



RICOMED MANUFACTURING

737 Ocean View  
Pt Roberts, WA 98281T 360-945-1599  
F 2534840812  
twolter@ricomed.com

October, 2012

# MATERIAL SAFETY DATA SHEET

## Stainles Steel 301, 303, 304 316

### Section I - Ingredients

Material/Component	CAS Number	% Weight	Exposure Limits	
			OSHA PEL (mg/m <sup>3</sup> )	ACGIH TLV (mg/m <sup>3</sup> )
Base Metal				
Iron (Fe)	7439-89-6	39-81	10 (Fe <sub>2</sub> O <sub>3</sub> Fume)	5 (Fe <sub>2</sub> O <sub>3</sub> Fume)
Alloying Elements				
Carbon (C)	7440-44-0	0.5 max	None Listed	None Listed
Manganese (Mn)	7439-96-5	10.0 max	5.0 as Mn	1.0 as Mn
Phosphorous (P)	7723-14-0	0.001-0.2	0.1 as P	0.1 as P
Sulfur (S)	7704-34-9	0.001-0.35	13 (Sulfur Dioxide)	5 (Sulfur Dioxide)
Silicon (Si)	7440-21-3	2.0 max	None Listed	None Listed
Chromium (Cr)	7440-47-3	10-27	1.0 as Cr	0.5 as Cr
Nickel (Ni)	7440-02-0	0-22	1.0 as Ni	1.0 as Ni
Selenium (Se)	7782-49-2	0-0.35	0.2 as Se	0.2 as Se
Columbium (Cb)	7440-03-1			
Tantalum (Ta)	7440-25-7	10 x C % W <sub>1</sub>	5.0 as Ta	5.0 as Ta
Copper (Cu)	7440-50-8	0.04-4	0.2 as Cu	0.2 as Cu
Molybdenum (Mo)	7439-98-7	0-4	5.0 Soluble Compds	5.0 Soluble Compds
Aluminum (Al)	7429-90-5	0-2	None Listed	5.0 as Welded Fumes
Titanium (Ti)	7440-32-6	0.70 max	15 (Ti O <sub>2</sub> )	10 as Total Dust

NOTE: The above listing is a summary of elements used to alloy stainless steel. Various grades of steel will contain different combinations of these elements. Trace elements may also be present in minute amounts.

### Section II - Physical Data

**Material** (at normal conditions): Solid

**Appearance and Odor:** Gray-Black with Metallic Lustre – Odorless

**Acidity / Alkalinity:** ph = NA

**Melting Point:** 2700°F

**Boiling Point:** NA

**Specific Gravity** (H<sub>2</sub>O=1): Approx 8

**Solubility in water** (% by weight): NA

**Vapor Pressure:** NA

### **Section III - Personal Protective Equipment**

---

#### **Respiratory Protection**

NIOSH approved dust/mist/fume respirator should be used during welding or burning if OSHA PEL or TLV is exceeded.

#### **Hands, Arms and Body**

Use appropriate clothing such as welders aprons & gloves when welding or burning. Check local codes.

#### **Eyes and Face**

Safety glasses should always be worn when grinding or cutting; face shields should be worn when welding or burning.

#### **Other Clothing and Equipment**

As required for protection depending on the operation and safety codes.

### **Section IV - Emergency Medical Procedures**

---

#### **Inhalation**

Remove to fresh air; if condition continues, consult physician.

#### **Eye Contact**

Immediately flush well with running water to remove particulate; get medical attention.

#### **Skin Contact**

If irritation develops, remove clothing and wash well with soap and water. If condition persists, seek medical attention.

#### **Ingestion**

If significant amounts of metal are ingested, seek medical attention.

### **Section V - Health/Safety Information**

---

#### **HEALTH**

Steel products in the natural state do not present an inhalation, ingestion, or contact health hazard. However, operations such as welding, burning, sawing, brazing, grinding, and possibly machining, which results in elevating the temperature of the product to or above its melting point or results in the generation of airborne particulates may present hazards. The above operations should be performed in well ventilated areas. The major exposure hazard is inhalation.

#### **Effects of overexposure are as follows:**

**Acute:** Excessive inhalation of all metallic fumes and dusts may result in irritation of eyes, nose and throat. Also high concentrations of fumes and ducts of

iron-oxide, manganese, copper & selenium may result in metal fume fever. Typical symptoms consist of a metallic taste in the mouth, dryness and irritation of the throat, chills and fever, and usually last from 12 to 48 hours.

**Chronic:** Chronic and prolonged inhalation of high concentrations of fumes or dust of the following elements may lead to the conditions listed opposite the elements:

*Iron (iron-oxide):* Pulmonary effects, siderosis

*Manganese:* Bronchitis, pneumonitis, lack of coordination, central nervous system.

*Chromium:* Various forms of dermatitis, inflammation and/or ulceration of upper respiratory tract, and possibly cancer of nasal passages and lungs. Based on available information, there does not appear to be any evidence that exposure to welding fume induces human cancer.

*Nickel:* SAME AS CHROMIUM

*Selenium:* Nasal and bronchial irritation, gastro-intestinal disturbances, garlic odor of breath.

*Copper:* Pulmonary effects, nasal and paranasal sinus, skin and liver.

*Vanadium:* May affect lungs. May affect blood pressure as vanadium pentoxide.

*Cobalt:* Inhalation of cobalt dust may cause an asthma-like disease with cough and dyspnea.

*Molybdenum:* Pain in joints, hands, knees and feet.

Medical conditions generally aggravated by exposure would be dermatitis and pulmonary disease or disorders.

**Occupational Exposure Limits: See Ingredients (Section I)**

Chromium and Nickel have been identified by the International Agency for Research on Cancer (IARC) and the National Toxicology Program (NTP) as potential carcinogens.

**FIRE AND EXPLOSION**

**Flash Point:** NA

**Auto Ignition Temperature:** NA

**Extinguishing Method:** NA

**Extinguishing Method Not to be used:** NA

**Fire and Explosion Hazards:** Steel products in their natural state do not present a fire or explosion hazard.

**Flammable Units in Air:**

Lower: NA

Upper: NA

**REACTIVITY**

**Stability:** Stable

**Incompatibility (Materials to Avoid):** Stable under normal conditions to use, storage and transport. Reacts with strong acids to form hydrogen gas. At temperatures above melting point, metallic oxide fumes may be liberated.

**Conditions to Avoid:** Non-ventilated areas when cutting, welding, burning or brazing; avoid generation of airborne dust and fumes.

**Keep Area Well Ventilated**

**Hazardous Decomposition Products:** Metallic oxides

## **Section VI - Environmental**

---

### **Spill or Leak procedures**

*Special Precautions:* NA - Use good housekeeping practices to prevent accumulation of dust and to keep airborne dust to a minimum, Avoid breathing metal fumes or dust.

*Waste Disposal Method:* Dust, etc. - follow federal, state, and local regulations regarding disposal.

## **Section VII - Additional Information**

---

The information in this MSDS was obtained from sources which we believe are reliable. However, the information is provided without any representation or warranty, express or implied regarding the accuracy or correctness. The conditions or methods of handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of the product.