



# HSM Wire International, Inc

Ph: 330-244-8501 Fax: 330-244-8561

www.hsmwire.com

## 1. PREPARATION INFORMATION:

This MSDS prepared October 1988, revised June 2005 by the Laboratory.

## 2. HAZARDOUS INGREDIENTS:

IMPORTANT: This section covers the materials contained in the wire and is applicable to dust generated by mechanical cutting or grinding. The fumes generated during high temperature processes such as welding are covered in the reactivity section.

Ingredients	CAS No.	TLV*	PEL*
Aluminum (Al)	7429-90-5	10	15
Chromium (Cr)	7440-47-3	0.5	1
Copper (Cu)	7440-50-8	1	1
Iron (Fe)	1309-37-1	None	None
Manganese (Mn)	7439-96-5	0.02	5
Molybdenum (Mo)	7439-98-7	10	15
Nickel (Ni)	7440-02-0	1	1
Niobium (Nb)	3/1/7440	None	None
Silicon (Si)	7440-21-3	10	15
Titanium (Ti)	7440-32-6	None	None

\*TLV & PEL in mg/m<sup>3</sup>C = ceiling limit

## ALLOY AND COMPOSITION

Alloy*	Mn	Si	Cr	Ni	Mo	Fe	Other
S177	0.0-1.0		16.0-18.0	6.5-7.8	2.0-3.0	REM	Al 0.75-1.5
S216	7.5-9.0		17.5-22.0	5.0-7.0		REM	
S2209	0.5-2.0		21.5-23.5	7.0-9.0	2.5-3.5	REM	
S302, S302H	0.0-2.0		17.0-19.0	8.0-10.0		REM	
S302HQ	0.0-2.0		17.0-19.0	8.0-10.0		REM	Cu 3.0-4.0
S304, 304L, 304H	0.0-2.0		18.0-20.0	8.0-10.5		REM	
S305, S305HQ	0.0-2.0		17.0-19.0	10.5-13.0		REM	
S308, S308L, S308LSI		0.0-2.5		19.0-22.0	9.0-12.0		Cu 3.0-4.0
S309, S309L, S309LSI		0.0-2.5		22.0-25.0	12.0-15.0		Cu 3.0-4.0
S310, 310S	0.0-2.5		24.0-28.0	19.0-22.5		REM	
S312	0.0-2.5		28.0-32.0	8.0-10.5		REM	
S31254		0.0-2.0		19.5-20.5	17.5-18.5		Cu 3.0-4.0
S314	0.0-2.0	0.0-2.5	23.0-26.0	19.0-22.0		REM	
S316, S316L, S316LSI		0.0-2.5		16.0-20.0	10.0-14.0	2.0-3.0	Cu 3.0-4.0
S317, S317L	0.0-2.5		18.0-20.5	11.0-15.0	3.0-4.0	REM	
S321	0.0-2.0		17.0-19.0	9.0-12.0		REM	Ti 0.1-1.0
S347	0.0-2.5		17.0-21.5	9.0-12.0		REM	Nb+Ta 0.1-1.0
S34/19Cb	0.0-2.5	0.75-2.0	19.0-21.0	34.0-37.0		REM	Nb+Ta 0.75-1.5
S409			10.5-12.5	0.0-0.6		REM	Ti 0.1-1.0
S410, S410L			11.5-13.5	0.0-0.6		REM	
S420			12.0-14.0	0.0-0.6		REM	
S430			16.0-18.0	0.0-0.3		REM	
S434A			16.0-18.0	0.0-0.5		REM	Cu 0.75-1.25
S446	0.0-1.5		23.0-27.0	0.0-0.5		REM	

\*Welding grade limits included in each alloy.

\*TLV = Threshold Limit Value, American Conference of Governmental Industrial Hygienists.

\*PEL = Permissible Exposure Limit, OSHA (29CFR 1910.1000)



# HSM Wire International, Inc

Ph: 330-244-8501 Fax: 330-244-8561

www.hsmwire.com

### 3. PHYSICAL DATA:

Solid silver colored metal wire. S.G. = 7.8-8.0 g/cm<sup>3</sup>, M.P. = 1370-1540°C

### 4. FIRE AND EXPLOSION DATA:

Non-flammable, non-explosive, CAUTION: Welding arcs and sparks can ignite flammable gases and combustible liquids or solids.

### 5. REACTIVITY DATA:

High temperature cutting and welding produce hazardous fumes and gases. The constituents of the fume may include oxides and silicates of elements in the base metal, filler metal, and any coatings present. Gases are generated during welding by heat or reaction between ultraviolet radiation and air. The gases are dependent on the alloy being welded, the process, and electrodes used. The following decomposition products and exposure limits apply to brazing, welding, and high temperature work areas. Determine actual exposure by industrial hygiene monitoring.

Substance	TLV	PEL	Substance	TLV	PEL
Aluminum fume	5	5	Nickel (soluble)	0.1	1
Carbon monoxide	29	55	Nitrogen dioxide	5.6	9 ( c )
Chromium (chromates)	0.05	.1 ( c )	Ozone	0.20 ( c )	0.2 ( c )
Copper fume	0.2	0.1	Silica (amorphous)	10	80
Iron Oxide fume	5	10	Titanium oxide	10	15
Manganese	0.2	5 ( c )	Welding fume	5	5
Molybdenum (soluble)	5	5			

C = Ceiling limit

TLV & PEL in mg/m<sup>3</sup>

CAUTION: Explosive hydrogen gas is evolved from these alloys when they dissolve in acids.

### 6. TOXICOLOGICAL PROPERTIES:

**Routes of Entry:** Inhalation of dust and fume, eye or skin contact with dust or fume.

**Short Term Exposure:** Acute exposure may cause irritation of the eyes or skin. Inhalation may give a metallic taste, headache, nausea, chills, fever, irritation of the respiratory tract, cough.

**Long Term Exposure:** Chronic exposure may cause skin sensitization, asthma, bronchitis, lung fibrosis or pneumonias. It may also cause damage to the kidneys and liver as well as the nervous system. Chromates and soluble nickel compounds are human carcinogens.

### 7. PREVENTATIVE MEASURES:

**Eye protection and protective clothing:** Safety equipment when brazing, cutting, or welding should include nonflammable clothing, gloves, and glasses, goggles or face shields with appropriate lens shade.

**Respiratory Protection:** Necessary when exposure limits are exceeded. Use an air supplied respirator in confined spaces. Keep head out of the fumes. Use industrial hygiene air monitoring to ensure that TLV or PEL values are not exceeded.

**Waste Disposal:** Recycle or dispose according to local regulations.

### 8. FIRST AID MEASURES:

If dust or fumes gets into eyes, irrigate immediately. If irritation persists, seek medical attention. If contact with skin occurs, wash with soap and water. If a rash develops, seek medical attention. If person breathes in large amounts of dust and fume, remove from exposure. Seek medical help if respiratory irritation persists.

The information herein is given in good faith, but no warranty, express or implied is made and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes.