Developers and Manufacturers of Hydraulic Flanges & Components

MATERIAL SAFETY DATA SHEET

TRADE NAME	CHEMICAL NAME	FORM
STAINLESS STEEL	EXAMPLES: 304, 304L, 316, 316L	HYDRAULIC COMPONENTS

DATE ISSUED	REVISION DATE
11-21-85	1-1-11

I. INGREDIENTS

MAT'L OR COMPONENT	CAS NO.	% WEIGHT	EXPOSURE LIMITS	
			OSHA PEL (mg/m^3)	ACGIH TLV (mg/m^3)
Base Metal				
Iron (Fe)	7439-89-6	Balance	10.0 as fume	5.0
Alloying Elements				
Carbon (C)	7440-44-0	0.5 Max	None Listed	None Listed
Chromium (Cr)	7440-47-3	10 - 27	1.0	0.5
Copper (Cu)	7440-50-8	0.04 - 0.4	1.0 as dust; 0.1 as fume	1.0 as dust; 0.2 as fume
Selenium (Se)	7782-49-2	0 - 0.35	0.2 as Selenium	0.2 as Selenium
Manganese (Mn)	7439-96-5	10.0 Max	5.0	0.2
Molybdenum (Mo)	7439-98-7	0 - 4	15 as insoluble compds	10 as insoluble compds
Nickel (Ni)	7440-02-0	0 - 22	1.0	1.5
Phosphorous (P)	7723-14-0	0.001 - 0.2	0.1	0.1
Silicon (Si)	7440-21-3	2.0 Max	15.0 as dust; 5.0 as fume	10.0
Sulfur (S)	7704-34-9	0.001 - 0.35	13.0 as Sulfur Dioxide	5.0 as Sulfur Dioxide
Tantalum (Ta)	7440-25-7	10 x C% Wt	5.0	5.0
Aluminum (Al)	7429-90-5	0 - 2	15.0 as dust; 5.0 as fume	10.0 as dust; 5.0 as fume
Titanium (Ti)	7440-32-6	0.70 Max	None Listed	None Listed

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

II. PHYSICAL DATA

MATERIAL IS (AT NORMAL CONDITIONS):	APPERANCE AND ODOR
SOLID	GRAY-BLACK WITH METALLIC LUSTRE - ODORLESS

ACIDITY/ALKALINITY	MELTING POINT	BOILING POINT	SPECIFIC GRAVITY ($H_2O = 1$)	SOLUBILITY IN WATER	VAPOR PRESSURE
ph = NA	2700^0 F (approx)	NA	7	NA	NA

III. PERSONAL PROTECTIVE EQUIPMENT

RESPIRATORY PROTECTION	HAND, ARMS AND BODY
NIOSH approved dust/mist/fume respirator should be used during welding or burning if OSHA PEL or TVL is exceeded.	Use appropriate protective clothing such as welders aprons & gloves when welding or burning. Check local codes.
EYES AND FACE	**OTHER CLOTHING AND EQUIPMENT**
Safety glasses should always be worn when grinding or cutting; face shields should be worn when welding or burning.	As required

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.

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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 dusts 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 element:

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

Auto Ignition Temperature	*Flammable Limits in Air*	*Extinguishing Media*
	Lower NA %	
Flash Point NA Deg F NA Deg F	Upper NA %	Dry powder or sand

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

Extinguishing Media Not to be Used
NA

REACTIVITY

Stability
_x_ Stable ___ Unstable

Incompatibility (Materials to Avoid)
Stable under normal conditions of 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
KEEP AREA WELL VENTILATED
Non-ventilated areas when cutting, welding, burning, or brazing; avoid generation of airborne dusts and fumes.

Hazardous Decomposition Products
Metallic oxides.

VI. ENVIRONMENTAL

Spill or leak procedures
NA

Special Precautions: 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.

VII. ADDITIONAL INFORMATION

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