Modesto Steel	Identification
P. O. Box 5036, 1424 Emerald Avenue	STLS
Modesto, CA 95352	
Stainless Steel	Date Issued:
Bar. Sheet, Plate	

# I. INGREDIENTS

Material or Component	CAS Number	% Weight		Exposure Limits
Base Metal			OSHA PEL (mg/m3)	ACGIH TLV (mg/m3)
Iron (Fe)	7439-89-6	39-81	10 (Fe <sub>2</sub> O <sub>3</sub> Fume)	5.0 (Fe <sub>2</sub> O <sub>3</sub> Fume)
Alloying Elements				
Carbon ©	7440-44-0	0.5 Max	None Listed	None Listed
Manganese (Mn)	7439-96-5	10.0 Max	5.0 as Manganese	1.0 as Manganese
Phosphorous (P)	7723-14-0	0.001 - 0.2	0.1 as Phosphorous	0.1 as Phosphorous
Sulfur (S)	7704-34-9	0.001 - 0.35 Max	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 Chromium	0.5 as Chromium
Nickel (Ni)	7440-02-0	0 - 22	1.0 as Nickel	1.0 as Nickel
Selenium (Se)	7782-49-2	0 - 0.35	0.2 as Selenium 0.2 as Selenium	
Columbium (Cb)	7440-03-1	10 x C % Wt	5.0 as Tantalum	5.0 as Tantalum
Tantalum (Ta)	7440-25-7	10 x C % Wt	5.0 as Tantalum	5.0 as Tantalum
Copper (Cu)	7440-50-8	0.04 - 4	0.2 as Copper	0.2 as Copper
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 welding fumes
Titanium (Ti)	7440-32-6	0.70 Max	15 as Ti O2	10 as total dust

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 quantities

## II. PHYSICAL DATA

Material is (At Normal conditions):				Appearance and Odor	
O Liquid	O Solid	O Gas	O Other	Gray-Black wi	th Metalic Lustre - Odorless
Acidity/Alkalinity		Approx.			Vapor Pressure
	Melting Point	2700°F	Specific Gravity (H2O = 1)	- Approx 8	(mm Hg at 20°C)
ph = NA	Boiling Point	NA °F	Solubility in water (% by w	eight) - NA	NA

# III. PERSONAL PROTECTIVE EQUIPMENT

Respiratory Protection	Hands, Arms, and Body
NIOSH approved dust/mist/fume respirator should be used during	Use appropriate protective clothing such as welders aprons
welding or burning if OSHA PEL or TLV is exceeded.	& 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	As required.
shields should be worn when welding or burning.	

Inhalation:	Remove to fresh air; if condition continues, consult physician.
Eye Contact:	Immediately flush well with running water to remove particulate; get medical attentior
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.

### **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:

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.

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.

Vanadium - No reported cases of exposure to vanadium.

Cobalt - Inhalation of cobalt dust may cause an asthma-like disease with cough and dyspnea. Molybdenum - Pain in joints, hands and feet.

Occupational Exposure Limits
See Section: 1

### FIRE AND EXPLOSION

		Auto Ignition Temperature		Flammable Limi	ts in Air		Extinguising Media
				Lower	NA	%	
Flash Point NA	°F	NA	°F	Upper	NA	%	NA
Fire and Explosion Hazard	ls			Extinguishing M	edia Not t	o be Used	•
		NONE					NA

### REACTIVITY

Stability	Incompatibility (Materials to Avoid)		
O Stable O Unstable	Reacts with strong acids to form hydrogen gas.		
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	Special Precautions: Use good housekeeping practices to prevent accumulation of dust and to			
NA	A keep airborne dust to a minimum.			
Waste Disposal Method				
Dust, etc follow federal, state, and local regulations regarding disposal.				

## VII. ADDITIONAL INFORMATION

#### Disclaimer

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Modesto Steel	Identification
P. O. Box 5036, 1424 Emerald Avenue	AL
Modesto, CA 95352	
Aluminum Alloys	Date Issued:
Bar, Sheet, Plate, Tubular	

## I. INGREDIENTS

Material or Component	CAS Number	% Weight	Ехро	sure Limits
Base Metal			1984-85 ACGIH TLV(mg/m <sub>3</sub> )	OSHA 1910.1000 PEL (mg/m <sub>3</sub> )
Aluminum (Al)	7429-90-5	90-99.7	10.0 as metal dust and oxide	Not Established
Alloying Elements			5.0 as welding fume	Not Established
Cobalt (Co)	7440-48-4	< 1.0 - 10.00	0.1	0.1
Copper (Cu)	7440-50-8	< 1.0 - 10.00	0.2 as fume	0.1 as fume
Iron ( Fe)	1309-37-1	< 1.0 - 10.00	5.0 as fume	10.0 as fume
Lead (Pb)	7439-92-1	< 0.2 - 0.7	0.15 as dust and fume	0.05 as dust and fume
Magnesium (Mg)	1309-48-4	< 1.0 - 10.00	10.0 as fume	15.0 as fume
Manganese (Mn)	7439-96-5	< 1.0 - 10.00	1.0 as fume	5.0 ceiling
Silicon (Si)	7440-21-3	< 1.0 - 10.00	10.0 as total dust	Not Established
Tin (Sn)	7440-31-5	< 1.0 - 10.00	2.0 as oxide and metal	2.0 as inorgainc compounds
Zinc (Zn)	1314-13-2	< 1.0 - 10.00	5.0 as fume	5.0 as fume

Note: Aluminum alloys will be comprised of various combinations of the elements shown here. In addition, other alloying elements may be present in minute quantities.

## II. PHYSICAL DATA

Material is (At Normal conditions):				Appearance and Odor	
O Liquid	O Solid	O Gas O	Other	Metallic Appea	arance - No odor
Acidity/Alkalinity		Approx.			Vapor Pressure
	Melting Point	900-1200°F	Specific Gravity (H2O = 1	) - 2.5 - 2.9	(mm Hg at 20°C)
ph = NA	<b>Boiling Point</b>	NA °F	Solubility in water (% by v	veight) - Nil	NA

# III. PERSONAL PROTECTIVE EQUIPMENT

Respiratory Protection	Hands, Arms, and Body
Appropriate respirator depending upon potential airborne comtaminants and	Appropriate gloves, especially for sheet and coil.
their concentrations. If exposure limits are reached or exceeded use NIOSH	
approved respiration equipment.	
Eyes and Face	Other Clothing and Equipment
Safety glasses or shield as appropriate.	As needed depending on operation and safety codes.

Eye Contact: Flush with water thoroughly. Get medical attent	tion if irritation persists.
Skin Contact: Remove particles thoroughly by washing with so	ap and water.

## HEALTH

For standard operations (e.g.,melting, cutting, grinding), aluminum alloys present a low health risk inhalation and are usually considered a nuisance dust. Toxicity by ingestion - non expected. Sking and eyes - not an irritant. Welding and plasma cutting of alloys high in copper (2000 and 7000 series) may present the potential for overexposure to copper fume which can result in upper respiratory tract irritation, nausea, and metal fume fever. Nickel and chrromium are other alloying elements considered hazardous as as fume; however, they do not present carcinogenic or other health concerns due to their low concentrations of the chemical form in which they are present. Overexposure to lead fumes over an extended period of time can result in such toxic effects as central nervous system disturbances, renal changes, peripheral neuropathy, gastriointestinal disturbances, anemia, and chromosomal changes.

Occupational Exposure Limits

See Section: 1

## FIRE AND EXPLOSION

		Auto Ignition Temperature	I	Flammable Limits i	n Air		Extinguising Media
				Lower	NA	%	
Flash Point NA	°F	NA	°F	Upper	NA	%	Dry powder of sand
Fire and Explosion Hazards			-				Extinguishing Media Not to be Used
spontaneously heat v	vith lik de on	nd dust may ignite readily. Damp Alu peration of hydrogen to form explosiv contact with water or certain metal c	e air mix	ctures. Molte	n		Do not use water of halogen on dust fires.

## REACTIVITY

Stability		Incompatibility (Materials to Avoid)
O Stable	O Unstable	Reacts with strong acids to form hydrogen gas.

Conditions to Avoid

Aluminum products under normal conditions are stable during use, storage, and transportation. Halogen acids and sodium hydroxide in contact with aluminum may generate explosive mixtures of hydrogen. Finely divided aluminum, such as small chips and fines, will form explosive mixtures in the air. It will also form explosive mixtures in air in the presence of bromates, iodates, or ammonium nitrate. Strong oxidizers cause violent reactions with considerable heat generation.

Hazardous Decomposition Products

See Additional Information Section VII.

#### VI. ENVIRONMENTAL

Spill or Leak Procedures

NA Waste Disposal Method

Used or unused product should be tested to determine hazard status and disposal requirement under federal, state, or local laws and regulations.

#### VII. ADDITIONAL INFORMATION

#### Other precautions:

- 1. Do not touch cast aluminum metal or heated aluminum product without knowing metal temperature. Aluminum experiences no color change during heating. Burns could result.
- 2. Aluminum powder must be packaged and shipped as a flammable solid.
- 3. Hard alloy ingots in the 2000 and 7000 Series must be stress relieved to prevent explosion when sawed.
- 4. The welding of aluminum alloys may generate carbon monooxide, carbon dioxide, ozone, nitrogen oxides, infrared radiation and ultraviolet radiation.

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Modesto Steel	Identification
P. O. Box 5036, 1424 Emerald Avenue	C Alloy & Tool
Modesto, CA 95352	
Carbon, Alloy and Tool Steels	Date Issued:
Bar, Sheets, Plate, Struct, Tubular	

## I. INGREDIENTS

Material or Component	CAS Number	% Weight	Exposure Limits			
Base Metal			OSHA PEL (mg/m3)	ACGIH TLV (mg/m3)		
Iron (Fe)	7439-89-6	Balance	10 (Fe <sub>2</sub> O <sub>3</sub> Fume)	5.0 (Fe <sub>2</sub> O <sub>3</sub> Fume)		
Alloying Elements						
Aluminum (Al)	7429-90-5	0.10 - 1.8	None Listed	5.0 as welding fume		
Carbon ©	7440-44-0	0.01 - 1.5	None Listed	None Listed		
Chromium (Cr)	7440-47-3	0.01 - 12	1.0 as chrome	0.5 as chrome		
Cobalt (Co)	7440-48-4	8 Max	0.1 as cobalt and fume	0.05 as fume		
Copper (Cu)	7440-50-8	0.04 - 0.7	0.2 as copper; 1.0 as dust	0.2 as fume; 1.0 as dust		
Lead (Pb)	7439-92-1	0.15 - 0.35	0.05 as fume & dust	0.15 as dust and fume		
Manganese (Mn)	7439-96-5	0.05 - 2.0	5 as manganese	5 as dust; 1 as fume		
Molybdenum (Mo)	7439-98-7	0.01 - 1.10	15 as insoluble compds	10 as insoluble compds		
Nickel (Ni)	7440-02-0	0.01 - 10	1.0 as Nickel	1.0 as Nickel		
Phosphorous (P)	7723-14-0	0.15 Max	0.1 as Phosphorous	0.1 as Phosphorous		
Silicon (Si)	7440-21-3	0.15 - 2.20	None Listed	10 total dust		
Sulfur (S)	7704-34-9	0.001 - 0.35	13 sulfur dioxide	5 sulfur dioxide		
Tungsten (W)	7440-33-7	0 - 18	None Listed	5 insoluble compds		
Vanadium (V)	7440-62-2	0.01 - 1.0	0.5 dust; 0.1 fume	0.05 dust and fume		
Zinc (Zn) Coating	1314-13-2	10 Max	5.0 as fume	5.0 as fume		

Note: The above listing is a summary of elements used to alloying steel. Various grades of steel will contain different combinations of these elements. Trace elements may also be present in minute quantities.

## II. PHYSICAL DATA

Material is (At Normal conditions):			/	Appearance and Odor	
O Liquid	O Solid	O Gas	O Other	Gray-Black with Met	alic Lustre - Odorless
Acidity/Alkalinity		Approx.		Vapo	or Pressure
	Melting Point	2750°F	Specific Gravity (H2O = 1) - 7	(mı	m Hg at 20°C)
ph = NA	<b>Boiling Point</b>	NA °F	Solubility in water (% by weig	ht) - NA	NA

## III. PERSONAL PROTECTIVE EQUIPMENT

Resultatory Protection	Use appropriate clothing such as welders aprons &
welding or burning if OSHA PEL or TLV is exceeded.	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	As required.
shields should be worn when welding or burning.	

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.

#### 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, zinc & lead 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.

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

Copper - Pulmonary effects.

Vanadium - No reported cases of exposure to vanadium.

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

Molybdenum - Pain in joints, hands, knees and feet.

Tungsten - Some evidence of pulmonary involvement such as cough.

Lead - Prolonged exposures can cause behavioral changes, kidney damage, periphery neuropathy characterized by decreased hand-grip strength and adverse reproductive effects.

Zinc - None Reported

Occupational Exposure Limits

See Section: 1

#### FIRE AND EXPLOSION

		Auto Ignition Temperature		Flammable Lim	nits in Air		Extinguising Media
				Lower	NA	%	
Flash Point NA	°F	NA	°F	Upper	NA	%	NA
Fire and Explosion Hazard	s			Extinguishing N	Media Not t	o be Use	ed
		NONE				N	Α

#### REACTIVITY

Stability Incompatibility (Materials to Avoid)

Stable O Unstable Reacts with strong acids to form hydrogen gas.

Conditions to Avoid Keep Area Well Ventilated

Non-ventilated areas when cutting, welding, burning, or brazing; avoid generation of airborne dusts and fumes.

Non-ventilated areas when cutting, weiging, burning, or brazing, avoid generation or an borne dusts and runnes

Hazardous Decomposition Products

Metallic Oxides.

## VI. ENVIRONMENTAL

Spill or Leak Procedures

Special Precautions: Use good housekeeping practices to prevent accumulation of dust and to

NA keep airborne dust to a minimum.

Waste Disposal Method

Dust, etc. - follow federal, state, and local regulations regarding disposal.

#### VII. ADDITIONAL INFORMATION

#### Disclaime

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.

Modesto Steel	Identification
P. O. Box 5036, 1424 Emerald Avenue	Brass
Modesto, CA 95352	
Brass/Bronze Rods	Date Issued:
Copper Alloys	

# I. INGREDIENTS

Material or Component	CAS Number	% Range	Exposure Limits		
Base Metal			OSHA PEL (mg/m3)	ACGIH TLV (mg/m3)	
Copper (Cu)	7440-50-8	45-91	10 (Fe <sub>2</sub> O <sub>3</sub> Fume)	5.0 (Fe <sub>2</sub> O <sub>3</sub> Fume)	
Alloying Elements					
Zinc (Zn) Coating	7440-66-6	0-43	None Listed	5.0 as welding fume	
Aluminum (Al)	7429-90-5	0-8	None Listed	None Listed	
Iron (Fe)	7439-89-6	0-6	1.0 as chrome	0.5 as chrome	
Lead (Pb)	7439-92-1	0-4.5	0.1 as cobalt and fume	0.05 as fume	
Manganese (Mn)	7439-96-5	0-5	0.2 as copper; 1.0 as dust	0.2 as fume; 1.0 as dust	
Nickel (Ni)	7440-02-0	0-12.0	0.05 as fume & dust	0.15 as dust and fume	
Phosphorous (P)	7723-14-0	0-0.5	5 as manganese	5 as dust; 1 as fume	
Silicon (Si)	7440-21-3	0-4.5	15 as insoluble compds	10 as insoluble compds	
Tin (Sn)	7440-31-5	0-4.5	1.0 as Nickel	1.0 as Nickel	

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 quantities.

## II. PHYSICAL DATA

e - Odorless
e
NA
_

## III. PERSONAL PROTECTIVE EQUIPMENT

Respiratory Protection	Hands, Arms, and Body
NIOSH approved dust/mist/fume respirator should be used during	Use appropriate clothing such as welders aprons &
welding or burning if OSHA PEL or TLV is exceeded.	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	As required.
shields should be worn when welding or burning.	

Inhalation:	Remove from exposure to dust or fume if present. Seek medical help if required.
Eye Contact:	Flush with water for at least 15 minutes. Seek medical help if required.
Skin Contact:	Wash thoroughly with soap and water
Ingestion:	Ingestion of significant amount of copper alloy are unlikely. Seek medical help if large quantities of product
	are ingested.

#### **HEALTH**

Under normal handling conditions the solid alloy presents no significant health hazards. Processing of the alloy by dust of fume producing operations (grinding, buffing, forgings, etc.) may result in the potential for exposure to airborne meta particulates or fume. The exposure levels in Section II are relevant to fumes and dusts.

Chronic exposure to copper, zinc, lead and manganese may cause metal fume fever. Symptoms of metal fume include fever, fatigue, dryness of throat, head and body ache, fever and chill. Overexposure to copper and lead may result in skir and hair discoloration. Chronic exposure may effect the central nervous system leading to emotional disturbances, gait and balance difficulties and paralysis.

Nickel and lead have been identified as potential cancer causing agents.

The product will not irritate the skin or eyes

Occupational Exposure Limits
See Section: 1

### FIRE AND EXPLOSION

		Auto Ignition Temperature Flammable Limits		nits in Air		Extinguising Media	
				Upper	NA	%	
Flash Point NA	°F	NA	°F	Lower	NA	%	NA
Fire and Explosion Hazard	ds			Extinguishing I	Media Not	to be Us	ed
		NONE					NA

## REACTIVITY

Stability			Incompatibility (Materials to Avoid)
	O Stable	O Unstable	Reacts with strong acids to form hydrogen gas.
Conditions to	o 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

Product in a non-hazardous solid. No special precautions are required for spills of bulk material. Scrap metal can be reclaimed for reuse. Follow Federal, State, and local regulations regarding disposal.

Waste Disposal Method

Dust, etc. - follow federal, state, and local regulations regarding disposal.

## VII. ADDITIONAL INFORMATION

#### Disclaimer

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