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MATERIAL SAFETY DATA SHEET

TRADE NAME (Common Name Or Synonym)
STAINLESS STEELS

CHEMICAL NAME
AISI/SAE Grades 300 Series, 400 Series, Special Alloys

I. INGREDIENTS

Material Or Component	CAS Number	% Weight	8 Hour TWA OSHA PEL (mg/m^3) EXPOSURE LIMITS		8 Hour TWA ACGIH TLV (mg/m^3)		NTP Listed	IARC Listed
			Dust	Fume	Dust	Fume		
Base Metal								
Iron (Fe)	7439-89-6	38.0-86.5	-	10	-	5	No	No
Alloying Elements								
Aluminum (Al)	7429-90-5	0.1-0.5	15	-	10	5	No	No
Carbon (C)	7440-44-0	.10-1.5	NA	NA	3.5	-	No	No
Chromium (Cr)	7440-47-3	10-27	1.0	-	-	5	Yes	Yes
Cobalt (Co)	7440-48-4	.01-.75	.1	-	-	.05	No	No
Columbium (Cb)	7440-03-1	.01-1.10	NA	NA	NA	NA	No	No
Copper (Cu)	7440-50-8	.18-4.5	1.0	.1	1.0	.2	Yes	No
Manganese (Mn)	7439-96-5	2-10	5	5	5	1	No	No
Molybdenum (Mo)	7439-98-7	.04-5	15	-	15	-	No	No
Nickel (Ni)	7440-02-0	12-34	1	-	1	-	Yes	Yes
Phosphorous (P)	7723-14-0	.01-.06	.1	-	.1	-	No	No
Selenium (Se)	7782-49-2	.01-0.3	.2	-	.2	-	No	No
Silicon (Si)	7440-21-3	.15-2.0	15	-	10	-	No	No
Sulfur (S)	7704-34-9	.01-.06	-	15	-	5	No	No
Tantalum (Ta)	7440-25-7	.01-1.10	5.0	-	5.0	-	No	No
Titanium (Ti)	7440-32-6	.01-0.70	-	15	-	10	No	No

NOTE: The above listing is a summary of elements used in alloying steel. 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 steel. Values shown are applicable to component elements.

II. PHYSICAL DATA

MATERIAL IS (At Normal Conditions)	APPEARANCE AND ODOR	% VOLATILE BY VOLUME	VAPOR DENSITY
( ) LIQUID (X) SOLID ( ) GAS ( ) OTHER	GREY-BLACK, ODORLESS	N/A	N/A

ACIDITY/ALKALINITY	Melting Point Approx. 2400-2800°F	Specific Gravity (H^20 = 1) Approx. 8	VAPOR PRESSURE (MM Hg AT 20°C)
pH = N/A	Boiling Point N/A °F	Solubility in water N/A	N/A

III. PERSONAL PROTECTIVE EQUIPMENT

RESPIRATORY PROTECTION. Appropriate dust/mist/fume respirator should be used to avoid excessive inhalation of particulates. If exposure limits are reached or exceeded, use NIOSH approved equipment.	HANDS, ARMS AND BODY. Protective gloves should be worn as required for welding, burning or handling operations.
EYES AND FACE. Safety glasses should be worn when grinding or cutting. Face shields should be worn when welding or cutting or burning.	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.
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.
INGESTION: If significant amounts of metal are ingested, consult physician.

V. HEALTH/SAFETY INFORMATION

HEALTH

Stainless steel products in their solid state present no inhalation, ingestion, or contact health hazard. Operations such as burning, 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 particulates may present hazards. The major exposure hazard is inhalation. Effects or 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 metal 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 conditions listed opposite the element:

Aluminum: Irritation of the eyes, nose and throat
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: Siderosis, pulmonary effects.
Manganese: Bronchitis, pneumonitis, 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, garlic breath odor
Sulfur: (As sulfur dioxide) Edema of the lungs
Titanium: No chronic debilitating symptoms indicated
Columbium/Tantalum: No chronic debilitating symptoms indicated

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Individuals with chronic respiratory disorders (i.e.:asthma, chronic bronchitis, emphysema, etc.) may be adversely affected by any fume or airborne particulate matter exposure.

OCCUPATIONAL EXPOSURE LIMITS: See Product Ingredients 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 & EXPLOSION

FLASH POINT	AUTO IGNITION TEMPERATURE	FLAMMABLE LIMITS IN AIR	EXTINGUISHING MEDIA
N/A °F	N/A	Lower N/A Upper N/A	Does not present fire or explosion hazards under normal conditions. Use dry powder or sand on molten metal.

FIRE AND EXPLOSION HAZARDS
Stainless products do not present fire or explosion hazards under normal conditions. Fine metal particles such as produced in grinding or sawing can burn. High concentrations of metallic fines in the air may present an explosion hazard.

EXTINGUISHING MEDIA
Do not use water on molten metal or fires caused by fine metal particles.

REACTIVITY

STABILITY	INCOMPATIBILITY (MATERIALS TO AVOID)
(X) Stable ( ) Unstable	Reacts with strong acids to form hydrogen gas.

CONDITIONS TO AVOID: Stainless steel at temperatures above the melting point may liberate fume containing oxides of iron and alloying elements.

HAZARDOUS DECOMPOSITION PRODUCTS:
Metallic Dust or fumes may be produced during welding, burning grinding and possible machining. Refer to ANSI Z49.1.

VI. ENVIRONMENTAL

SPILL OR LEAK PROCEDURES
Fine turnings and small chips should be swept or vacuumed. Scrap metal can be reclaimed for re-use.

WASTE DISPOSAL METHOD*
Used or unused product should be disposed of in accordance with Federal, State or Local Laws and Regulations.
*Disposer must comply with Federal, State and Local disposal or discharge laws.

VII.ADDITIONAL INFORMATION

In welding, precautions should be taken for airborne contaminates which may originate from components of the welding rod.

Arc or spark generated when welding or burning could be a source of ignition for combustion and flammable materials.

DISCLAIMER

The information in this MSDS was obtained from sources which we believe are reliable, however, the information is provided without any representation or warranty, expressed 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.