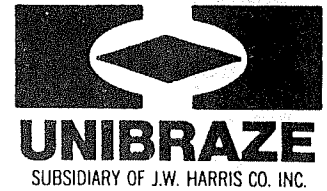




MATERIAL SAFETY DATA SHEET



STAINLESS STEEL BARE WELDING WIRE AND COATED WELDING ELECTRODES

SECTION 1 - MATERIAL IDENTIFICATION

Manufacturers Name J. W. Harris Co., Inc. Distributor Name (If Applicable) _____
 Address 10930 Deerfield Road
 Address Cincinnati, Ohio 45242
 Emergency Telephone (513) 891-2000
 MSDS Date November 1985

The following table lists the trade name and composition of products covered by this Material Safety Data Sheet. **See Section 2 and especially Section 6 for important health hazard data.**

Trade Name	Approximate Chemical Range, Bare Wire and Coated Electrode Core Wire								
	C	Cr	Ni	Mo	CbTa	Mn	Si	Cu	Fe
Bare Wire 307	0.04-0.14	19.5-22.0	8.0-10.7	0.5-1.5		3.3-4.75	0.30-0.65	0.75	Balance
Electrode 307-15, 307-16	0.04-0.14	18.0-11.5	9.0-10.7	0.5-1.5		3.3-4.75	0.90	0.75	Balance
Bare Wire 308, 308L, 308HiSiI, 308LHiSiI, 308H, 308MO, 308MOL	0.03-0.08	18.0-22.0	9.0-12.0	0.75-3.0		1.0-2.5	0.30-1.00	0.75	Balance
Electrode 308-15, 308-16, 308L-15, 308L-16 308H, 308MO, 308MOL	0.03-0.08	18.0-22.0	9.0-12.0	0.75-3.0		0.5-2.5	0.30-0.65	0.75	Balance
Bare Wire 309, 309L, 309HC, 309HiSiI, 309LHiSiI	0.03-0.12	23.0-25.0	12.0-14.0	0.75		1.0-2.5	0.30-1.00	0.75	Balance
Electrode 309-15, 309L-15, 309-16, 309L-16, 309CB-15, 309CB-16, 309MO-15, 309MO-16	0.03-0.12	23.0-25.0	12.0-14.0	0.75		1.0-2.5	0.30-0.65	0.75	Balance
Bare Wire 310, 310HC	0.08-0.45	25.0-28.0	20.0-22.5	0.75		1.0-2.5	0.30-0.65	0.75	Balance
Electrode 310-15, 310-16, 310CB-15, 310CB-16, 310MO-15, 310MO-16, 310-15HC	0.08-0.15	25.0-28.0	20.0-22.5	0.75		1.0-2.5	0.30-0.65	0.75	Balance
Bare Wire 312	0.15	28.0-32.0	8.0-10.5	0.75		1.0-2.5	0.30-0.65	0.75	Balance
Electrode 312-15, 312-16	0.15	28.0-32.0	8.0-10.5	0.75		1.0-2.5	0.30-0.65	0.75	Balance
Bare Wire 316, 316L, 316HiSiI, 316LHiSiI	0.03-0.08	18.0-20.0	11.0-14.0	2.0-4.0		1.0-2.5	0.30-1.00	0.75	Balance

Trade Name	Approximate Chemical Range, Bare Wire and Coated Electrode Core Wire								
	C	Cr	Ni	Mo	CbTa	Mn	Si	Cu	Fe
Electrode 316-15, 316L-15, 316-16, 316L-16	0.03-0.08	18.0-20.0	11.0-14.0	2.0-4.0		1.0-2.5	0.30-0.65	0.75	Balance
Bare Wire 317-317L	0.03-0.08	18.5-20.5	13.0-15.0	3.0-4.0		1.0-2.5	0.30-0.65	0.75	Balance
Electrode 317-15, 317-16, 317L-16	0.03-0.08	18.5-20.5	13.0-15.0	3.0-4.0		1.0-2.5	0.30-0.65	0.75	Balance
Bare Wire 318	0.08	18.0-20.0	11.0-14.0	2.0-3.0	1.0	1.0-2.5	0.30-0.65	0.75	Balance
Bare Wire 320 (20Cb-3), 320LR	0.025-0.07	19.0-21.0	32.0-36.0	2.0-3.0	1.0	1.5-2.5	0.15-0.60	3.0-4.0	Balance
Electrode 320CB-16, 320CB-15	0.025-0.07	19.0-21.0	32.0-36.0	2.0-3.0		1.5-2.5	0.15-0.60	3.0-4.0	Balance
Bare Wire 321A	0.08	18.5-20.0	9.0-10.5	0.75		1.0-2.5	0.30-0.65	0.75	Balance
Bare Wire 330	0.18-0.25	15.0-17.0	34.0-37.0	0.75		1.0-2.5	0.30-0.65	0.75	Balance
Electrode 330-15, 330-16	0.18-0.25	15.0-17.0	34.0-37.0	0.75		1.0-2.5	0.30-0.65	0.75	Balance
Bare Wire 347, 347HSil	0.08	19.0-21.5	9.0-11.0	0.75		1.0-2.5	0.30-1.00	0.75	Balance
Electrode 347-15, 347-16	0.08	19.0-21.5	9.0-11.0	0.75		1.0-2.5	0.30-0.65	0.75	Balance
Bare Wire 410, 410NiMo	0.06-0.12	11.0-13.5	0.6-5.0	0.4-0.75		0.6	0.50	0.75	Balance
Electrode 410-15, 410-16, 410NiMo-160.06-0.12	0.06-0.12	11.0-13.5	0.6-5.0	0.4-0.70		0.6	0.50	0.75	Balance
Bare Wire 420	0.25-0.40	12.0-14.0	0.6	0.75		0.6	0.50	0.75	Balance
Bare Wire 430	0.10	15.5-17.0	0.6	0.75		0.6	0.50	0.75	Balance
Electrode 430-15, 430-16	0.10	15.5-17.0	0.6	0.75		0.6	0.50	0.75	Balance
Bare Wire 502	0.10	4.6-6.0	0.6	0.45-0.65		0.6	0.50	0.75	Balance
Electrode 502-15, 502-16, 502-180.10	0.10	4.6-6.0	0.6	0.45-0.65		0.6	0.50	0.75	Balance
Bare Wire 505	0.10	8.0-10.5	0.5	0.8-1.2		0.6	0.50	0.75	Balance
Electrode 505-15, 505-15	0.10	8.0-10.5	0.40	0.85-1.2		1.0	0.90	0.75	Balance
Bare Wire 630 (17-4) PH	0.05	16.0-16.75	4.5-5.0	0.75	0.15-0.30	0.25-0.75	0.75	3.25-4.00	Balance
Electrode 630-15, 630-16	0.05	16.0-16.75	4.5-5.0	0.75	0.15-0.30	0.25-0.75	0.75	3.25-4.00	Balance
Bare Wire 26-1	0.01	25.0-27.5	B	0.75-1.50		0.40	0.40	0.20B	Balance
Bare Wire 16-8-2	0.10	14.5-16.5	7.5-9.5	1.0-2.0		1.0-2.5	0.30-0.65	0.75	Balance
Electrode 16-8-2	0.10	14.5-16.5	7.5-9.5	1.0-2.0		1.0-2.5	0.30-0.65	0.75	Balance

A = Ti - 1.0 max.

B = Nickel, max-0.5 minus the copper content

Single figures are maximum

SECTION 2 - HAZARDOUS MATERIALS

Welding electrode or wire is a nonhazardous solid at ambient temperature. Hazards (as defined by OSHA 29CFR 1910.1200) may result from fume generated during welding. Section 1 lists product designations and composition as manufactured. **IMPORTANT - See Section 6 for information on potential fume hazard resulting from use of the product.**

SECTION 3 - PHYSICAL DATA

Solid wire or rod. Rods are coated with flux for use with shielded metal arc (SMAW or stick) welding process.

SECTION 4 - FIRE AND EXPLOSION DATA

(Nonflammable) Welding arc, open flame and sparks can ignite combustibles, See ANSI/ASC Z49.1-1983 Section 6.

SECTION 5 - HEALTH HAZARD DATA - STAINLESS STEEL BARE WELDING WIRE AND COATED ELECTRODES

Possible Effects of Exposure - Short term exposure to welding fume may result in discomfort, dizziness, nausea, or dryness or irritation of the throat. Long term exposure to welding fume, gases or dust may contribute to pulmonary irritation or pneumoconiosis. Long term exposure to iron fume may produce siderosis, which is generally regarded as benign. Nickel and chromium should be considered possible carcinogens per OSHA 29CFR 1910.1200. Certain nickel compounds have been implicated based on experience in some nickel refining operations. The specific compounds, however, have not been determined and a direct association between nickel in welding fume and cancer has not been demonstrated. Some compounds of hexavalent chromium have been reported to be carcinogenic. No clear association, however, has been established between chromium in welding fume and the development of cancer. Exposure limits should be maintained below the levels listed in Section 6.

SECTION 6 - REACTIVITY DATA

Hazardous Decomposition Products

Welding and brazing fumes and gases cannot be classified simply. The composition and quantity of both are dependent upon the metal being brazed or welded, the process, procedures, and filler metals 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 welders and the volume of the work area, the quality and amount of ventilation, the position of the operator'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 filler metal is consumed, the fume and gas decomposition products generated are different in percent and form from the solid wire or rod ingredients listed in Section 1. Fume and gas decomposition products, and not the ingredients in the electrode or wire are important. The concentration of a given fume or gas component may decrease or increase by many times the original concentration in the electrode. Also, new compounds not in the electrode or wire may form. Decomposition products of normal operation include those originating from the base metal and coating, etc., as noted above.

Section 1 lists composition of the stainless steel wire or electrode. The chart below lists those constituents, defined as hazardous, which are likely to be present in the welding fume.

Element	Bare Wire or Core Wire		
	CAS#	PEL mg/m ³ (1)	TLV mg/m ³ (2)
Chromium (VI)	7440-47-3	0.1	0.05
Nickel (soluble)	7440-02-0	1.0	0.1
Molybdenum (soluble)	7439-98-7	5.0	5.0
Manganese	7439-96-5	5.0 (ceiling)	1.0 (fume)
Silicon (SiO ₂ , amorphous, respirable)	60676-76-86-0	Not Listed	5mg/m ³ respirable dust 10 mg/m ³ total dust
Copper (fume)	7440-50-8	0.1	0.2

Element	Flux Coating		
	CAS#	PEL	TLV
Titanium Dioxide	13463-76-7	15.0	10.0
Calcium Carbonate	1317-65-3	5.0 (CaO)	10.0
Calcium Fluoride	14542-23-5	2.5 (F)	2.5 (F)

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Cryolite	15096-52-3	2.5 (F)	2.5 (F)
Feldspar	68476-25-5	Not Listed	2.0
Chromium Oxide	1308-38-9	0.05 (CR VI)	0.05 (CR VI)
Potassium Silicate	1312-76-1	Not Listed	5.0
Sodium Silicate	1344-09-8	Not Listed	5.0
Potassium Hydroxide	1310-58-3	Not Listed	2.0

(1) Permissible exposure limit OSHA 29CFR 1910.1000 Subpart Z

(2) Threshold limit value American Conference of Government Industrial Hygenists

Gaseous reaction products such as carbon monoxide and carbon dioxide, ozone and nitrogen oxides may be formed by the radiation from the arc during electric arc welding.

One recommended way to determine the composition and quantity of fumes and gases to which workers are exposed is to take an air sample from 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, Florida 33135.

SECTION 7 - SPILL OR LEAK PROCEDURES

NOT APPLICABLE

SECTION 8 AND 9 - SPECIAL PROTECTION INFORMATION AND PRECAUTIONS

Read and understand the manufacturer's instructions and the precautionary label on the product. See American National Standard Z49.1, *Safety in Welding and Cutting* published by the American Welding Society, P.O. Box 351040, Miami, FL 33135 and OSHA Publication 2206 (29CFR1910), U.S. Government Printing Office, Washington, D.C. 20402 for more detail on many of the following.

Ventilation

Use enough ventilation, local exhaust at the arc (or flame), or both, to keep the fumes and gases below TLV's in the worker's breathing zone and the general area. Train the employee to keep his head out of the fumes. See ANSI/ASC Z49.1 Section 5.

Respiratory Protection

Use respirable fume respirator or air supplied respirator when welding, brazing, or soldering 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 of appropriate shade number (see ANSI/ASC Z49.1 - Section 4.2). Provide protection screens and flash goggles, if necessary, to shield others.

Protective Clothing

Wear head and body protection which help to prevent injury from radiation, sparks, flame, 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 substantial clothing. Train the employee not to touch live electrical parts and to insulate himself from work and ground.

The information and recommendations contained in this publication have been compiled from sources believed to be reliable and to represent the best information on the subject at the time of issue. No warranty, guarantee, or representation is made by Unibrazo Corp. or J.W. Harris Co., Inc. as to the absolute correctness or sufficiency of any representation contained in this and other publications; Unibrazo Corp. and J.W. Harris Co., Inc. assume no responsibility in connection therewith; nor can it be assumed that all acceptable safety measures are contained in this (and other publications), or that other or additional measures may not be required under particular or exceptional conditions or circumstances.



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