MATERIAL SAFETY DATA SHEET

This Material Safety Data Sheet is offered pursuant to OSHA's Hazard Communication Standard (29 CFR 1910.1200).

WARNING: PRODUCT COMPONENTS PRESENT HEALTH AND SAFETY HAZARDS. READ AND UNDERSTAND THIS MSDS. FOLLOW YOUR EMPLOYER'S SAFETY PRACTICES. This product contains Chromium and/or Nickel which are listed by OSHA, NTP, or IARC as being a carcinogen or potential carcinogen. Use of this product may expose you or others to fumes and gases at levels exceeding those established by the American Conference of Governmental Industrial Hygienists (ACGIH) or the Occupational Safety and Health Administration (OSHA).

1. IDENTIFICATION

Manufacturer/Supplier Name: UNIBRAZE CORP.
1050 PENNER CREST, HOUSTON, TX 77055
www.unibraze.com

Emergency Phone: (713) 869-6000 1-800-364-6900

Trade name: **UNIBRAZE Nickel and Nickel Alloy Wires**

Recommended Use: MIG/TIG/SAW welding of Nickel and Nickel Alloys

Classifications: AWS A5.7, A5.14 & A5.15
ASME SFA 5.7, 5.14, & 5.15 Section II Part C

Product Identification: **Trade name/AWS Classification/Composition (%)**

	Al	Cr	Co	Cu	Fe	Mn	Mo	Ni	Nb	Si	Ti	W
Unibraze 44 *ERNiFeMn-CI*					45	11		44				
Unibraze 55 *No AWS Class*					44			56				
Unibraze 59 *ERNiCrM0-13*		23			1		16	60				
Unibraze 60 *ERNiCu-7*				27		4		65	1	1	2	
Unibraze 61 *ERNi-1*	1				1	1		94			3	
Unibraze 62 *ERNiCrFe-5 (Modified)*		17			5	3		73	2			
Unibraze 67 *ERCuNi*				69		1		30				
Unibraze 82 *ERNiCr-3*		20				1	3	72	3			
Unibraze 99 *ERNi-CI*								99				
Unibraze 601 *ERNiCrFe-11*	1	23		1	14	1		61				
Unibraze 617 *ERNiCrCoMo-1*	1	22	12		2	1	9	52		1		
Unibraze 622 *ERNiCrMo-10*		20			5		14	58				3
Unibraze 625 *ERNiCrMo-3*		22			1		9	61	4			
Unibraze 718 ERNiFeCr-2		19			19		3	53	5		1	
Unibraze 825 *ERNiFeCr-1*		21		2	30	1	3	42				
Unibraze C276 *ERNiCrMo-4*		16	2		6		16	57				3
Unibraze X *ERNiCrMo-2*		22	2		18	1	9	47				1
Unibraze W *ERNiMo-3*		5	2		5	1	25	61		1		

NOTE: The above percentages are nominal and do not represent a certification of content

2. HAZARD(S) IDENTIFICATION

*The term "Hazardous" should be interpreted as a term required and defined in OSHA HAZARD COMMUNICATION STANDARD (29 CFR1910.1200); however, the use of this term does not necessarily imply the existence of any hazard.

Emergency Overview: Not Hazardous as shipped.

Warning: Avoid breathing fumes and gases, they may be dangerous to your health. Use adequate ventilation and personal protective equipment

Potential Health Hazards:

Skin: Some individuals can develop allergic skin reactions to Nickel and other metallic ingredients. Wire ends may have sharp edges and can cause cuts. During welding fumes generated may be cause skin irritation. UV radiation produced may cause ray burns. Hot metal may cause burns.

Eyes: Wire ends may have sharp edges and can cause cuts. During welding fumes may cause eye irritation. UV arc radiation can cause eye burns.

Ingestion: Metal ingestion can cause toxic effects. Not a normal route of entry.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Composition % is given in Section 1 above refer to the appropriate Trade name or product designation.

Component	CAS#	EC#	Classification
Aluminum	7429-90-5	231-072-3	F: R15, R10
Chromium	7440-47-3	231-157-5	Not Classified
Cobalt	7440-48-4	231-158-0	R42/43 R53
Copper	7440-50-8	231-159-6	Not Classified
Iron	7440-89-6	231-096-4	Not Classified
Manganese	7440-96-5	231-105-1	Xn, R20/22
Molybdenum	7439-98-7	231-107-2	Not classified
Nickel	7440-02-0	231-111-4	Carc. Cat 3: R40, R43
Niobium	7440-03-1	231-113-5	Not classified
Silicon	7440-21-3	231-130-8	Not classified
Titanium	7440-32-6	231-142-3	Xn; R15
Tungsten	7440-33-7	231-143-9	Not classified

4. FIRST AID MEASURES

Skin: Wash skin with soap and water to remove metallic particles. If rash or burn develops, seek medical attention

Eyes: Flush particles from eyes with water for at least 15 minutes. If irritation persists or burns develop seek medical attention.

Inhalation: Remove from exposure. If respiratory irritation persists seek medical attention.

Ingestion: If metallic particles are swallowed, seek medical attention.

Advice to physician: Treat symptomatically.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES

Flash point & Method	Solid Material – No flash point
Auto ignition Temperature	Not flammable
Flame Propagation Rate (Solids)	Not flammable
OSHA Flammability Class	None – solid material
Extinguishing Media	Use agent appropriate for surrounding fire
Unusual Fire & Explosion Hazards	None
Special Fire Fighting Precautions/Instructions	Wear self-contained breathing apparatus. Hazardous metallic fumes can be generated in a fire.

6. ACCIDENTIAL RELEASE MEASURES

As shipped materials are not hazardous to the environment.

7. HANDLING AND STORAGE

Handle with care to avoid cuts. Wear gloves when handling welding consumables. Retain all warning and product labels.
Avoid breathing welding fumes. Keep your head out of the fumes. Use with enough ventilation or exhaust at the arc, or both, to keep fumes and gases below the occupational exposure limits in your breathing zone and the general area.
Use air sampling to determine the need for corrective action. Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. Fumes from welding and oxygen depletion can alter the air quality causing injury or death.
Take appropriate precautions to prevent fires and explosion.
Read and understand the manufacturer's instructions and the precautionary label on the product. Assure compliance with the OSHA Standard on Chromium (VI), 29CFR 1910.1026.
Store in a dry area and protect from contamination with other materials.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Component	*CAS No.*	
Aluminum (Al)	7429-90-5	TLV: 10 mg/m^3(Metal dust): 5 mg/m^3 (Metal Fumes) PEL: 15 mg/m^3(Total Metal dust): 5 mg/m^3 (Metal dust – respirable fraction) LD_{50}: Not available EH40 : Aluminum metal: Total inhalable dust OES 10 mg/m^3(8 hrs TWA), Total respirable dust OES 4mg/m^3 (8 hrs TWA)
*Chromium (Cr)	7440-47-3	TLV: 0.5 mg/m^3 PEL: 1.0 mg/m^3(Metals as Cr) LD_{50}: Not available EH40 : Chromium VI Compounds (as Cr) OES .05mg/m^3 (8 hr TWA) : Chromium II Compounds (as Cr) OES .05mg/m^3 (8 hr TWA) : Chromium III Compounds (as Cr) OES .05mg/m^3 (8 hr TWA)
Cobalt (Co)	7440-48.4	TLV: 0.02 mg/m^3 (Dust & fume as Co) PEL: 0.1 mg/m^3(As Co metal) LD_{50}: 6,170 mg/kg, rat, oral EH40 : OES 0.1mg/m^3 (8 hrs TWA)
*Copper (Cu)	7440-50-8	TLV: 1.0 mg/m^3(Dusts & mists, as Cu) 0.2 mg/m^3 (Fume) PEL: 1.0 mg/m^3(Dusts & mists, as Cu) 0.1 mg/m^3 (Fume as Cu) LD_{50}: 35 mg/kg, mouse, intraperitoneal EH40 : Fume OES 0.2mg/m^3 (8 hr TWA) Dusts & mists (as Cu) OES 1.0 mg/m^3 8 hr TWA) 2.0 mg/m^3 (15 minute reference period)
Iron (Fe)	7439-89-6	TLV: No limit set (for Fe_2O_3 fume the TLV is 5 mg/m^3 as Fe) PEL: No limit set (for Fe_2O_3 dust & fume the PEL is 10 mg/m^3 as Fe) LD_{50}: Not available EH40 : Iron Oxide Fume (as Fe) OES 5.0mg/m^3 (8 hr TWA) 10.0 mg/m^3 (15 minute reference period)
Manganese (Mn)	7439-96-5	TLV: 0.2 mg/m^3 elemental & inorganic compounds, as Mn PEL: 5 mg/m^3 (Ceiling, as Mn Compounds) 5 mg/m^3 (Fume,as Mn) LD_{50}: 9,000 mg/kg rat. Oral EH40 : Manganese & its inorganic compounds (as Mn) OES 0.5mg/m^3 (8 hr TWA)
Molybdenum (Mo)	7439-98-7	TLV: 10 mg/m^3(insoluble & metal compounds, as Mo) PEL: 15 mg/m^3(Insoluble compounds, total dust as Mo) LD_{50}: Not available EH40 : Molybdenum compounds (as Mo): Soluble – OES 5.0 mg/m^3 (8 hours TWA) 10 mg/mg ^{3}(15 minute reference period) Insoluble- OES 10.0 mg/m^3 (8 hours TWA) 20 mg/mg^3 (15 minute reference period)
Nickel (Ni)	7440-02-0	TLV: 1.5 mg/m^3 as metal (inhalable fraction) PEL: 1.0 mg/m^3 for metal and insoluble compounds as Ni LD_{50}: >9000 mg/kg, rat oral EH40 : Nickel & its inorganic compounds (except nickel carbonyl); Water soluble Nickel compounds (as Nickel) OES 0.1 mg/m^3 (8 hr TWA). Nickel & water in-soluble Nickel compounds (as Ni) OES 0.5 mg/m^3 (8 hr TWA)
Niobium (Nb)	7440-03-1	TLV: No limit set PEL: No limit set LD_{50}: Not available
Silicon (Si)	7440-21-3	TLV: 10.0 mg/m^3 PEL: 10.0 mg/m^3 Total dust LD_{50}: 3160 mg/kg, rat, oral in amorphous form EH40 : Total inhalable dust OES 10.0 mg/m^3 (8 hr TWA). Total respirable dust OES 4.0 mg/m^3 (8 hr TWA)
Titanium (Ti)	7440-32-6	TLV: No limit set PEL: No limit set LD_{50}: Not available EH40 – As Titanium dioxide: Total inhalable dust OES 10.0 mg/m^3 (8 hr TWA) Total inhalable dust OES 10.0 mg/m^3 (8 hr TWA)
Tungsten (W)	7440-33-7	TLV: 5.0 mg/m^3 insoluble compounds, as W PEL: 10.0 mg/m^3 for soluble compounds, as W LD_{50}: 2000mg/kg, rat, unreported route EH40: Soluble compounds OES 1.0 mg/m^3 (8 hr TWA)& 10 mg/mg ^{3}(15 minute reference period) Soluble compounds OES 5.0 mg/m^3 (8 hr TWA) & 19 mg/mg ^{3}(15 minute reference period)

***Additional Information**: A portion of metallic chromium may be converted during the welding process to hexavalent chromium. Hexavalent chromium is classified as an IARC Group 1 Carcinogenic. NTP classifies hexavalent chromium as a known carcinogen.

Monitoring Procedures: If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be determine the effectiveness of ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to European Standard EN689 for methods for the assessment of exposure by inhalation to chemical agents and national guidance documents for methods for the determination of hazardous substances.

Ventilation: Use process enclosures, local ventilation or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fumes or mist, use ventilation to keep exposure to airborne contaminates below the exposure limits.

Respiratory Protection: Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels the hazards of the product and the safe working limits of the selected respirator.

Hand Protection: Gloves should be worn to minimize contact. During the welding process, heat insulated gloves are recommended.

Eye Protection: Safety glasses or goggles are recommended when handling this material. During the welding process, safety goggles and dark lenses must be worn.

Skin Protection: Personal protective equipment for the body should be selected based on the task being performed and the risk involved and should be approved by a specialist before handling this product.

Hearing Protection: During the welding process, the operator and other personal close to the welding operation must be protected from excessive noise. Hearing protection that meets local standards should be used.

Hygiene Measures: Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period, appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Grey to Silver
Physical State: Solid
Molecular Weight: Mixture
Odor: Odorless
Chemical Formula: Mixture

Flash point: None
Melting Point: >2300°F (1260°C)
Solubility in water: Insoluble
Specific Graving (water =1.0): 8-9

Other physical and chemical properties as described in 91/155/eed and in the Approved code of Practice, ref. 11 have no safety implications in these materials.

10. STABILITY AND REACTIVITY

These consumables are stable and no hazardous decomposition products are formed upon exposure to water or the atmosphere.

Nickel can react with carbon monoxide in reducing atmospheres to from nickel carbonyl, an extremely toxic gas.

11. TOXICOLOGICAL INFORMATION

Nickel and cobalt are classified as Category 3 carcinogens. The exposure route of concern is inhalation.

As shipped these alloys in massive form have no known toxicological properties other than causing an allergic reaction to those sensitive to metals contained in these products. However, dust and fumes may contact with skin or eyes to produce mechanical irritation. Chronic exposures couple with sweat could cause skin irritation or conjunctivitis.

Excessive inhalation of dust or fumes from welding could, depending on the specific features of the process used, pose a long term health hazard. The IARC has determined that welding fumes are carcinogenic to humans.

Contamination or surface preparations etc. can affect the composition of the produced fume.

Delayed Effects

Chromium	The International Agency for Research on Cancer considers hexavalent chromium to be a carcinogen but does not have adequate evidence for chromium and trivalent chromium . Fumes have been associated with lung fibrosis.
Iron	Prolonged inhalation of iron oxide fumes can lead to siderosis, which presents as a benign pneumoconiosis.
Molybdenum	Repeated inhalation of fumes has caused kidney damage, respiratory irritation and liver damage in animals.
Nickel	Nickel is "reasonable anticipated to be a human carcinogen" National Toxicology Program's 10th Report). IARC states that nickel is possibly carcinogenic to humans. Epidemiological studies of workers exposed to nickel powder, dust and fumes in nickel producing industries do not indicate a significant respiratory cancer hazard. Inhalation of nickel powder produced malignant tumors in rodent studies. Single intratracheal installation of nickel powder at levels close to the LD_{50} has caused malignancies in hamsters. Can cause skin irritation in susceptible individuals through prolonged contact.
Niobium	No data available.

12. ECOLOGICAL INFORMATION

Welding processes can release fumes directly into the environment. Residues from welding consumables and processes could degrade and accumulate in soil and ground water.

13. DISPOSAL CONSIDERATIONS

Discard any product, residue, packaging, container or liner in an environmentally accepted manner in compliance with federal, state and local regulations. Packaging is Recyclable

14. TRANSPORTATION INFORMATION

No specific precautions are necessary for the transport of Nickel wires.

15. REGULATORY INFORMATION

This information applies to the wire as supplied.
SARA Section 313 Supplier Notification
The product covered by this MSDS may contain the following toxic chemicals subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-To-Know act of 1986 and of 40 DFR 372: Beryllium, Chromium, Copper, Manganese and Nickel. Refer to Section 3 of the MSDS for percentage of each element by weight and CAS number.

Risk Phrases: R40- Limited evidence of a carcinogenic effect.
R42/43: May cause sensitization BY INHALATION AND SKIN CONTACT.
R15- Contact with water liberates extremely flammable gases. R10- Flammable

Safety Phrases: S22- Do not breathe dust.
S24- Avoid contact with skin
S37- Wear suitable protective gloves

Product Use: Classification and labeling have been performed according to EU Directives 67/548/EEC and 1999/45/EC (including amendments) and the intended use.

Industrial Application: Used by welding

16. OTHER INFORMATION

Current Issue date: December 2014 **Previous Issue date:** September 2014

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 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”.

TSCA STATEMENT: All the components of these products are in compliance with the Toxic Substances Control Act (TSCA) and are either listed on the TSCA Inventory or are otherwise exempted from listing.

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.