THE STEEL SUPPLY COMPANY

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MATERIAL SAFETY DATA SHEET

Stainless Steels in AISI/SAE Grades 300 and 400 Series, Special Alloys

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I. INGREDIENTS

			Exposure Limits	
Material or Component	CAS Number	% Weight	OSHA PEL (mg/m3)	ACGIH TLV (mg/m3)
Base Metal				
Iron (Fe)	1309-37-1	38.0-86.5	10 Oxide Fume	5 Oxide Fume
Alloying Elements				
Aluminum (Al)	7429-90-5	<.01-0.5	15 Dust	10 Dust/5 Fume
Carbon (C)	7440-44-0	<.03-2.0	Not Estab.	3.5 AS Carbon Black
Chromium (Cr)	7440-47-3	<10-27	1.0 Chrome Metal	0.5 Chrome Metal
Cobalt (Co)	7440-48-4	<.01-.75	0.1 Cobalt Metal	0.05 Cobalt Fume
Copper (Cu)	7440-50-8	<.18-4.5	0.1 Fume/1.0 Dust	0.2 Fume/1.0 Dust
Manganese (Mn)	7439-96-5	<2-10	5c Dust/5c Fume	5c Dust/1 Fume
Molybdenum (Mo)	7438-98-7	<.04-5	15 Insol. Compounds	10 Insol. Compounds
Nickel (Ni)	7440-02-0	<.12-34	1 Nickel Metal	1 Nickel Metal
Phosphorous (P)	7723-14-0	<.01-.06	0.1 Phosphorous	0.1 Phosphorous
Selenium (Se)	7782-49-2	<.01-0.3	0.2 Se Metal	0.2 Se Metal
Silicon (Si)	7440-21-3	<.15-2.0	15 Dust	10 Total Dust
Sulfur (S)	7704-34-9	<.01-.06	13 Sulfur Dioxide	5 Sulfur Dioxide
Titanium (Ti)	7440-32-6	<.01-0.70	15 Ti Dioxide	10 Ti Dioxide
Columbium (Cb)	7440-03-1	<.01-1.10	Not Established	Not Established
Tantalum (Ta)	7440-25-7	<.01-1.10	5.0 Ta Metal	5.0 Ta Metal

NOTE: The above listing is a summary of elements used in alloying stainless steels. Various grades of steel will contain different combinations of these elements. Trace elements may also be present in minute amounts. No permissible exposure limits (PEL) or thresholds limit values (TLV) exist for stainless steel. Values shown are applicable to component elements.

II. PHYSICAL DATA

Material is (At Normal Conditions) SOLID
Appearance and odor is Silver-Grey and Odorless
% Volatile by Volume is N/A
Vapor Density is N/A
Vapor Pressure (mm Hg at 20 degrees C) is N/A
Specific Gravity (Water =1) Approx. 8
Solubility in water (% by weight) is N/A
Boiling point degrees F is N/A
Melting point degrees F is approximately 2400-2800
Acidity/Alkalinity pH=N/A

III. PERSONAL PROTECTIVE EQUIPMENT

RESPIRATORY PROTECTION. Appropriate dust/mist/fume respirator should be used to avoid excessive inhalation of particulate. If exposure limits are reached or exceeded, use NIOSH approved equipment.

EYES AND FACE. Safety glasses should be worn when grinding, filing or cutting. Face shield should be worn when filing, cutting or welding.

HANDS, ARMS AND BODY. Protective gloves should be worn as required for welding or handling operations.

OTHER CLOTHING AND EQUIPMENT. As required depending on operations and safety codes.

IV. EMERGENCY MEDICAL PROCEDURES

INHALATION:	Remove to fresh air; if condition continues, consult a physician.
INGESTION:	If significant amounts of metal are ingested, consult physician.
EYE CONTACT:	Flush thoroughly with running water to remove particulate; obtain medical attention.
SKIN CONTACT:	Remove particles by washing thoroughly with soap and water. Seek medical attention if condition persists.

V. HEALTH AND SAFETY INFORMATION

HEALTH: Stainless steel products in their solid state present no inhalation, ingestion, or contact health hazard. Operations such as welding, sawing, brazing, grinding, and machining, which result in elevating the temperature of the product to, or above its melting point, or result in the generation of airborne particulate may present hazards. The major exposure hazard is inhalation. Effects of overexposure to fume and dust are as follows:

ACUTE: Excessive inhalation of metallic fumes and dust may result in irritation of eyes, nose and throat. High concentrations of fumes and dust of iron oxide, manganese, copper, zinc and lead may result in material fume fever. Typical symptoms last from 12 to 48 hours and consist of a metallic taste in the mouth, dryness and irritation of the throat, chills and fever.

CHRONIC. Chronic and prolonged inhalation of high concentrations of fumes or dust of the following elements may lead to the condition listed:

Aluminum: Irritation of the eyes, throat and nose.
Chromium: Lesions of the skin and mucous membranes, possibly cancer of the nose or lungs-bronchogenic carcinoma.
Cobalt: Respiratory tract irritation, skin rash.
Copper: Irritation of the eyes, nose and throat, metal fume fever.
Iron: Pulmonary effects, siderosis.
Manganese: Bronchitis, pneumonitis, and lack of coordination.
Molybdenum: Respiratory tract irritation, possible liver and kidney damage, bone deformity.
Nickel: Lesions of the skin and mucous membranes, possibly cancer of the nose or lungs-bronchogenic carcinoma.
Phosphorous: Necrosis of the mandible.
Selenium: Nasal and bronchial irritation, gastrointestinal disturbances, and garlic breath odor.
Sulfur: (As sulfur dioxide) Edema of the lungs.
Titanium: No chronic debilitating symptoms indicated.
Columbium/Titanium: No chronic debilitating symptoms indicated.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: any fume or airborne particulate matter exposure may, adversely affect Individuals with chronic respiratory disorders such as asthma, emphysema, etc..

OCCUPATIONAL EXPOSURE LIMITS: See products ingredients in Section I. Chromium and Nickel have been identified by the International Agency for Research on Cancer (IARC) and/or the National Toxicology Program (NTP) as potential cancer causing agents.

FIRE AND EXPLOSION DATA:
Flash Point degrees F is N/A
Auto Ignition Temperature is N/A
Flammable Limits in Air on Upper and Lower is N/A %
Extinguishing Media: Does not present fire or explosion hazards under normal conditions. Use dry powders or sand on molten metal. Do not use water on molten metal or fires caused by fine metal particles.
Fire and Explosion Hazards: Stainless steel products do not present fire or explosion hazards under normal conditions. Fine metal particles as produced in grinding, machining or sawing can burn. High concentrations of metallic fines in the air may present an explosion hazard.

REACTIVITY: Stability: Stainless steel products are classified as Stable. Reacts with strong acids to form hydrogen gas.

Conditions to Avoid: Stainless steel products at temperatures above the melting point may liberate fumes containing oxides of iron and alloying elements.
Hazardous Decomposition Products: Metallic dust or fumes may be possibly be produced during machining, grinding and welding. Refer to ANSI Z49.1

VI. ENVIRONMENTAL

SPILL OR LEAK PROCEDURES: Fine turnings and small chips should be swept or vacuumed. Recycle scrap for re-use in the manufacturing process.

WATER DISPOSAL METHOD: Disposing agent must comply with Federal, State and Local disposal or discharge laws.

VII. ADDITIONAL INFORMATION

In welding, exercise caution when operations result in airborne contaminants, which may originate from components of the welding rod. Arc or spark generated when welding could be a source of ignition for combustion and flammable materials.