCuAl-A1), Aluminum Bronze A2 (ERCuAl-A2), Aluminum Bronze A3 (ERCuAl-A3), Nickel Aluminum Bronze (ERCuNiAl), Manganese-Nickel Aluminum Bronze (ERCuMnNiAl), Unibraise 1400 (ECuSn-C), Unibraise 1600 (ECu), Aluminum Bronze A2 Coated (ECuAl-A2), Unibraise 1500 (ECuSi)

### SECTION 2 – IDENTIFICATION OF HAZARDS

Classification Mixture – Solid  
 GHS-US Classification  
 Skin Sens. 1 H317  
 Carc. 1B H350  
 STOT RE 1 H372  
 Aquatic Acute 1 H400  
 Aquatic Chronic 3 H412  
 GHS Labeling GHS-US Pictograms



GHS07



GHS08



GHS09

Single Word: DANGER

#### GHS-US HAZARD STATEMENTS:

- H317 May cause allergic skin reaction
- H350 May cause cancer
- H372 Causes damage to organs through prolonged or repeated exposure
- H400 Very toxic to aquatic life
- H411 Toxic to aquatic life with long lasting effects

#### PRECAUTIONARY STATEMENTS:

- P201 Obtain special instructions before use
- P202 Do not handle until all safety precautions have been read and understood.

### SECTION 3 - HAZARDOUS INGREDIENTS

#### CONTENT PERCENTAGE BY INGREDIENTS

INGREDIENT	CAS	EINECS	%WEIGHT	INGREDIENT	CAS	EINECS	%WEIGHT
CHROMIUM	7440-47-3	231-157-5	5-35	NICKEL	7440-02-0	231-111-4	0-40
IRON	7439-89-6	231-096-4	40-90	SILICON	7440-21-3	231-130-8	0-1
MANGANESE	7439-96-5	231-105-1	0-5	(Amorphous Silica Fume)	69012-64-2	273-761-5	
MOLYBDENUM	7439-98-7	231-107-2	0-4				

**SECTION 4 – FIRST AID MEASURES**

**INHALATION:** If breathing is difficult provide fresh air and contact physician.

**EYE/SKIN INJURIES:** For radiation burns, see physician.

Section 11 of this MSDS covers the acute effects of overexposure to the various ingredients within the welding consumable. Section 8 of this MSDS lists the exposure limits and covers methods for protecting yourself and your co-workers.

**SECTION 5 - 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. Unused welding consumables may remain hot for a period of time after completion of a welding process. See American National Standard (ANSI) Z49.1 for further general safety information on the use and handling of welding consumables and associated procedures.

**SECTION 6 - ACCIDENTAL RELEASE MEASURES**

Solid objects can be picked up and placed into a container. Wear proper personal protective equipment while handling. Do not discard as general trash.

**SECTION 7 - HANDLING AND STORAGE**

**HANDLING:** No specific requirements in the form supplied. Handle with care to avoid cuts. Wear gloves when handling welding consumables. Avoid exposure to dust. Do not ingest. Some individuals can develop an allergic reaction to certain materials. Retain all warning and product labels.

**STORAGE:** Keep separate from acids and strong bases to prevent possible chemical reactions.

**SECTION 8 - EXPOSURE CONTROL AND PERSONAL PROTECTION**

Read and understand the instructions and the labels on the packaging. Welding fumes do not have a specific OSHA PEL or ACGIH TLV. The OSHA PEL for Particulate – Not Otherwise Classified (PNOC) is 5 mg/m<sup>3</sup> – Respirable Fraction, 15 mg/m<sup>3</sup> – Total Dust. The ACGIH TLV for Particles – Not Otherwise Specified (PNOS) is 3 mg/m<sup>3</sup> – Respirable Particles, 10 mg/m<sup>3</sup> – Inhalable Particles. The individual complex compounds within the fume may have a lower OSHA PEL or ACGIH TLV than the OSHA Particulate – Not Otherwise Classified (PNOC) and ACGIH Particles – Not Otherwise Specified (PNOS). 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. European Union Occupational Exposure Limits (EU OEL) are listed with the most stringent limit among the EU member nations. All exposure limits are in milligrams per cubic meter (mg/m<sup>3</sup>).

INGREDIENT	CAS	EINECS	OSHA PEL	ACGIH TLV	EU OEL
CHROMIUM#	7440-47-3	231-157-5	1 (Metal) 0.5 (Cr II & Cr III Cpnds) 0.005 (Cr VI Cpnds)	0.5 (Metal) {A4} 0.5 (Cr III Cpnds) {A4} 0.05 (Cr VI Sol Cpnds) {A1} 0.01 (Cr VI Insol Cpnds) {A1}	0.1 I* (Aerosol) - Switzerland 0.005; 0.01*** - Denmark 0.005 (Total Aerosol); 0.015*** (Total Aerosol) - Sweden
IRON+	7439-89-6	231-096-4	5 R*	5 R* (Fe <sub>2</sub> O <sub>3</sub> ) {A4}	3 R* (Aerosol as Fe <sub>2</sub> O <sub>3</sub> ) – Switzerland 7*** (as Fe <sub>2</sub> O <sub>3</sub> ) - Denmark
MANGANESE#	7439-96-5	231-105-1	5 CL ** (Fume) 1, 3 STEL*** ■	0.1 I* {A4} ♦ 0.02 R* ♦♦	0.02 R* (Aerosol); 0.16 R*** (Aerosol) - Germany 0.2 I* (Aerosol) - Germany 0.2; 0.4*** - Denmark
MOLYBDENUM	7439-98-7	231-107-2	5 R*	3 R*; 10 I* (Ele and Insol) 0.5 R* (Sol Cpnds) {A3}	3 R* - Spain; 4; 10*** - Poland
NICKEL#	7440-02-0	231-111-4	1 (Metal) 1 (Sol Cpnds) 1 (Insol Cpnds)	1.5 I* (Ele) {A5} 0.1 I* (Sol Cpnds) {A4} 0.2 I* (Insol Cpnds) {A1}	0.05; 0.1*** - Denmark
SILICON+	7440-21-3	231-130-8	5 R*	3 R*	4 R* (Aerosol); 10 I* (Aerosol) - Denmark
(Amorphous Silica Fume)	69012-64-2	273-761-5	0.8	3 R*	2 I*; 4 I*** - Denmark
SODIUM OXIDE	7681-49-5	215-208-9	5 R*	3 R*	1.5 R* (Dust NOS - Aerosol) - Germany
STRONTIUM CARBONATE+	1633-05-2	216-643-7	216-643-7	5 R*	3 R* 1.5 R* (as Dust -
NOS) - Germany					
TITANIUM DIOXIDE	13463-67-7	236-675-5	15 (Dust)	10 {A4}	1.5 R* - Germany

R\* - Respirable Fraction R\*\*\* - Respirable Fraction - Short Term Exposure Limit I\* - Inhalable Fraction I\*\*\* - Inhalable Fraction - Short Term Exposure Limit \*\* - Ceiling Limit \*\*\* - Short Term Exposure Limit + - 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 ■ - NIOSH REL TWA and STEL ♦ - Limit of 0.1 mg/m<sup>3</sup> is for Inhalable Mn in 2013 by ACGIH ♦♦ - Limit of 0.02 mg/m<sup>3</sup> is for Respirable Mn in 2013 by ACGIH Ele – Element Sol – Soluble Insol – Insoluble Inorg – Inorganic Cpnds – Compounds NOS – Not Otherwise Specified {A1} - Confirmed Human Carcinogen per ACGIH {A2} - Suspected 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 (noncrystalline) form

**VENTILATION:** Use enough ventilation, local exhaust at the arc or both to keep the fumes and gases below the PEL/TLV/OELs 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 the regulatory limits.

**EYE PROTECTION:** Wear helmet or use face shield with filter lens. As a rule of thumb begin with 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 from the weld arc flash.

**PROTECTIVE 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 nonsynthetic 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

**SPECIAL PRECAUTIONS (IMPORTANT):** Maintain exposure below the PEL/TLV/OEL. Use industrial hygiene monitoring to ensure that your use of this material does not create exposures which exceed PEL/TLV/OEL. Always use exhaust ventilation. Refer to the following sources for important additional information: American National Standard (ANSI) Z49.1; 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.

**SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES**

Welding consumables applicable to this sheet as shipped are nonreactive, nonflammable, nonexplosive and essentially nonhazardous until welded.

**PHYSICAL STATE:** Cored Wire

**ODOR:** N/A

**COLOR:** Gray

**FORM:** Coated Rod

**SECTION 10 – STABILITY AND REACTIVITY**

**GENERAL:** Welding consumables applicable to this sheet are solid and nonvolatile as shipped. This product is only intended for use per the welding parameters it was designed for. When this product is used for welding, hazardous fumes may be created. Other factors to consider include the base metal, base metal preparation and base metal coatings. All of these factors can contribute to the fume and gases generated during welding. The amount of fume varies with the welding parameters. **STABILITY:** This product is stable under normal conditions.

**REACTIVITY:** Contact with acids or strong bases may cause generation of gas.

**SECTION 11 – TOXICOLOGICAL INFORMATION****SHORT-TERM (ACUTE) OVEREXPOSURE EFFECTS:**

**Welding Fumes** - May result in discomfort such as dizziness, nausea or dryness or irritation of nose, throat or eyes. **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. **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. **Molybdenum** - Irritation of the eyes, nose and throat. **Nickel, Nickel Compounds** - Metallic taste, nausea, tightness in chest, metal fume fever, allergic reaction. **Silica (Amorphous)** - Dust and fumes may cause irritation of the respiratory system, skin and eyes.

**LONG-TERM (CHRONIC) OVEREXPOSURE EFFECTS:**

**Welding Fumes** - Excess levels may cause bronchial asthma, lung fibrosis, pneumoconiosis or "siderosis." **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. **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 (Fe<sub>3</sub>O<sub>4</sub>) 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. Overexposure to manganese and manganese compounds above safe exposure limits can cause irreversible damage to the central nervous system, including the brain, symptoms of which may include slurred speech, lethargy, tremor, muscular weakness, psychological disturbances and spastic gait. **Molybdenum** - Prolonged overexposure may result in loss of appetite, weight loss, loss of muscle coordination, difficulty in breathing and anemia. **Nickel, Nickel Compounds** - Lung fibrosis or pneumoconiosis. Studies of nickel refinery workers indicated a higher incidence of lung and nasal cancers. **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.

**MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:** Persons with pre-existing impaired lung functions (asthma-like conditions). Persons with a pacemaker should not go near welding and cutting operations until they have consulted their doctor and obtained information from the manufacturer of the device. Respirators are to be worn only after being medically cleared by your company-designated physician.

**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 compounds and nickel compounds are classified as IARC Group 1 and NTP Group K carcinogens. Chromium VI, nickel compounds and welding fumes must be considered as possible carcinogens under OSHA (29 CFR 1910.1200).

**CALIFORNIA PROPOSITION 65:** WARNING: These products contain or produce 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.)

**SECTION 12 – ECOLOGICAL INFORMATION**

Welding processes can release fumes directly to the environment. Welding wire can degrade if left outside and unprotected. Residues from welding consumables and processes could degrade and accumulate in the soil and groundwater.

**SECTION 13 – DISPOSAL CONSIDERATIONS**

Use recycling procedures if available. Discard any product, residue, packaging, disposable container or liner in an environmentally acceptable manner, in full compliance with federal, state and local regulations.

**SECTION 14 – TRANSPORT INFORMATION**

No international regulations or restrictions are applicable. No special precautions are necessary.

**SECTION 15 – REGULATORY INFORMATION**

Read and understand the manufacturer's instructions, your employer's safety practices and the health and safety instructions on the label and the material safety data sheet. Observe all local and federal rules and regulations. Take all necessary precautions to protect yourself and others.

United States EPA Toxic Substance Control Act: All constituents of these products are on the TSCA inventory list or are excluded from listing.

**CERCLA/SARA TITLE III:** Reportable Quantities (RQs) and/or Threshold Planning Quantities (TPQs):

Ingredient name	RQ(lb)	TPQ (lb)
Products on this MSDS are a solid solution in the form of a solid article.	--	--

Spills or releases resulting in the loss of any ingredient at or above its RQ require immediate notification to the National Response Center and to your Local Emergency Planning Committee.

**Section 311 Hazard Class**

As shipped:	Immediate	In use:	Immediate delayed
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**EPCRA/SARA TITLE III 313 TOXIC CHEMICALS:** The following metallic components are listed as SARA 313 "Toxic Chemicals" and potentially subject to annual SARA 312 reporting: Chromium, Manganese and Nickel. See Section 3 for weight percentage.

**CANADIAN WHMIS CLASSIFICATION:** Class D; Division 2, Subdivision A

**CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA):** All constituents of these products are on the Domestic Substance List (DSL).

**SECTION 16 – OTHER INFORMATION**

The following Risk and Safety Phrase Texts and Hazard Statements correspond with the columns labeled - EU 67/548/EEC within Section 2 of this material safety data sheet. Take appropriate precautions and protective measures to eliminate or limit the associated hazard.

**EU Directive 67/548/EEC - Risk Phrase Texts**

R9 – Explosive when mixed with combustible material  
R20/22 – Harmful by inhalation and if swallowed  
R24/25 – Toxic in contact with skin and if swallowed  
R26 – Very toxic by inhalation  
R35 – Causes severe burns  
R36/37 – Irritating to eyes and respiratory system  
R40 – Limited evidence of a carcinogenic effect  
R42/43 – May cause sensitization by inhalation and skin contact  
R43 – May cause sensitization by skin contact  
R45 – May cause cancer  
R46 – May cause heritable genetic damage  
R48/20/22 – Harmful: danger of serious damage to health by prolonged exposure through inhalation and if swallowed  
R48/23 – Toxic: danger of serious damage to health by prolonged exposure through inhalation  
R50 – Very toxic to aquatic organisms  
R53 – May cause long-term adverse effects in the aquatic environment  
R62 – Possible risk of impaired fertility

For additional information please refer to the following sources:

USA: American National Standard (ANSI) Z49.1 “Safety in Welding and Cutting”, ANSI/American Welding Society (AWS) F1.5 “Methods for Sampling and Analyzing Gases from Welding and Allied Processes”, ANSI/AWS F1.1 “Method for Sampling Airborne Particles Generated by Welding and Allied Processes”, AWSF3.2M/F3.2 “Ventilation Guide for Weld Fume”, American Welding Society, 550 North Le Jeune Road, Miami, Florida, 33135.  
Safety and Health Fact Sheets available from AWS at [www.aws.org](http://www.aws.org).  
OSHA Publication 2206 (29 C.F.R. 1910), U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954.  
Threshold Limit Values and Biological Exposure Indices, American Conference of Governmental Hygienists (ACGIH), 6500 Glenway Ave., Cincinnati, Ohio 45211, USA.  
NFPA 51B “Standard for Fire Prevention during Welding, Cutting and Other Hot Work” published by the National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169.  
UK: WMA Publication 236 and 237, “Hazards from Welding Fume”, “The arc welder at work, some general aspects of health and safety”.  
Canada: CSA Standard CAN/CSA-W117.2-01 “Safety in Welding, Cutting and Allied Processes”.

**LIABILITY-DISCLAIMER:** *Unibraze does not assume liability whatsoever for the accuracy or completeness of the information contained in this MSDS. The information contained is accurate to the best of our knowledge. The final suitability of any material is the responsibility of the user. Materials may present unknown hazards and are intended for use by qualified individuals experienced and trained in welding safety.*