# Material Safety Data Sheet

**STAINLESS STEEL BARE WELDING WIRE**

## Section 1: Product Information

Supplier's Name
Weldtool Technologies Inc.

Address

2440 N Glassell Unit X
Orange, Ca 92865

Telephone Number

Refer to supplier
1-866-936-3354

Trade Name
WT Alloys

Chemical Formula:
N/A

Manufacturer's Name
Refer to supplier

Address

Telephone Number

Product Use
GMAW And GTAW of Stainless Steel

## Section 2: Hazardous Ingredients

**Electrode Type 1: Bare Wire 307**
**Electrode Type 2: Bare Wire 308,308L,308HiSil, 308LHiSil,308H,308MO,308MOL**
**Electrode Type 3: Bare Wire 309,309L,309HC,309HiSil, 309LHiSil**
**Electrode Type 4: Bare Wire 310,310HC**
**Electrode Type 5: Bare Wire 312**
**Electrode Type 6: Bare Wire 316,316L,316HiSil,316LHiSil**
**Electrode Type 7: Bare Wire 317,317L**
**Electrode Type 8: Bare Wire 318**
**Electrode Type 9: Bare Wire 320 (20Cb-3), 320LR**
**Electrode Type 10: Bare Wire 321A**



## Section 2: Hazardous Ingredients (continued)

**Electrode Type 11: Bare Wire 330**
**Electrode Type 12: Bare Wire 347, 347HiSil**

**Electrode Type 13: Bare Wire 410, 410NiMo**
**Electrode Type 14: Bare Wire 420**
**Electrode Type 15: Bare Wire 430**
**Electrode Type 16: Bare Wire 502**
**Electrode Type 17: Bare Wire 505**
**Electrode Type 18: Bare Wire 630(17-4) PH**
**Electrode Type 19: Bare Wire 16-8-2**

| | CAS # | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| C | 1317-65-3 | 0.04-0.14 | 0.03-0.08 | 0.03-0.12 | 0.08-0.45 | 0.15 | 0.30-0.08 | 0.03-0.08 | 0.08 |
| Cr | 7440-47-3 | 19.5-22.0 | 18.0-22.0 | 23.0-25.0 | 25.0-28.0 | 28.0-32.0 | 18.0-20.0 | 18.5-20.5 | 18.0-20.0 |
| Ni | 7440-02-0 | 8.00-10.7 | 9.00-12.0 | 12.0-14.0 | 20.0-22.50 | 8.0-10.5 | 11.0-14.0 | 13.0-15.0 | 11.0-14.0 |
| Mo | 7438-98-7 | 0.50-1.50 | 0.75-3.0 | 0.75 | 0.75 | 0.75 | 2.00-4.00 | 3.00-4.00 | 2.00-3.00 |
| Cb+Ta | N/A | -- | -- | -- | -- | -- | -- | -- | 1.00 |
| Mn | 7439-96-5 | 3.30-4.75 | 1.00-2.50 | 1.00-2.50 | 1.00-2.50 | 1.00-2.50 | 1.00-2.50 | 1.00-2.50 | .00-2.50 |
| Si | 7440-21-3 | 0.30-0.65 | 0.30-1.00 | 0.30-1.00 | 0.30-0.65 | 0.30-0.65 | 0.30-1.00 | 0.30-.65 | 0.30-0.65 |
| Cu | 7440-50-8 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |
| Fe | 7439-89-6 | Bal | Bal | Bal | Bal | Bal | Bal | Bal | Bal |

| | CAS # | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|
| C | 1317-65-3 | .025-0.07 | 0.08 | 0.18-0.25 | 0.08 | 0.06-0.12 | 0.25-0.40 | 0.10 | .10 |
| Cr | 7440-47-3 | 19.0-21.0 | 18.5-20.5 | 15.0-17.0 | 19.0-21.5 | 11.0-13.5 | 12.0-14.0 | 15.5-17.0 | 4.60-6.00 |
| Ni | 7440-02-0 | 32.0-36.0 | 9.00-10.5 | 34.0-37.0 | 9.00-11.0 | 0.60-5.00 | 0.60 | 0.60 | 0.60 |
| Mo | 7438-98-7 | 2.00-3.00 | 0.75 | 0.75 | 0.75 | 0.40-0.75 | 0.75 | 0.75 | 0.45-0.65 |
| Cb+Ta | N/A | 1.00 | -- | -- | 1.00 | -- | -- | -- | -- |
| Mn | 7439-96-5 | 1.50-2.50 | 1.00-2.50 | 1.00-2.5 | 1.00-2.50 | 0.60 | 0.60 | 0.60 | 0.60 |
| Si | 7440-21-3 | 0.15-0.60 | 0.30-0.65 | 0.30-0.65 | 0.30-1.00 | 0.50 | 0.50 | 0.50 | 0.50 |
| Cu | 7440-50-8 | 3.00-4.00 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |
| Fe | 7439-89-6 | Bal | Bal | Bal | Bal | Bal | Bal | Bal | Bal |

| | CAS # | 17 | 18 | 19 |
|---|---|---|---|---|
| C | 1317-65-3 | 0.10 | 0.05 | 0.10 |
| Cr | 7440-47-3 | 8.00-10.5 | 16.0-16.75 | 14.5-16.5 |
| Ni | 7440-02-0 | 0.50 | 4.50-5.00 | 7.50-9.50 |
| Mo | 7438-98-7 | 0.80-1.20 | 0.75 | 1.00-2.00 |
| Cb+Ta | N/A | -- | 0.15-30.0 | -- |
| Mn | 7439-96-5 | 0.60 | 0.25-0.75 | 1.00-2.50 |
| Si | 7440-21-3 | 0.50 | 0.75 | 0.30-0.65 |
| Cu | 7440-50-8 | 0.75 | 3.25-4.00 | 0.75 |
| Fe | 7439-89-6 | Bal | Bal | Bal |

**IMPORTANT**

**Welding electrodes are a non-hazardous solid at ambient temperatures. This section covers the materials from which these products are manufactured. The fumes and gases produced while welding during normal use of these products are covered in Sections 6 and 7.**



**<u>Core Wire</u>**

| Hazardous Ingredients | CAS # | OSHA PEL (mg/m3) | ACGIH TLV (mg/m3) |
|---|---|---|---|
| ***Chromium (VI)** | **7440-47-3** | **0.10** | **0.05** |
| ***Nickel (soluble)** | **7440-02-0** | **1.00** | **0.10** |
| ***Molybdenum (soluble)** | **7439-98-7** | **5.00** | **5.00** |
| **Manganese** | **7439-96-5** | **5.00(ceiling)** | **1.00(fume)** |
| **Silicon (SIO2 amphorous respirable)** | **60676-86-0** | **0.08** | **0.10** |
| **Copper (fume)** | **7440-50-8** | **0.10** | **0.20** |

*** Substance identified by other source as a suspected or confirmed human carcinogen.**

**Substances of Variable Composition**

| Hazardous Ingredients | CAS # | OSHA PEL (mg/m3) | ACGIH TLV (mg/m3) |
|---|---|---|---|
| **Welding Fume** | **NOC** | **----** | **5.00** |

## Section 3: Physical Data

| | |
|---|---|
| Physical State: **Solid** | Boiling Point: N/A |
| Odour and Appearance: Wire-grey-silver colour | Freezing Point: N/A |
| Odour Threshold (PPM): N/A | Solubility in Water: N/A |
| Specific Gravity: N/A | % Volatile (by Volume): N/A |
| Vapour Pressure (MM): N/A | pH: N/A |
| Vapour Density (Air =1): N/A | Coefficient of Water/Oil Distribution: N/A |
| Evaporation Rate: N/A | |

## Section 4: Fire or Explosion Hazard

Flammable: No
Means of Extinction: This alloy is non-combustible. Use extinguishing media appropriate to the surrounding fire.
Special Fire Fighting Procedures: If this material is reduced to powder form, caution must be used to prevent fire or explosion. To extinguish a metal powder fire, use dry sand, dry graphite or other class "D" fire extinguishing powder.
Unusual Fire and Explosion Hazard: no unusual fire or explosion hazards are associated with this material.
Flashpoint: None
Upper Flammable Limit (% by volume): None
Lower Flammable Limit (% by volume): None
Auto ignition temperature: N/A
Hazardous Combustion Products: N/A
Explosion data-sensitivity to mechanical impact: N/A
Explosion data-sensitivity to static discharge: N/A



## Section 5: Reactivity Data

Chemical Stability: Yes
Incompatibility to other substances: Yes
If so, which ones? Avoid contact with mineral acids and oxidizing agents that may generate hydrogen gas; the evolution of hydrogen may be an explosion hazard.
Reactivity under what conditions? N/A
Hazardous decomposition products: Various elemental metals and metal oxides may be generated from melting or gross handling operations. Refer to Section 2 for permissible exposure limits.

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 filler metal being 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, galvanizing, etc.), the number of welders and the volume of the work area, the quality and amount of the ventilation, the 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 vapours from cleaning and degreasing activities).

When the filler metal is consumed, the fume and gas produced are different in percent and form from the ingredients listed in the section Hazardous Ingredients. Fume and gas decomposition and not the ingredients in the electrode are important. The concentration of a given fume or gas component may decrease or increase by many times the original concentration in the electrodes. Also, new compounds not in the electrodes may form. Decomposition products of normal operation include those originating from the volatilization reaction, or oxidation of the materials shown in the section Hazardous Ingredients, plus those from the base metal and coating, etc.

One recommended way to determine the composition and quantity of fumes and gases 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", also F1.3 "Evaluating Contaminants in the Welding Environment-A Sampling Strategy Guide", which gives additional advice on sampling).

Most welding, even with primitive ventilation, does not produce exposures inside the welding helmet above 5 mg/m3. That which does should be controlled.

## Section 6: Toxicological Information

Welding generates fumes, gases and electromagnetic radiation with known adverse health effects. The composition of welding emissions varies substantially with the welding process.

Possible effects of exposure: Short-term exposure to welding fumes may result in discomfort, dizziness, nausea and dryness or irritation of the throat. Long-term exposure to welding fumes, 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.



## Section 6: Toxicological Information (continued)

Nickel and chromium should be considered possible carcinogens per OSHA 29 CFR 1910.1200. Certain nickel compounds have been implicated based on some 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 hexvalent 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 levels listed in Section 2.

Route of Entry: Inhalation of fume

Pre-existing Medical Conditions: Individuals with impaired pulmonary function or illness may have symptoms exacerbated by irritants contained in welding fumes.

| | | | |
|---|---|---|---|
| Exposure Limits | **5 mg/M3** | Reproductive Toxicity | N/A |
| Irritancy of Material | N/A | Teratogenicity | N/A |
| Sensitization to Material | N/A | Mutagenicity | N/A |
| Carcinogenicity | See above | Toxicologically synergistic products | N/A |

**Section 7: Preventive Measures**

Personal Protective Equipment:

Respiratory Protection: Use respirable fume respirator or air supplied respirator when welding, brazing or soldering in confined space or where local ventilation does not keep exposure below PEL's, TLV's or STEL's.

Eye Protection: Wear helmet or use face shield with filter lens of appropriate shade number (see ANSI/ASC Z49.1, Section 4.2) Provide protective 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. Welders should not wear short sleeves, short pants or cut-offs.

Engineering Controls: Use enough ventilation, local exhaust at the arc (or flame), or both to keep the fumes and gases below PEL's, TLV's or STEL'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.



**Section 7: Preventive Measures (continued)**

Leak or Spill Procedure: N/A

Handling Procedures and Equipment: Avoid breathing welding fumes. Wear full protective equipment during welding.

Waste Disposal: Prevent waste from contaminating surrounding environment. Discard any product, residue, disposable container or liner in an environmentally acceptable manner, in full compliance with local, provincial and federal regulations.

Storage Requirements: N/A

Special Shipping Information: N/A

**Section 8: First Aid Measures**

Remove from dust or fume exposure. If breathing has stopped, perform artificial respiration. Summon medical aid immediately.

**Section 9: Preparation Information**

Prepared by: Weldtool Tech Inc.

Date Prepared: January 1, 2012

Note: 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 (29CFR 1910), U.S. Government Printing Office, Washington D.C. 20402 for more detailed information.

Note: For other precautions or additional safety information on welding and cutting, see American Standard Z49.1-1980, Safety In Welding and Cutting, and the Welding Handbook, Volume 1, Chapter 9, Safe Practices in Welding and Cutting, both available from the American Welding Society, Inc. 550 N.W. Lejeune Road, P.O. Box 351040, Miami, FL 33135, Telephone Number (305) 443-9353

The manufacturer believes this data to be accurate and to reflect qualified expert opinion regarding current research. However, the manufacturer cannot make any express or implied warranty as to this information

**References:**

**Air Contaminants - Permissible Exposure Limits**
Title 29 Code of Federal Regulations Part 1910.1000

**Threshold Limit Values and Biological Exposure Indices for 1989-1990 Second Printing**
American Conference of Governmental Industrial Hygienist

**Code of Federal Regulation**
Parts 1900 to 1910 Revised July 1, 1988

**Operator□s Manual for Oxyfuel Gas Cutting**
ANSI/AWS C4.2-90 An American National Standard

**Effects of Welding on Health - VI**
Prepared for: Safety and Health Committee of the American Welding Society

**OSHA: Employee Workplace Rights**
U.S. Dept. Of Labor, OSHA 3021 Revised

**Respiratory Protection**
U.S. Dept. Of Labor, OSHA 3079 Revised 1988

**Modern Welding**
Copyright 1988