

MATERIAL SAFETY DATA SHEET

STAINLESS STEEL

Hohmann & Barnard, Inc.
30 Rasons Court
Hauppauge, NY 11788
February 2013

PRODUCT NAME: Stainless Steel
Types: 304,316
Manufacturer's Name: Hohmann & Barnard, Inc.
631-234-0600

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Section I - Ingredients

Material/Component	CAS Number	% Weight		Exposure Limits	
		TYPE 304	TYPE 316	OSHA PEL (mg/m3)	ACGIH TLV (mg/m3)
Alloying Elements					
Carbon (C)	7440-44-0	0.08 max	0.08 max	None Listed	None Listed
Manganese (Mn)	7439-96-5	2.0 max	2.0 max	5.0 as Mn	1.0 as Mn
Phosphorous (P)	7723-14-0	0.045 max	0.045 max	0.1 as P	0.1 as P
Sulfur (S)	7704-34-9	0.030 max	0.030 max	13 (Sulfur Dioxide)	5 (Sulfur Dioxide)
Silicon (Si)	7440-21-3	2.0 max	0.75 max	None Listed	None Listed
Chromium (Cr)	7440-47-3	18.0-20.0	18.0-20.0	1.0 as Cr	0.5 as Cr
Nickel (Ni)	7440-02-0	8.0-12.0	8.0-12.0	1.0 as Ni 1.0 as Ni	
Molybdenum (Mo)	7439-98-7	0.0	2.0-3.0	5.0 Sol. Cmpds	5.0 Sol. Cmpds
Nitrogen (N)	7727-37-9	0.10 max	0.10 max	None Listed	Simple Asphyxiant
Base Metal					
Iron (Fe)	7439-89-6	Balance	Balance	(Fe ₂ O ₃ Fume)	5 (Fe ₂ O ₃ Fume)

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

Density: TYPE 304: 0.29 lbs/in³, 8.03 g/cm³ TYPE 316: 0.29 lbs/in³, 7.99 g/cm³

Electrical Resistivity: microhm-in (microhm-cm) 68°F (20°C) – 28.4 (72)

Specific Heat: BTU/lb/°F (kJ/kg•K) 32 - 212°F (0 - 100°C) – 0.12 (0.50)

Thermal Conductivity: BTU/hr/ft²/ft/°F (W/m•K)
at 212°F (100°C) – 9.4 (16.2)
at 932°F (500°C) – 12.4 (21.4)

Mean Coefficient of Thermal Expansion: in/in/°F (µm/m•K)

TYPE 304

32- 212°F (0 - 100°C) – 9.4 x 10⁻⁶ (16.9)
32- 600°F (0 - 315°C) – 9.6 x 10⁻⁶ (17.3)
32-1000°F (0 - 538°C) – 10.2 x 10⁻⁶ (18.4)
32-1200°F (0 - 649°C) – 10.4 x 10⁻⁶ (18.7)

TYPE 316

32- 212°F (0 - 100°C) – 9.4 x 10⁻⁶ (16.0)
32- 600°F (0 - 315°C) – 9.6 x 10⁻⁶ (16.2)
32-1000°F (0 - 538°C) – 10.2 x 10⁻⁶ (17.5)
32-1200°F (0 - 649°C) – 10.4 x 10⁻⁶ (18.5)

Modulus of Elasticity: ksi (MPa)

28.0 x 10³ (193 x 10³) in tension
11.2 x 10³ (78 x 10³) in torsion

Melting Range: °F (°C) TYPE 304: 2550 - 2650 (1399 - 1454) TYPE 316: 2500 - 2550 (1371 - 1399)

Boiling Point: NA

Specific Gravity: (H₂O=1) Approx. 8

Solubility in water: (% by weight) NA

Vapor Pressure: NA

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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

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.

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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**

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