The Marwin Company, Inc.
P.O. Box 9126
Columbia, SC 29290
803-776-2396

MATERIAL SAFETY DATA SHEET

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Trade Name:	Emergency Phone Number:
Carbon and High Strength Low Alloy Steels	(803) 776-2396
Chemical Name:	**Issue Date:**
Steel	February 28, 2006
Form:	**Identification Number:**
Sheet and Plate	Carbon and Alloy

I. INGREDIENTS

Material or Component	CAS Number	% of Weight	Exposure limits	
Base Metal			OSHA PEL (mg/m ^{3})	ACGIH TLV (mg/m ^{3})
Iron (Fe)	7439-89-6	Balance	10 (FE_2O_3 Fume)	5.0 (FE_2O_3 Fume)
Alloying Elements				
Aluminum (Al)	7429-90-5	0.01 - 0.25 %	None Listed	5.0 as welding fume
Carbon (C)	7440-44-0	0.001 – 1.5 %	None Listed	None Listed
Chromium (Cr)	7440-47-3	0.01 – 1.1 %	0.1 as chrome	0.5 as chrome
Cobalt (Co)	7440-48-4	0.05 % Max.	0.1 as chrome and fume	0.05 as fume
Copper (Cu)	7440-50-8	0.01 – 0.20 %	0.2 as copper; 1.0 as dust	0.2 as fume; 1.0 as dust
Lead (Pb)	7439-92-1	> 0.10 %	0.05 as fume & dust	0.15 as dust and fume
Manganese (Mn)	7439-96-5	0.01 – 2.0 %	5 as manganese	5 as dust; 1 as fume
Molybdenum (Mo)	7439-98-7	0.01 – 0.25 %	15 as insoluble compds.	10 as insoluble compds
Nickel (Ni)	7440-02-0	0.01 – 1.0 %	1.0 as Nickel	1.0 as Nickel
Phosphorous (P)	7723-14-0	0.001 – 0.15 %	0.1 as Phosporous	0.1 as Phosporous
Silicon (Si)	7440-21-3	0.01 – 1.0 %	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	0.001 – 0.05 %	None Listed	5 insoluble compds.
Vanadium (V)	7440-62-2	0.01 – 0.25 %	0.5 dust; 0.1 fume	0.05 dust and fume
Zinc (Zn) coating	7440-66-6	5 % Max.	5.0 as fume	5.0 as fume

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.

II. PHYSICAL DATA

Material is (At Normal Conditions):				Appearance and Odor:		
☐ Liquid	☒ Solid	☐ Gas	☐ Other	Gray–Black with Metallic Lustre - Odorless		
Acidity/Alkalinity:					Vapor Pressure (mm Hg at 20°C):	
pH = N/A	Melting Point: Approx. 2750°F Boiling Point: N/A			Specific Gravity (H_2O = 1) – 7 Solubility in Water – N/A	N/A	

III. PERSONAL PROTECTIVE EQUIPMENT

Respiratory Protection:	Hands, Arms, and Body:
NIOSH approved dust/mist/fume respirator should be used during welding or burning if OSHA PEL or TLV is exceeded.	Use appropriate protective clothing such as welders aprons & gloves when welding and 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 result 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 preformed in well ventilated areas. The major exposure hazard is inhalation.

Effects of overexposure are as follows:

Acute: Excessive inhalation of 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 I.

FIRE AND EXPLOSION

Flash Point:	Auto ignition temperature:	Flammable limits in air:	Extinguishing Media:
N/A	N/A	Lower: N/A Upper: N/A	N/A

Fire and Explosion hazards:	Extinguishing Media NOT to be used:
None	N/A

REACTIVITY

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

Conditions to Avoid:

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:

N/A Special Precautions: Use good housekeeping practices to prevent accumulation of dust and to keep airborne dust to a minimum.

Waste Disposal Method:

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