

MATERIAL SAFETY DATA SHEET

GALVANIZED CARBON AND HIGH STRENGTH - LOW ALLOY STEEL (HOT DIPPED)

California Steel Industries, Inc.
14000 San Bernardino Avenue
Fontana, California 92335

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

TELEPHONE NUMBERS

Emergency: 1-909-350-6300
General Information: 1-909-350-6332

TRADE NAME

Galvanized Carbon and High Strength - Low Alloy Steel (Hot Dipped)

CHEMICAL NAME & SYNONYMS

Galvanized Steel

CAS NUMBER

65997-19-5

CHEMICAL FAMILY

Steel Alloy

OTHER NAMES

None

2. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS No.	% by Wt	Exposure Guidelines					Listed Carcinogen ¹
			ACGIH		OSHA		Unit	
			TWA	STEL	TWA	STEL		
<u>Base metal & Residuals</u>								
Iron	1309-37-1	> 97	5 (oxide fume)	NA	10 (ox. fume)	NA	mg/M ³	no
Manganese	7439-96-5	0.15-1.10	0.2	NA	1	3	mg/M ³	no
					5 (ceiling)	NA	mg/M ³	
Silicon	7440-21-3	0.35 max	10 (total dust)	NA	10 (tot. dust)	NA	mg/M ³	no
Carbon	7440-44-0	0.30 max	10 (total dust)	NA	--	NA	mg/M ³	no
Copper	7440-50-8	0.35 max	0.2 (fume)	NA	0.1 (fume)	NA	mg/M ³	no
			1 (dust)	NA	1 (dust)	NA	mg/M ³	
Nickel ²	7440-02-0	0.10 max	0.05	NA	1 (insoluble)	NA	mg/M ³	yes
Chromium ²	7440-47-3	0.10 max	0.5 (insol.)	NA	1 (metal)	NA	mg/M ³	yes
			0.01 (Cr VI)	NA	--	--	--	yes
Aluminum	7429-90-5	0.08 max	5 (fume)	NA	5 (fume)	NA	mg/M ³	no
			10 (dust)	NA	15 (dust)	NA	mg/M ³	
Molybdenum	7439-98-7	0.05 max	10 (insol.)	NA	10 (dust)	NA	mg/M ³	no
Columbium	7440-03-1	0.05 max	--	NA	--	NA	--	
Sulfur	7704-34-9	0.025 max	10 (total dust)	NA	--	NA	mg/M ³	no
Phosphorus	7723-14-0	0.025 max	0.1	NA	0.1	NA	mg/M ³	no
Tin	7440-31-5	0.020 max	2	NA	2	NA	mg/M ³	no
Nitrogen	7727-37-9	0.012 max	--	NA	--	NA	--	no
Vanadium	7440-62-2	0.08 max	0.05 (oxide)	NA	0.05 (oxide)	NA	mg/M ³	no

¹NTP, IARC or OSHA-listed

²Nickel and hexavalent chromium are listed carcinogens under California Proposition 65.

Components	CAS No.	% by Wt	Exposure Guidelines					Listed Carcinogen ¹
			ACGIH		OSHA		Unit	
			TWA	STEL	TWA	STEL		
<u>Coating Materials</u> Zinc ²	7440-66-6	> 99	5 (oxide fume) 10 (ox. dust)	10 NA	5 (oxide fume) 10 (ox. dust)	10 NA	mg/M ³ mg/M ³	no
Aluminum	7429-90-5	0.20-0.50	5 (fume) 10 (dust)	NA NA	5 (fume) 15 (dust)	NA NA	mg/M ³ mg/M ³	no
Lead ^{2,3}	7439-92-1	0.03-0.04	0.05	NA	0.05	NA	mg/M ³	no

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

WARNING!

WELDING, GRINDING, BURNING AND CUTTING MAY CAUSE DUST AND/OR FUMES TO BE RELEASED. INHALATION OF DUST OR FUMES MAY BE HARMFUL.

MAY BE IRRITATING TO THE EYES, SKIN, AND RESPIRATORY SYSTEM.

Potential Health Effects

Note: Steel products, under normal conditions, do not present an inhalation, ingestion or skin hazard. However, operations such as welding, grinding, sawing, and burning, which may cause airborne particulate or fume formation may present a health hazard.

INHALATION

Dust may cause irritation of the nose, throat, and lungs by mechanical abrasion. Prolonged or repeated inhalation of fumes may cause metal fume fever, an influenza-like illness. It is characterized by a sweet or metallic taste in the mouth, accompanied by dryness and irritation of the throat, cough, shortness of breath, pulmonary edema, general malaise, weakness, fatigue, muscle and joint pains, blurred vision, fever and chills.

EYE CONTACT

Dust or particulates may cause mechanical irritation including pain, tearing, and redness. Particulates may cause a red-brown pigmentation of the eye following repeated exposure. Fumes may be irritating.

SKIN CONTACT

Dust or particulates may cause irritation due to abrasion. Particulates may cause a red-brown pigmentation of the skin following repeated exposure. Contact with heated material may cause thermal burns.

SKIN ABSORPTION

Not expected to occur.

INGESTION

Not expected to be acutely toxic via ingestion based on the physical and chemical properties of the product.

¹NTP, IARC or OSHA-listed

²Not detectable in final product

³Lead is a listed reproductive toxin under California Proposition 65.

3. HAZARDS IDENTIFICATION (Continued)

CHRONIC EFFECTS/CARCINOGENICITY

Overexposure to specific components of this material that are generated in dusts or fumes may cause adverse effects to the following organs or systems: central nervous system, respiratory system, liver, and kidney.

Contains components that are listed carcinogens or reproductive toxins.

Welding fumes have been associated with adverse health effects.

See section 11 for additional information.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE

Pre-existing medical conditions which may be aggravated by exposure to dusts and fumes include disorders of the respiratory system including asthma, bronchitis, and emphysema. Long-term inhalation exposure to pneumoconiotic agents may act synergistically with inhalation of oxide fumes or dusts of this product.

4. FIRST AID MEASURES

INHALATION

In case of overexposure to dusts or fumes, remove to fresh air. If not breathing, give artificial respiration or give oxygen by trained personnel. Get immediate medical attention.

EYE CONTACT

In case of overexposure to dusts or fumes, immediately flush eyes with plenty of water for at least 15 minutes occasionally lifting the eye lids. Get immediate medical attention.

SKIN CONTACT

If thermal burn occurs, flush area with cold water. Get immediate medical attention.

In case of overexposure to dusts or particulates, wash with soap and plenty of water. Get medical attention if irritation develops or persists.

INGESTION

Not considered an ingestion hazard. However, if dust or particulates are swallowed, treat symptomatically and supportively. Get medical attention.

NOTES TO PHYSICIAN

Inhalation of metal fume or metal oxides may produce an acute febrile state, with cough, chills, weakness, and general malaise, nausea, vomiting, muscle cramps, and remarkable leukocytosis. Treatment is symptomatic, and condition is self limited in 24-36 hours. Chronic exposure may result in pneumoconiosis of mixed type.

5. FIRE FIGHTING MEASURES

FLASH POINT (METHOD)

Not applicable.

FLAMMABLE LIMITS (% VOLUME IN AIR)

Not applicable.

AUTOIGNITION TEMPERATURE

Not applicable.

EXTINGUISHING MEDIA

For fires involving powder or dust, use dry chemicals, sand, earth, water spray or regular foam.

SPECIAL FIRE FIGHTING PROCEDURES

Avoid breathing fumes

UNUSUAL FIRE OR EXPLOSION HAZARDS

Does not burn or support combustion in the solid state. However, dust powder or fumes are flammable or explosive when exposed to heat or flames.

6. ACCIDENTAL RELEASE MEASURES

PRECAUTIONS IF MATERIAL IS SPILLED OR RELEASED

Not applicable to steel in solid state. For dust or powder, keep away from sources of ignition. Use proper protective equipment and sweep or shovel into appropriate disposable, clean dry containers.

WASTE DISPOSAL METHODS

Dispose in accordance with Federal, State, and Local regulations.

7. HANDLING AND STORAGE

STORAGE TEMPERATURE

Stable under normal temperatures and pressures.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Store away from strong oxidizers. Dusts or powders may form explosive mixtures with air. Avoid breathing dusts or fumes.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Operations with the potential for generating high concentrations of airborne particulates or fumes should be evaluated and controlled as necessary.

RESPIRATORY PROTECTION

NIOSH/MSHA approved dust and fume respirator should be used if exposure limits are exceeded.

EYE PROTECTION

Use safety glasses. Dust resistant safety goggles are recommended under circumstances where particles could cause mechanical injury. Goggles and face shield to be used in welding.

SKIN

Appropriate protective gloves if dust or fume is generated.

VENTILATION

Provide general and/or local exhaust ventilation to control airborne levels of dust or fumes below exposure guidelines.

EXPOSURE GUIDELINES

Not established for product as a whole. See Section 2 for component materials.

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE AND ODOR

Odorless, metallic gray solid.

BOILING POINT

Not applicable.

PH

Not applicable.

MELTING POINT

2750 °F

SPECIFIC GRAVITY

7.85

VAPOR PRESSURE

Not applicable.

VAPOR DENSITY (AIR = 1)

Not applicable.

9. PHYSICAL AND CHEMICAL PROPERTIES (continued)

SOLUBILITY IN WATER

Insoluble.

EVAPORATION RATE (BUTYL ACETATE = 1)

Not applicable.

OTHER PHYSICAL AND CHEMICAL DATA

None.

10. STABILITY AND REACTIVITY

STABILITY

Stable.

CONDITIONS TO AVOID

Storage near strong oxidizers.

HAZARDOUS POLYMERIZATION

Will not occur.

INCOMPATIBILITY (MATERIALS TO AVOID)

Strong oxidizers.

HAZARDOUS DECOMPOSITION PRODUCTS

Thermal decomposition may release hazardous metal fumes.

11. TOXICOLOGICAL INFORMATION

Ingestion overexposures to iron may affect the gastrointestinal, nervous, and hematopoietic system and the liver. Long-term exposure to iron dusts or fumes can result in a condition called siderosis which is considered to be a benign pneumoconiosis. Symptoms may include chronic bronchitis, emphysema, and shortness of breath upon exertion. Penetration of iron particles in the skin or eye may cause an exogenous or ocular siderosis which may be characterized by a red-brown pigmentation of the affected area. Iron and steel founding, but not iron or iron oxide, has been listed as potentially carcinogenic by IARC.

Prolonged exposure to manganese dusts or fumes is associated with "manganism", a Parkinson-like syndrome characterized by a variety of neurological symptoms including muscle spasms, gait disturbances, tremors, and psychoses.

Prolonged and repeated overexposure to chromium dusts or fumes may cause skin ulcers, nasal irritation and ulceration, kidney damage and cancer of the respiratory system. Cancer is generally attributed to the hexavalent (+6) form of chromium which is a listed carcinogen by NTP and IARC (Group 1).

Prolonged and repeated contact with nickel may cause sensitization dermatitis. Inhalation of nickel compounds has caused lung damage as well as sinus, nasal and lung cancer in laboratory animals. Nickel is a listed carcinogen by NTP and IARC (Group 1).

Welding fumes may be different in composition from the original welding product, with the chief component being ordinary oxides of the metal being welded. Chronic health effects (including cancer) have been associated with the fumes and dusts of individual component metals (see above), and welding fumes as a general category have been listed by IARC as a carcinogen (Group 2B). There is also limited evidence that welding fumes may cause adverse reproductive and fetal effects. Evidence is stronger where welding materials contain known reproductive toxins, e.g., lead which is present in the coating material of this product.

12. ECOLOGICAL INFORMATION

No specific information available on this product.

13. DISPOSAL CONSIDERATIONS

Dispose in accordance with Federal, State, and Local regulations.

14. TRANSPORT INFORMATION

DOT PROPER SHIPPING NAME

Not regulated.

DOT HAZARD CLASSIFICATION

Not regulated.

UN/NA NUMBER

Not applicable.

15. REGULATORY INFORMATION

This product is not hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29 CFR 1910.1200. However, dusts and fumes from this product may be hazardous as noted in Sections 2 and 3.

TOXIC SUBSTANCES CONTROL ACT (TSCA)

Components of this product are listed on the TSCA Inventory.

COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT (CERCLA)

Product is not reportable. We recommend that you contact local authorities to determine if there may be other local reporting requirements.

SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (SARA), TITLE III

SECTION 311/312 HAZARD CATEGORIES:

none

SECTION 313 REPORTABLE INGREDIENTS:

<u>Chemical Name</u>	<u>CAS Number</u>	<u>Concentration (% by Wt.)</u>
Manganese	7439-96-5	0.15-1.10
Copper	7440-50-8	0.35 max
Nickel	7440-02-0	0.10 max
Chromium	7440-47-3	0.10 max
Aluminum	7429-90-5	0.08 max
Phosphorus	7723-14-0	0.025 max
Vanadium	7440-62-2	0.08 max
Zinc	7440-66-6	ND (99% in coating)
Lead	7439-92-1	ND (0.04 max in coating)

CALIFORNIA PROPOSITION 65

This product contains chemicals (nickel and chromium) known to the State of California to cause cancer and a chemical (lead) known to the State of California to cause birth defects or other reproductive harm. For additional information, please call the telephone number provided herein on page 1.

16. OTHER INFORMATION

This product may be coated with a variety of materials, including oils or paints. Depending on the nature of the coating, special precautions should be taken when handling, cutting, welding, burning and other operations that may result in the formation of fumes or dusts.

Disclaimer of Liability

The information contained in this MSDS is believed to be correct by California Steel Industries, but no representations, guarantees or warranties of any kind are made as to its accuracy, suitability, for particular applications, hazards connected with the use of the material or the results to be obtained from the use thereof. User assumes all risks and liabilities of any use, processing, or handling of any material.



UNITED LUBRICANTS CORPORATION

**UL-CP-10
MATERIAL SAFETY
DATA SHEET**

I. IDENTIFICATION AND EMERGENCY INFORMATION

PRODUCT NAME	UL-CP-10
APPEARANCE AND ODOR	Amber Liquid, Slight Hydrocarbon Odor
EMERGENCY TELEPHONE NUMBER	(513) 743-9031
CHEMTREC EMERGENCY NUMBER	(800) 424-9300

II. COMPONENTS AND HAZARD INFORMATION

CHEMICAL COMPONENTS	CAS NUMBER	WEIGHT %	OSHA PEL	ACGIH TLV	NTP LISTED	IARC LISTED
Severely Hydrotreated Naphthenic Oil	64742-52-6	85 - 95	5 mg/m3	5 mg/m3	No	No

III. TYPICAL PHYSICAL PROPERTIES

BOILING POINT	> 550 F	SPECIFIC GRAVITY (water=1)	0.89
VAPOR PRESSURE (mm Hg@20C)	< 0.1	PERCENT VOLATILES (by volume)	Negligible
VAPOR DENSITY (air=1)	> 10	EVAPORATION RATE (ether=1)	< 0.1
SOLUBILITY IN WATER	Negligible	pH DATA	NA

IV. FIRE AND EXPLOSION HAZARD INFORMATION

FLASH POINT (METHOD)	315 F C.O.C.	FLAMMABILITY LIMITS (% BY VOLUME IN AIR)	LEL : 0.90 UEL : 7.00	AUTOIGNITION TEMPERATURE	500 (est.)
FIRE AND EXPLOSION HAZARDS	Avoid breathing decomposition products.				
EXTINGUISHING MEDIA	Foam, Dry Chemical, CO2, Water Fog				
SPECIAL FIREFIGHTING PROCEDURES	None				

V. REACTIVITY INFORMATION

STABILITY (CONDITIONS TO AVOID):	None
CHEMICAL INCOMPATIBILITY:	Strong oxidizers
HAZARDOUS DECOMPOSITION PRODUCTS:	Oxides of carbon.
HAZARDOUS POLYMERIZATION:	Will not occur.
CORROSIVE TO METAL:	No
OXIDIZER:	No

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM					
HEALTH	1	FLAMMABILITY	1	REACTIVITY	0
			SPECIAL	0	

HEALTH HAZARD AND FIRST AID INFORMATION

ROUTES OF ENTRY

ROUTES OF ENTRY	EFFECTS OF OVEREXPOSURE
INHALATION	Prolonged exposure to high concentrations of mists may cause lung irritation.
EYE CONTACT	Causes irritation.
SKIN CONTACT	Prolonged or repeated exposure may cause mild irritation.
INGESTION	May cause irritation of the digestive tract, nausea, vomiting and diarrhea.

EMERGENCY FIRST AID PROCEDURES

INHALATION	Remove victim to fresh air and provide oxygen if breathing is difficult. Give artificial respiration if not breathing. Get medical attention.
EYES	Flush eyes with water. If irritation occurs, get medical attention.
SKIN	Remove contaminated clothing and wipe excess from skin. Wash skin with soap and water. If irritation occurs, get medical attention.
INGESTION	Do not induce vomiting. Get medical attention immediately.

SECTION 313 CHEMICAL

EPA SARA TITLE III INFORMATION

SECTION 313 CHEMICAL	CAS #	WEIGHT PERCENT
None		

OCCUPATIONAL CONTROL PROCEDURES

VENTILATION	Provide local exhaust in areas where airborne concentrations constitute overexposure.
RESPIRATORY	Use NIOSH approved respirator for organic vapors to prevent overexposure.
EYE PROTECTION	Safety glasses or goggles are recommended where splashes to eye may occur.
SKIN PROTECTION	Rubber gloves are recommended for prolonged or repeated exposure.
HANDLING AND STORAGE	Store in a dry location away from heat, sparks and other sources of ignition. Keep containers closed when not in use.

ENVIRONMENTAL CONTROL PROCEDURES

SPILL AND LEAK PROCEDURES	Dike area to contain spill and prevent from entering public waters if possible. Absorb in sand, earth, vermiculite or similar material. Wear appropriate protective equipment.
WASTE DISPOSAL METHODS	Dispose of according to local and RCRA regulations.

ADDITIONAL INFORMATION

WHILE THE INFORMATION AND RECOMMENDATIONS SET FORTH ON THIS DATA SHEET ARE BELIEVED TO BE ACCURATE AS OF THE PRESENT DATE, UNITED LUBRICANTS MAKES NO WARRANTY WITH RESPECT THERETO AND DISCLAIMS ALL LIABILITY FROM RELIANCE THEREON.

DATE PREPARED: January 18, 1991

PREPARED BY:

William F. Ricks
WILLIAM F. RICKS

DATE REVISED: NA

TITLE:

DIRECTOR OF RESEARCH

EXPLANATION OF ABBREVIATIONS

NE=NOT ESTABLISHED
AP=APPROXIMATE

ND=NOT DETERMINED
NA=NOT APPLICABLE

TR=TRACE
UK=UNKNOWN

>=GREATER THAN
<=LESS THAN

Oakite

MATERIAL SAFETY DATA SHEET

4662

PRODUCT CODE: 4662
 OAKITE OKEMCOAT F-2
 124-GE-304

EMIS 3 0 1 5

SECTION I - PRODUCT IDENTIFICATION

TRADE NAME OAKITE OKEMCOAT F-2 EMERGENCY TELEPHONE NUMBER:
 CHEMICAL NAME (300) 424-9300 (CHEMTREC)
 AND SYNONYMS NA; Mixture
 MANUFACTURER'S NAME OAKITE PRODUCTS INC. (908) 464-6900 (3am-6pm)
 AND TELEPHONE NO. A Member of the CHEMETALL Group
 ADDRESS 50 Valley Road Berkeley Heights NJ 07922
 DATE OF PREPARATION 04-05-94

SECTION II - HAZARDOUS INGREDIENTS

	CAS NO.	% BY WT	ACGHE OSHA		UNITS
			TLV (TWA)	PEL (TWA)	
Chromium phosphate (-) (CrIII compounds)	0007789040	<10	0.5	0.5	mg/m ³
Chromium trioxide (-) (as Cr VI, soluble)	0001330820	<10	0.05	0.1	mg/m ³
Nitric acid(+)	0007697372	<5	2	2	ppm
Non-hazardous ingredients		Bal.			

Unidentified ingredients are considered not hazardous under Federal Hazard Communication Standard (29 CFR 1910.1200).

All component of this material are on the US TSCA Inventory.

(-) This product contains ingredient(s) identified in Section II with (-) which are subject to the reporting requirements of section 313 of SARA Title III and 40 CFR 372.

SECTION III - PHYSICAL DATA

BOILING POINT (F) NE SPECIFIC GRAVITY (HEQ=1) 1.145
 VAPOR PRESSURE (mm Hg) NE Bulk Density 9.5 lb/gal

OAKITE PRODUCTS, INC. warrants that the products or products described herein will conform with its published specifications. The products shipped by Oakite and information related to them are intended to be of quality having necessary industrial skill and knowledge. Users should undertake sufficient verification and testing to determine the suitability of the Oakite materials for their own particular purposes. Any other conditions of use of products are beyond Oakite's control. Oakite does not warrant any recommendations and information for the use of such products. OAKITE DISCLAIMS ALL OTHER WARRANTIES INCLUDING THE IMPLIED WARRANTY OF MERCHANTABILITY AND FITNESS FOR ANY PARTICULAR PURPOSE IN CONNECTION WITH THE USE OF ITS PRODUCTS.

NA - Not Applicable

NE - Not Established



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VAPOR DENSITY (Air=1)	NE	PERCENT VOLATILE	
SOLUBILITY IN WATER	Complete	BY WEIGHT(%) Excludes H ₂ O	<5
EVAPORATION RATE	NA	PH 4% by volume	2
APPEARANCE AND ODCR	Dark green liquid; acrid odor.	Concentrate	<1

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method Used): None

FLAMMABLE LIMITS: LEL: NA UEL: NA

EXTINGUISHING MEDIA: Use media suitable for surrounding materials.

SPECIAL FIRE FIGHTING PROCEDURES: Wear Self-Contained Breathing Apparatus (SCBA).

UNUSUAL FIRE AND EXPLOSION HAZARDS: May have oxidizing properties, therefore, fire risk on contact with combustible materials.

SECTION V - HEALTH HAZARD INFORMATION

ROUTE(S) OF ENTRY:	INHALATION:	SKIN:	INGESTION:
	X	X	X

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: None known

SYMPTOMS/EFFECTS OF OVEREXPOSURE:

Inhalation of mist may cause irritation of mucous membranes. Severe skin burns. May cause severe or permanent eye damage. Chronic overexposure to some Chromium VI compounds can cause bronchitis, skin sensitization, and kidney and liver damage. Some Chromium VI compounds are known carcinogens (IARC, NTP).

FIRST AID

EYES: Immediately flush eyes with plenty of water for at least 15 minutes while holding eyelids open. Get prompt medical attention.

SKIN: Immediately remove contaminated clothing. Wash skin with large amounts of water for at least 15 minutes. Get prompt medical attention. Wash clothing before reuse.

INGESTION: Contact local poison control center or physician IMMEDIATELY!

NA - Not Applicable

NE - Not Established



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INHALATION: Move victim to fresh air.

SECTION VI - REACTIVITY DATA

STABILITY: NORMALLY STABLE

Avoid extreme heat.

INCOMPATIBLE MATERIALS: Alkalies, Chlorine-releasing materials, Combustibles.

HAZARDOUS DECOMPOSITION PRODUCTS: Phosphorous oxides, Nitrogen oxides, chromium oxides.

SECTION VII - SPILL OR LEAK PROCEDURES

PROCEDURES: Wear personal protective equipment (See Section VIII).
Clean up with noncombustible absorbant material. Store in dry container for disposal.

WASTE DISPOSAL METHOD: Dispose of in accordance with Local State and Federal regulations.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY: If TLV is exceeded, or for symptoms of overexposure, wear a NIOSH-approved acid gas respirator.

EYEWEAR: Wear chemical safety goggles.

CLOTHING/GLOVES: If potential for skin contact exists, wear neoprene or other chemical resistant gloves and apron or coveralls and/or foot coverings, as needed.

VENTILATION: Local exhaust may be necessary for some handling/use conditions. Specific needs should be addressed by supervisory or health/safety personnel.

SECTION IX - SPECIAL PRECAUTIONS

CORROSIVE. Oxidizing properties. Store in closed container in cool well-ventilated area.

APPROVAL *Michael Chang*

Mgr. Health & Environmental Dept. 04/05/1994

NA - Not Applicable

NE - Not Established

***** Section 1 - Chemical Product and Company Identification *****

Chemical Name: Mixture

Product Use: Slab, Roll and Sheet Products

Manufacturer Information

National Steel Corporation
4100 Edison Lakes Parkway
Mishawaka, IN 46545

Phone #: (219) 273-7000

Emergency #: (219) 273-7000

***** Section 2 - Composition / Information on Ingredients *****

CAS #	Components	Percent
7439-89-6	Iron	97-99
7439-96-5	Manganese	0.15-1.65
7440-02-0	Nickel	0.04-1.1
7440-47-3	Chromium	0.02-1.1
7440-21-3	Silicon	0.01-0.95
7429-90-5	Aluminum	0.2-0.504
7440-50-8	Copper	0.01-0.4
7440-36-0	Antimony	0.005-0.06

Coated Product May Also Contain:

7429-90-5	Aluminum	0.2-3.7
7440-36-0	Antimony	0.005-0.06
7440-66-6	Zinc	0.001-10.25
7440-31-5	Tin	0.001-2.5
7440-47-3	Chromium	0.004-2

Component Related Regulatory Information

This product may be regulated, have exposure limits or other information identified as the following: Nickel compounds.

Component Information/Information on Non-Hazardous Components

As supplied, this product is considered non-hazardous under 29 CFR 1910.1200 (Hazard Communication), however, dusts, particulates or fumes generated in the processing of this product are hazardous.

***** Section 3 - Hazards Identification *****

Emergency Overview

Product is a solid iron alloy. As supplied, this product does not present a physical or health hazard. Processing of the product for some final uses can include formation of dusts, particulates or fumes which may present certain health hazards. Dusts from this product may pose a dust explosion hazard. Contact of molten product with water poses an explosion hazard. Firefighters should wear a positive pressure self-contained breathing apparatus with full facepiece.

Hazard Statements

Dusts, particulates and vapors that may be produced in the processing of this product, may be irritating to the eyes, skin, respiratory system and gastrointestinal tract. Dusts, particulates or fumes that may be produced may contain metals that cause metal fume fever, a flu-like condition lasting 24 to 48 hours and includes fever, chills, aches, cough and general malaise. Exposure to dusts, particulates or fumes containing nickel may cause cancer. Fumes containing metallic components in this product may be hazardous.

Potential Health Effects: Eyes

Dust or powder may be irritating to the eyes. Rubbing may cause abrasion of the cornea.

Material Safety Data Sheet

Material Name: Iron Alloy (Steel)

ID: NS-001

Potential Health Effects: Skin

Dust or powder may irritate the skin. Rubbing may increase mechanical irritation to the skin. Product contains chromium and nickel, which may cause an allergic skin reaction. No components of this product are known to be absorbed through the skin.

Potential Health Effects: Ingestion

Dusts or powders may cause temporary irritation of the throat, stomach and gastrointestinal tract.

Potential Health Effects: Inhalation

Dusts and powders from this product may cause irritation to the nasal passages and respiratory tract. When inhaled in very large amounts, damage to the lung may occur. Dusts, particulates or fumes that may be produced may contain metals that cause metal fume fever, a transitory condition including fever, chills, aches, cough and general malaise.

HMIS Ratings: Health: 1* Fire: 0 Reactivity: 0 Pers. Prot.: safety glasses, gloves

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe * = Chronic hazard

*** Section 4 - First Aid Measures ***

First Aid: Eyes

For contact with dusts or particulates, flush eyes with water for 15 minutes. Eye injuries from solid particles should be treated by a physician immediately.

First Aid: Skin

For skin contact with dusts or powders, wash immediately with soap and water. Cuts or abrasions should be treated promptly with thorough cleansing of the affected area.

First Aid: Ingestion

No need for first aid is anticipated if dusts or particulates from the material are swallowed, however if symptoms develop, seek medical attention.

First Aid: Inhalation

If large amounts of dusts, fumes or particulates are generated, move person to fresh air. If symptoms develop, seek medical attention.

First Aid: Notes to Physician

Respiratory disorders may be aggravated by exposure to metallic dusts or fumes.

*** Section 5 - Fire Fighting Measures ***

Flash Point: Not applicable

Upper Flammable Limit (UFL): Not applicable

Auto Ignition: Not applicable

Rate of Burning: Not applicable

General Fire Hazards

This material will not burn. Fine dusts of this material mixed with oxygen and a suitable source of ignition may pose an explosion hazard.

Hazardous Combustion Products

Material will begin softening at approximately 2400 °F, will proceed to a liquid and will form irritating and toxic fumes at extremely high temperatures.

Extinguishing Media

Use methods for the surrounding fire.

Fire Fighting Equipment/Instructions

Firefighters should wear full-face, self contained breathing apparatus and impervious protective clothing.

NFPA Ratings: Health: 1 Fire: 0 Reactivity: 0 Other:

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

*** Section 6 - Accidental Release Measures ***

Containment Procedures

Containment of this material should not be necessary. If dusts or particulates are generated, eliminate sources of ignition.

Material Safety Data Sheet

Material Name: Iron Alloy (Steel)

ID: NS-001

Clean-Up Procedures

Small pieces of this product may be collected with a broom and shovel. Dusts and particulates may be collected by using a vacuum with a HEPA filter. Place collected material in a closed container.

Evacuation Procedures

Isolate area. Keep unnecessary personnel away.

Special Procedures

None necessary.

* * * Section 7 - Handling and Storage * * *

Handling Procedures

Avoid generating dusts or particulates. Avoid inhalation of dusts, particulates or fumes. Avoid contact of dusts or particulates with eyes or skin. Wash thoroughly after handling.

Storage Procedures

Store in a dry area.

Labeling

No label is required.

* * * Section 8 - Exposure Controls / Personal Protection * * *

Exposure Guidelines

A: General Product Information

Follow all applicable exposure limits.

B: Component Exposure Limits

Manganese (7439-96-5)

ACGIH: as Mn, 0.2 mg/m³ TWA
OSHA: fume, as Mn: 1 mg/m³ TWA
compounds, as Mn: C 5 mg/m³
NIOSH: as Mn: 1 mg/m³ TWA
3 mg/m³ STEL

Tin (7440-31-5)

ACGIH: metal: 2 mg/m³ TWA
0.2 mg/m³ STEL
OSHA: inorganic compounds (except oxides), as Sn: 2 mg/m³ TWA
NIOSH: as Sn: 2 mg/m³ TWA

Nickel (7440-02-0)

ACGIH: metal: (1) mg/m³ TWA
OSHA: 1 mg/m³ TWA
NIOSH: as Ni: 0.015 mg/m³ TWA

Chromium (7440-47-3)

ACGIH: 0.5 mg/m³ TWA
OSHA: (as Cr): 1 mg/m³ TWA
Chromic acid and chromates: C 0.1 mg/m³
NIOSH: as Cr: 0.5 mg/m³ TWA; see Appendix C for supplementary exposure limits

Silicon (7440-21-3)

ACGIH: 10 mg/m³ TWA (The value is for total dust containing no asbestos and <1% crystalline silica)
OSHA: total dust: 10 mg/m³ TWA; respirable fraction: 5 mg/m³ TWA
NIOSH: total: 10 mg/m³ TWA; respirable dust: 5 mg/m³ TWA

Aluminum (7429-90-5)

ACGIH: metal dust, as Al: 10 mg/m³ TWA
OSHA: total dust, as Al: 15 mg/m³ TWA; respirable fraction, as Al: 5 mg/m³ TWA
NIOSH: total: 10 mg/m³ TWA; respirable dust: 5 mg/m³ TWA; welding fumes: 5 mg/m³ TWA

Copper (7440-50-8)

ACGIH: fume: (0.2) mg/m³ TWA; dusts and mists, as Cu: (1) mg/m³ TWA
OSHA: fume, as Cu: 0.1 mg/m³ TWA

Material Safety Data Sheet

Material Name: Iron Alloy (Steel)

ID: NS-001

NIOSH: (dusts and mists) as Cu: 1 mg/m³ TWA; 0.1 mg/m³ TWA (fume)

Antimony (7440-36-0)

ACGIH: as Sb: 0.5 mg/m³ TWA

OSHA: as Sb: 0.5 mg/m³ TWA

NIOSH: 0.5 mg/m³ TWA

Engineering Controls

Whenever dusts, particulates or fumes are generated, use appropriate local exhaust ventilation to keep exposures below the regulated limits.

PERSONAL PROTECTIVE EQUIPMENT

Personal Protective Equipment: Eyes/Face

Wear safety glasses with side shields. Additional protection may be necessary for some operations.

Personal Protective Equipment: Skin

Wear leather or other appropriate gloves, if necessary for the type of operation.

Personal Protective Equipment: Respiratory

When dusts or thermal processing fumes are generated and ventilation is not sufficient to effectively remove them, appropriate NIOSH/MSHA approved respiratory protection must be provided.

Personal Protective Equipment: General

Use good industrial hygiene practices in handling this material.

* * * Section 9 - Physical & Chemical Properties * * *

Appearance:	Metallic color	Odor:	None
Physical State:	Solid	pH:	Not applicable
Vapor Pressure:	Not applicable	Vapor Density:	Not applicable
Boiling Point:	Not available	Melting Point:	2400 - 2800 °F
Solubility (H₂O):	Insoluble	Specific Gravity:	7.5 - 8.5 g/cm ³
Softening Point:	2400 °F		

* * * Section 10 - Chemical Stability & Reactivity Information * * *

Chemical Stability

Product is stable.

Chemical Stability: Conditions to Avoid

None known.

Incompatibility

None known.

Hazardous Decomposition

Material will begin softening at approximately 2400 °F, will proceed to a liquid and will form irritating and toxic fumes at extremely high temperatures.

Hazardous Polymerization

Will not occur.

Material Safety Data Sheet

Material Name: Iron Alloy (Steel)

ID: NS-001

*** Section 11 - Toxicological Information ***

Acute Toxicity

A: General Product Information

The product as shipped, does not present a health hazard. Operations which supply sufficient energy to the product (i.e. welding, high speed grinding or melting) can release dust or fumes which may make components of the product biologically available. Exposure to dusts or fumes from some metals including iron, manganese, chromium, copper and zinc can produce a condition known as metal fume fever, a flu-like illness with nausea, vomiting, chest tightness, muscle aches and weakness. Chronic exposure to iron can lead to mottling of the lungs, a condition known as siderosis which is a benign pneumoconiosis and does not cause significant physiological impairment of the lung. Early signs of manganese poisoning are sluggishness, loss of appetite, sleepiness, weakness in the legs, uncontrollable laughter, hallucinations, delusions, spastic or slow gait, speech impairment, aggressiveness, tremor, mask-like faces, and clumsy movements. Occupational exposure to manganese has been reported to increase the incidence of pneumonia, perforation of the nasal septum and lung, and kidney and liver damage. Inhalation of aluminum dust may cause aluminosis, a type of pulmonary fibrosis. Occupational exposure to antimony can cause a form of dermatitis known as antimony spots. Chronic inhalation of antimony dusts can cause pneumoconiosis which can progress to obstructive lung disease. Chronic exposure to antimony dusts and fumes can also cause eye irritation, diarrhea, vomiting, abdominal cramps, gastric ulcerations and cardiac effects. Chronic exposure to copper fume or dust can cause respiratory tract irritation, hemolytic anemia and allergic contact dermatitis. Chronic exposure to nickel can cause rhinitis, sinusitis and permanent allergic contact dermatitis and sensitization. Chronic inhalation of tin dusts or fumes can cause a condition known as stannosis which is a benign pneumoconiosis and does not cause significant physiologic impairment of the lung. Dusts and fumes from this product may cause cancer, reproductive and/or birth defects.

B: Component LD50/LC50

Iron (7439-89-6)

Oral LD50 Rat: 30 gm/kg

Manganese (7439-96-5)

Oral LD50 Rat: 9 gm/kg

Silicon (7440-21-3)

Oral LD50 Rat: 3160 mg/kg

Antimony (7440-36-0)

Oral LD50 Rat: 7 gm/kg

Carcinogenicity

A: General Product Information

No information available for the product. Occupational exposure to nickel dusts or fumes increases the risk of respiratory cancers. Chronic exposure to chromium (VI) has been associated with an increased risk of cancer. Inhalation of antimony produced lung tumors in experimental animals, and there is a possible link between occupational exposure and lung cancer in humans. Copper has caused cancer when implanted in experimental animals. Tin has been shown to cause tumors in experimental animals.

B: Component Carcinogenicity

Nickel (7440-02-0)

NIOSH: occupational carcinogen

NTP: suspect carcinogen (Listed under 'Nickel and certain nickel compounds') (Possible Select Carcinogen)

IARC: Monograph 49; 1990 (Evaluated as a group) (related to Nickel compounds) (Group 1 (carcinogenic to humans))

IARC: Monograph 49; 1990 (metal and alloys) (Group 2B (sufficient animal data))

Chromium (7440-47-3)

ACGIH: A4-not classifiable as a human carcinogen

IARC: Monograph 49; 1990 (Group 3 (not classifiable))

Epidemiology

No information available for the product.

Material Safety Data Sheet

Material Name: Iron Alloy (Steel)

ID: NS-001

Neurotoxicity

No information available for the product. Chronic exposure to manganese can lead to the neurological condition of parkinsonism and to diminished fine motor coordination. Occupational exposure to aluminum has been associated with increased adverse effects on the central nervous system.

Mutagenicity

No information available for the product. Manganese and chromium (VI) have been shown to cause mutations in experimental systems. Aluminum and antimony have been shown to increase the number of sister chromatid exchanges and antimony is clastogenic when orally administered to laboratory animals. Copper can induce DNA structural transformations and chromosomal aberrations. Nickel inhibited DNA repair and induced transformation in experimental assays.

Teratogenicity

No information available for the product. Manganese, chromium and aluminum have been shown to have teratogenic effects. Manganese, chromium, antimony, copper and nickel have been reported to have adverse reproductive effects in experimental animals. Chromium, copper and nickel have been shown to be fetotoxic in experimental animals.

Other Toxicological Information

None identified.

*** Section 12 - Ecological Information ***

Ecotoxicity

No information available for the product.

Environmental Fate

No information available for the product.

*** Section 13 - Disposal Considerations ***

US EPA Waste Number & Descriptions

A: General Product Information

This product is not regulated as a hazardous waste by the federal EPA. Collected dusts and other similar wastes generated during processing of the product could contain a constituent identified as hazardous under 40 C.F.R. § 261.24.

Disposal Instructions

Wastes must be tested using methods described in 40 C.F.R. Part 261 to determine if they exhibit a characteristic of hazardous waste. Waste must be treated and/or disposed in accordance with all applicable regulations.

*** Section 14 - Transportation Information ***

US DOT Information

Shipping Name: Not regulated as dangerous goods.

Hazard Class: None

UN/NA #: None

Packing Group: None

Required Label(s): None

Additional Info.: None

International Transportation Regulations

Not regulated as dangerous goods.

*** Section 15 - Regulatory Information ***

US Federal Regulations

A: General Product Information

No information available for the product.

B: Component Information

This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65) and/or CERCLA (40 CFR 302.4).

Zinc (7440-66-6)

SARA 313: form R reporting required for 1.0% de minimus concentration (only fume or dust)

CERCLA: final RQ = 1000 pounds (454 kg) (no reporting of releases of this hazardous substance is required if the diameter of the solid metal released is equal to or exceeds 0.004 inches)

Manganese (7439-96-5)

Material Safety Data Sheet

Material Name: Iron Alloy (Steel)

ID: NS-001

SARA 313: form R reporting required for 1.0% de minimus concentration

Nickel (7440-02-0)

SARA 313: form R reporting required for 0.1% de minimus concentration

CERCLA: final RQ = 100 pounds (45.4 kg) (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is equal to or exceeds 0.004 inches)

Chromium (7440-47-3)

SARA 313: form R reporting required for 1.0% de minimus concentration

CERCLA: final RQ = 5000 pounds (2270 kg) (no reporting of releases of this hazardous material is required if the diameter of the pieces of the solid metal released is equal to or exceeds 0.004 inches)

State Regulations

A: General Product Information

Other state regulations may apply. Check individual state requirements.

The following statement(s) are provided under the California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65):

WARNING! This product contains a chemical known to the state of California to cause cancer.

Other Regulations

A: Component Information (Canada)

The following components are identified under the Canadian Hazardous Products Act Ingredient Disclosure List:

Component	CAS #	%	Minimum Concentration
Manganese	7439-96-5	0.15-1.65	1% item 974 (1077)
Tin	7440-31-5	0.001-1.4	1% item 1571 (804)
Nickel	7440-02-0	0.04-1.1	0.1% item 1126 (1193)
Chromium	7440-47-3	0.02-1.1	0.1% item 399 (561)
Aluminum	7429-90-5	0.2-0.504	1% item 47 (197)
Copper	7440-50-8	0.01-0.4	1% item 433 (578)
Antimony	7440-36-0	0.005-0.06	1% item 122 (251)

*** Section 16 - Other Information ***

Other Information

Reasonable care has been taken in the preparation of this information, but the manufacturer makes no warranty of merchantability or any other warranty, expressed or implied, with respect to this information. The manufacturer makes no representations and assumes no liability for any direct, incidental or consequential damages resulting from its use. Supersedes MSDS for this product from 10/1993.

Key/Legend

EPA = Environmental Protection Agency; ACGIH = American Conference of Governmental Industrial Hygienists; IARC = International Agency for Research on Cancer; NIOSH = National Institute for Occupational Safety and Health; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration; TLV = Threshold Limit Value; NFPA = National Fire Protection Association; HMIS = Hazardous Material Information System; CFR = Code of Federal Regulations; HEPA = High Efficiency Particulate Air; CERCLA = Comprehensive Environmental Response, Compensation and Liability Act; SARA = Superfund Amendments and Reauthorization Act

Contact Person: John Olashuk

Contact Phone: (219) 273-7342

This is the end of MSDS #NS-001

SECTION I: GENERAL INFORMATION

Manufacturer: MSC Pinole Point Steel Inc.
Address: 2995 Atlas Road, Richmond, California 94806
Information and Emergency Telephone Number: (510) 223-8883
Product Name: Hot Dipped Galvanized Steel Sheet or Coil
Synonyms: Galvanized Sheet or Coil
Revision Date: 09/10/99

SECTION II: CONSTITUENT IDENTIFICATION AND INFORMATION

CONSTITUENT	CAS NUMBER	WT%	OSHA-PEL (1) (mg/m ³)	ACGIH-TLV (mg/m ³)
<u>BASE METAL</u>				
Iron	1309-89-6	Balance	oxide fume-10	oxide fume-5
<u>ALLOYING ELEMENTS</u>				
Aluminum *	7429-90-5	<1	dust - 15 fume - 5	dust - 10 fume - 5
Carbon	7440-44-0	<1	dust - 15	fume - 10
Columbium	7440-03-01	<1	dust - 15	dust - 10
(2) Manganese *	7439-96-5	<1	dust - 5 fume - 5	dust - 5 fume - 1
Phosphorous *	7723-14-0	<1	dust - 15	dust - 10
(2) Rare Earth (Ce)	7440-45-1	<1	dust - 15	dust - 10
Sulfur	7440-34-9	<1	dust - 15	dust - 10
(2) Titanium	7440-32-6	<1	dust - 15	dust - 10
(2) Vanadium *	7440-62-2	<1	dust - 15	dust - 10
<u>METALLIC COATING (3)</u>				
Aluminum	7429-90-5	<1	dust - 15 fume - 5	dust - 10 fume - 5
Arsenic	7440-38-2	<0.1	0.01	0.01
Cadmium	7440-43-9	<0.1	dust - 0.005 fume - 0.005	dust - 0.002
Iron	1309-89-6	<1	oxide fume - 10	oxide fume - 5
*Lead	7439-92-1	<0.1	0.05	0.15
*Zinc	7400-66-6	<10	dust - 15 fume - 5	dust - 15 fume - 5
<u>NON-METALLIC COATING (3)</u>				
*Chromium phosphate (as Cr III)	7789-04-0	<0.1	0.5	0.5
*Chromium trioxide (as Cr VI)	1333-82-0	<0.1	0.1	0.05
Nitric acid	7697-37-2	<1	0.3	0.1

- (1) All exposure limits are based on 8-hour time weighted average values unless stated otherwise.
 (2) Not present in structural quality galvanized sheet/roll.
 (3) % wt is a percent of total product.

MATERIAL SAFETY DATA SHEET

* This chemical is subject to the reporting requirements of Section 313 of SARA 40CFR Part 372. However, the weight percentages of these compounds are below the levels for which reporting of exact percentages is required in Section 313 of SARA 40CFR part 372.38

SECTION III: PHYSICAL DATA

Boiling Point:	Not applicable	
Melting Point:	Base metal:	2700 - 2800 F
	Metallic coating:	800 - 900 F
Appearance & Odor:	Metallic grey solid, odorless	
Specific Gravity (water = 1):	7.7 - 7.9	
Solubility in Water:	Negligible	
Percent Volatile:	Not applicable	
Evaporation Rate:	Not applicable	
Vapor Density (air = 1):	Not applicable	
Vapor Pressure:	Not applicable	
pH:	Not applicable	

SECTION IV: FIRE, EXPLOSION AND REACTIVITY INFORMATION

Steel products in their solid state do not present a fire or explosion hazard. However, mechanical operations such as grinding or polishing, may produce zinc dust, which is FLAMMABLE. Steel will react with strong acids or bases to liberate hydrogen gas which is FLAMMABLE. At high temperatures above the melting point, this product may release oxide fumes. Molten metal is highly REACTIVE when poured into water.

CONDITIONS TO AVOID: contact with strong acids or bases; heating to or above the melting point; pouring molten metal into water.

HAZARDOUS DECOMPOSITIONS PRODUCTS : hydrogen gas metal oxides, metallic fumes and dusts.

SECTION V: HEALTH HAZARD DATA

Steel products in their solid state do not present an inhalation, ingestion, eye or skin hazard. However, operations such as burning, welding, brazing, sawing, sanding etc, which may elevate the temperature of the product to or above the melting point and/or result in the release of fumes and/or airborne particles.

EFFECTS OF OVEREXPOSURE:

The inhalation of high concentrations of freshly formed oxide fumes and/or dust of manganese, copper, lead, iron and/or zinc in the respirable particle size range may cause an influenza like illness termed "Metal Fume Fever". Typical symptoms last 6 to 48 hours and are characterized by a metallic taste in the mouth, dryness and irritation of the throat and coughing, followed by shortness of breath, headache, fever chills, muscle aches, nausea, weakness and profuse sweating.

Continuous exposure to high concentrations of manganese can cause central nervous system disorders and "manganese pneumonia". Fibrosis of lung tissue from manganese exposures has also been reported for products containing manganese.

Prolonged or repeated exposure to copper fumes and/or dusts may cause discoloration of the skin and/or hair.

CANCER WARNING:

Iron oxide fumes, manganese and manganese fumes, copper, copper fumes and dust, sulfur oxide, zinc oxide fumes and chromium and various chromium compounds are listed by OSHA in 29CFR Part 1910 Subpart Z.

EMERGENCY AND FIRST AID PROCEDURES:

INHALATION:

For overexposure to airborne particles and/or fumes, remove exposed person to fresh air. If breathing is difficult or has stopped, administer artificial respiration or oxygen, as required. Seek medical attention immediately. Metal Fumes Fever may be treated by bed rest and administering a pain and fever reducing medication.

SKIN:

For thermal burns, flush area with cold water. Seek medical attention. For mechanical abrasions, seek medical attention.

EYES:

Flush eyes with large amounts of water to remove airborne particles and/or fumes; seek medical attention.

SECTION VI: PRECAUTIONS FOR SAFE HANDLING AND USE

SPILL OR LEAK PROCEDURES:

Not applicable to steel in solid state.

DISPOSAL METHOD:

Dispose in accordance with local, state, and federal laws.

HANDLING AND STORAGE:

Hot dipped galvanized steel products are typically supplied in coils or cut sheets. Proper warehousing safety practices should be followed including use of adequate sized cranes, crane hooks, fork lift trucks and coil chains. In addition, hard hats, safety shoes and tear resistant gloves are recommended.

SECTION VII: CONTROL AND PERSONAL PROTECTION

RESPIRATORY:

None required in normal handling and use; NIOSH/MSHA approved dust and fume respirators should be used to avoid excessive inhalation of particles.

SKIN:

Protective gloves should be worn to protect hands from cuts. Steel may be coated with oil. Discard gloves when they are saturated or soaked through with oil. Wash hands and any area of the skin after contact with soap and water.

EYES:

Safety glasses with side shields, goggles and/or face shield is required when welding, brazing, grinding, sawing, sanding and performing machining operations.

SECTION VIII: FEDERAL OR STATE REGULATORY INFORMATION

SARA 313:

The materials listed below are subject to 40CFR 372 [for the Superfund Amendments and Reauthorization Act of 1986 (SARA 313)] reporting requirements. Please note that if you repackage or otherwise redistribute this product to industrial customers, SARA 313 requires that a notice be sent to those customers.

CAS	CHEMICAL NAME
7429-90-5	Aluminum (fume or dust)
7440-38-2	Arsenic
7440-43-9	Cadmium
7439-92-1	Lead
7439-96-5	Manganese
7723-14-0	Phosphorous (yellow or white)
7440-62-2	Vanadium (fume or dust)
7440-66-6	Zinc (fume or dust)

California Prop.65: This product contains a material known to the state of California to cause cancer or reproductive toxicity.

SECTION IX: DISCLAIMER

MATERIAL SAFETY DATA SHEET

This Material Safety Data Sheet is provided solely as general information and it is compiled from existing reliable sources. It is not to be construed as a determination that this product is hazardous. No legal representation or warranty- expressed or implied--as to the accuracy of completeness of this information is provided. Furthermore , no warranty of merchantability, fitness for any particular purpose, safety of this product, or the hazards related to its use is expressed or is to be implied. This information and product are furnished on the condition that the person receiving them shall make his/her own determination as to the suitability of the product for his/her particular purpose and on the condition that he assumes the risk of his/her use thereof. MSC Pinole Point Steel Inc. assumes no liability for incidental, consequential, or direct damages of any kind--regardless of the causes, including negligence.



U. S. STEEL GROUP
Material Safety Data Sheet
 P.O. Box 206, Pittsburgh, PA 15230-0206
 Telephone Information:
 8:00 am-5:00 pm: (412) 433-6840
 Off-Hour Emergencies: (412) 433-5811
 Fax: (412) 433-6601

This information is taken from sources or based upon data believed to be reliable; however, USX Corporation makes no warranty as to the absolute correctness or sufficiency of any of the following or that additional or other measures may not be required under particular conditions.

PHYSICAL DATA:

Boiling Point: Not Applicable
Freezing Point Not Applicable
Melting Point—Base Metal: 2750°F
Melting Point—Metallic Coating: 800-900°F
Specific Gravity: 7.85
Vapor Pressure—at 20°C: Not Applicable
Vapor Density (air = 1): Not Applicable
Solubility in Water: Not Soluble
% Volatiles: Not Applicable
Evaporation Rate: Not Applicable
pH: Not Applicable
Oil/Water Dist. Coefficient: Not Applicable
Odor Threshold Conc.: Not Applicable
Appearance (Physical State and Color): Metallic Gray Solid
Odor: No Odor

FIRE AND EXPLOSION HAZARDS:

Not flammable or combustible. Steel products in the solid state present no fire or explosion hazard and do not contribute to the combustion of other materials.

FIRE AND EXPLOSION DATA

Extinguishing Media: Not Applicable

Special Fire Fighting Instructions: None

Stability: Stable under normal conditions of use, storage and transport. May react with strong acids to liberate hydrogen.

Hazardous Combustion Products: At temperatures above the melting point, may liberate fumes containing oxides of iron and alloying elements.

Oxidizing Material: Does Not Cause or Contribute to Combustion of Other Material by Yielding Oxidizer

PRODUCT INFORMATION

Product/Common Name: Galvanized Sheet-HSLA Steel (Hot Dipped)
CAS No: 65997-19-5 **USS Code No:** 3H012
Original Issue Date: 8/1/85 **Reference:** 6/97

REGULATORY INFORMATION

U.S. OSHA R-T-K — Contains regulated material
Pennsylvania R-T-K — Contains regulated material

- A = Hazardous Substance
- E = Environmental Hazard
- S = Special Hazard Substance

New Jersey R-T-K — Contains regulated material

- B = Hazardous Substance
- H = Special Health Hazard Substance

California Prop. 65 — This product may contain small amounts of lead, a material known to the State of California to cause cancer or reproductive toxicity.

SARA 313: MANGANESE, ZINC

The above materials are subject to SARA 313 reporting requirements. Please also note that if you prepackage or otherwise redistribute this product to industrial customers, SARA 313 requires that a notice be sent to those customers.

WHMIS: (Canadian): D-2B Product Classification

1995 NIOSH Registry of Toxic Effects of Chemical Substances Reference

NO4565500, BD0330000, FF5250100, QT9900000
 OO9275000, TH3500000, WS4250000, XR1700000,
 YW1355000, CC4025000, OF7525000, ZG8600000

Definitions:

- C Ceiling
- PNOC Particulates not otherwise classified
- PNOR Particulates not otherwise regulated
- STEL Short Term Exposure Limit. A 15-minute Time-Weighted Average Value.

INGREDIENTS AND RECOMMENDED OCCUPATIONAL EXPOSURE LIMIT

Ingredient Name	CAS No.	% wt.	LD50 Species/Route	OSHA PEL	ACGIH TLV
Base Metal Iron	7439-89-6	Balance	30 gm/kg rat/oral	Iron Oxide Fume - 10 mg/M ³ Total Dust - 15 mg/M ³ (PNOR) Respirable Fraction - 5 mg/M ³ (PNOR)	5 mg/M ³ (iron oxide dust and fume)
Alloying Elements Aluminum (E/B)	7429-90-5	.10 max.	No information	Total Dust - 15 mg/M ³ Respirable Fraction - 5 mg/M ³	10 mg/M ³ (dust) 5 mg/M ³ (welding fume)
Carbon	7440-44-0	.25 max.	440 mg/kg mouse/intravenous	Total Dust - 15 mg/M ³ (PNOR) Respirable Fraction - 5 mg/M ³ (PNOR)	10 mg/M ³ (Inhalable PNOC) 3 mg/M ³ (Respirable PNOC)
Columbium	7440-03-1	.10 max.	LD > 10 gm/kg rat/oral	Total Dust - 15 mg/M ³ (PNOR) Respirable Fraction - 5 mg/M ³ (PNOR)	10 mg/M ³ (Inhalable PNOC) 3 mg/M ³ (Respirable PNOC)
Manganese (E/B)	7439-96-5	.05/1.90	9 gm/kg rat/oral	Dust & Fume - 5 mg/M ³ (C)	.2 mg/M ³
Phosphorus (E/H)	7723-14-0	.15 max.	3030 ug/kg rat/oral	.1 mg/M ³	.1 mg/M ³
Rare Earth (Ce) (B)	7440-45-1	.10 max.	No information	Total Dust - 15 mg/M ³ (PNOR) Respirable Fraction - 5 mg/M ³ (PNOR)	10 mg/M ³ (Inhalable PNOC) 3 mg/M ³ (Respirable PNOC)
Sulfur (A/B)	7704-34-9	.05 max.	LD > 8437 mg/kg rat/oral	Total Dust - 15 mg/M ³ (PNOR) Respirable Fraction - 5 mg/M ³ (PNOR)	10 mg/M ³ (Inhalable PNOC) 3 mg/M ³ (Respirable PNOC)
Titanium (B)	7440-32-6	.30 max.	No information	Total Dust - 15 mg/M ³ (PNOR) Respirable Fraction - 5 mg/M ³ (PNOR)	10 mg/M ³
Vanadium (E/B)	7440-62-2	.20 max.	59 mg/kg rabbit/subcutaneous	Respirable Dust (as V ₂ O ₅) - 0.5 mg/M ³ (C) Fume (as V ₂ O ₅) - 0.1 mg/M ³ (C)	10 mg/M ³ (Inhalable PNOC) 3 mg/M ³ (Respirable PNOC) .05 mg/M ³ as V ₂ O ₅ respirable dust and fume
Metallic Coating Aluminum (E/B)	7429-90-5	* .055 max.	No information	Total Dust - 15 mg/M ³ Respirable Fraction & Welding Fume - 5 mg/M ³	10 mg/M ³ (dust) 5 mg/M ³ (welding fume)
Antimony (E/B)	7440-36-0	.011 max.	No information	.5 mg/M ³	.5 mg/M ³
Iron	7439-89-6	.092 max.	30 gm/kg rat/oral	Iron Oxide Dust & Fume - 10 mg/M ³ Total Particulates (as Fe)	5 mg/M ³ (iron oxide dust and fume)
Lead (E/H)	7439-92-1	.004 max.	TDLo—450 mg/kg/6 yrs. oral/human	.05 mg/M ³	.05 mg/M ³
Zinc (E/B)	7440-66-6	.18/9.1	TCLo—124 mg/M ³ /50 min inhalation/human	Fume - 5 mg/M ³ Total Dust - 15 mg/M ³ Respirable Fraction - 5 mg/M ³	5 mg/M ³ (fume) 10 mg/M ³ (fume—STEL) 10 mg/M ³ (dust)

NOTES:

All commercial metals contain small amounts of various elements in addition to those specified. These small quantities, frequently referred to as "trace" or "residual" elements, generally originate in the raw materials used. Typical levels of commonly involved trace or residual elements that may be encountered in steel products are provided in Annex I so that their potential hazards may be considered.

All exposure limits are based on 8-hour time-weighted average values unless stated otherwise. (STEL) denotes "Short-Term Exposure Limit", a 15-minute time-weighted average value.

* % wt/metallic coating is a percent of total product.

HEALTH DATA

Primary Routes of Entry:
Inhalation, ingestion and skin,
if coated.

Effects of Overexposure:

Chronic inhalation of high concentrations of iron oxide fumes or dusts may lead to a benign pneumoconiosis (siderosis). Inhalation of high concentrations of ferric oxide may possibly enhance the risk of lung cancer development in workers exposed to pulmonary carcinogens.

Chronic inhalation of high concentrations, or ingestion, of lead may affect a variety of organ systems, including the nervous system, kidneys, reproductive system, blood formation, and gastrointestinal tract.

The inhalation of high concentrations of freshly formed oxide fumes and dusts of Manganese and/or Zinc in the respirable particle size range can cause an influenza-like illness termed metal fume fever. Typical symptoms last 12 to 48 hours and are characterized by metallic taste in mouth, dryness and irritation of the throat, followed by weakness, muscle pain, fever and chills. Continuous exposures to high concentrations of manganese can cause central nervous system disorders and "manganese pneumonia". Fibrosis of lung tissue from manganese exposures has also been reported for products containing manganese only.

Inhalation of phosphorus oxides may cause respiratory irritation.

Sulfur compounds, present in the fumes, may irritate the skin, eyes, lungs and gastrointestinal tract.

Vanadium compounds, especially the pentoxide, are irritants to the eyes, respiratory tract and skin. Excessive long-term or repeated exposures may result in chronic pulmonary changes such as emphysema or bronchitis.

Longterm inhalation exposure to high concentrations (overexposure) to pneumoconiotic agents may act synergistically with inhalation of oxides, fumes or dusts of this product to cause toxic effects.

OIL COATING MAY BE USED: Prolonged or repeated contact with unprotected skin may result in skin irritation. Torching or burning operations on steel products with oil coating may produce emissions which can be irritating to the eyes and respiratory tract.

Emergency and First Aid Procedures:

Respiratory: For overexposure to airborne fumes and particulates, remove exposed person to fresh air. If breathing is difficult or has stopped, administer artificial respiration or oxygen as indicated. Seek medical attention promptly. Metal fume fever may be treated by bed rest, and administering a pain and fever reducing medication. Seek medical attention.

Skin: If thermal burn has occurred, flush area with cold water. Seek medical attention. For mechanical abrasions, seek medical attention.

Eyes: Flush eyes with large amounts of water to remove particles. If irritation persists, seek medical attention.

Special Protection Information:

Respiratory: NIOSH/MSHA-approved dust and fume respirators should be used to avoid excessive inhalation of particulates. Appropriate respirator selection depends on the magnitude of exposure.

Skin: Protective gloves should be worn as required for welding, burning or handling operations. Oil coating may be used: Wear gloves when handling; do not continue to use gloves or work clothing that has become saturated or soaked through with oil coating. Wash hands, and any area of skin after contact, with soap and water or waterless hand cleaner.

Eyes: Use safety glasses or goggles as required for welding, burning, sawing, brazing, grinding or machining operations.

Ventilation: Local exhaust ventilation should be provided when welding, burning, sawing, brazing, grinding or machining to prevent excessive dust or fume exposure.

Other Protective Equipment: Depending upon the conditions of use and specific work situations, additional protective equipment and/or clothing may be required to control exposures.

Precautions in Handling and Storage: Operations with the potential for generating high concentrations of airborne particulates should be evaluated and controlled as necessary. Avoid breathing metal fumes and/or dusts.

Spill or Leak Procedures: Not applicable to steel in solid state. Dispose in accordance with state and local regulation.

U. S. STEEL GROUP

A Division of USX Corporation
Material Safety Data Sheet

PRODUCT INFORMATION

Product/Common Name: Galvanized Sheet-HSLA Steel (Hot Dipped)

CAS No.: 65997-19-5

USS Code No.: 3H012

Reference: 6/97

Health Hazard Data

NOTE: Steel products under normal conditions do not present an inhalation, ingestion, contact health or environmental hazard. However, operations such as burning, welding, sawing, brazing, grinding, and possibly machining, etc., 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 health hazards.

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.

SARA Potential Hazard Categories are:

- Immediate Acute Health Hazard
- Delayed Chronic Health Hazard

Carcinogen Information:

IARC identifies lead and welding fumes as Group 2B carcinogens, that are possibly carcinogenic to humans. (Lists of IARC Evaluations, May, 1995)

Regulatory Information Components

NOTE: The listing of regulations relating to a USS product may not be complete and should not be solely relied upon for all regulatory compliance responsibilities.

Components: Regulation

Al = SARA 313 if > 1.0%; SDWA; RCRA
Mn = SARA 313 if > 1.0%
P = SARA 313 if > 1.0%; CWA; CERCLA; SARA 302
Pb = SARA 313 if > 1.0%; Calif. Prop. 65; CWA 304 and 307; SDWA; CAA 109; RCRA; SARA 302; SARA 110; OSHA Specific Requirements; CERCLA
Sb = SARA 313 if > 1.0%; TSCA 8(a)(8)(d); CWA 304 and 307; SDWA; RCRA; CERCLA
V = SARA 313 if > 1.0%; SDWA
Zn = SARA 313 if > 1.0%; CWA 304 and 307; SDWA; RCRA; CERCLA; SARA 110

Abbreviations

ACGIH American Conference of Governmental Industrial Hygienists
CAA Clean Air Act
CAS Chemical Abstract Service
CERCLA Comprehensive Environmental Response, Compensation and Liability Act
CWA Clean Water Act
IARC International Agency for Research on Cancer
NIOSH National Institute of Occupational Safety and Health
NTP National Toxicology Program
OSHA Occupational Safety and Health Administration
PEL Permissible Exposure Limit
RCRA Resource Conservation Recovery Act
SARA Superfund Amendments and Reauthorization Act of 1986
SDWA Safe Drinking Water Act
TLV Threshold Limit Value
TSCA Toxic Substances Control Act
WHMIS Workplace Hazardous Materials Information System



U. S. STEEL GROUP
Material Safety Data Sheet
 P.O. Box 206, Pittsburgh, PA 15230-0206

Telephone Information:
 8:00 am-5:00 pm: (412) 433-6840
 Off-Hour Emergencies: (412) 433-5811
 Fax: (412) 433-6601

This information is taken from sources or based upon data believed to be reliable; however, USX Corporation makes no warranty as to the absolute correctness or sufficiency of any of the following or that additional or other measures may not be required under particular conditions.

PHYSICAL DATA:

Boiling Point:	<u>Not Applicable</u>
Freezing Point	<u>Not Applicable</u>
Melting Point—Base Metal:	<u>2750°F</u>
Melting Point—Metallic Coating:	<u>800°F</u>
Specific Gravity:	<u>7.85</u>
Vapor Pressure—at 20°C:	<u>Not Applicable</u>
Vapor Density (air = 1):	<u>Not Applicable</u>
Solubility in Water:	<u>Not Soluble</u>
% Volatiles:	<u>Not Applicable</u>
Evaporation Rate:	<u>Not Applicable</u>
pH:	<u>Not Applicable</u>
Oil/Water Dist. Coefficient:	<u>Not Applicable</u>
Odor Threshold Conc.:	<u>Not Applicable</u>
Appearance (Physical State and Color):	<u>Metallic Gray Solid</u>
Odor:	<u>No Odor</u>

FIRE AND EXPLOSION HAZARDS:

Not flammable or combustible. Steel products in the solid state present no fire or explosion hazard and do not contribute to the combustion of other materials.

FIRE AND EXPLOSION DATA

Extinguishing Media: Not Applicable

Special Fire Fighting Instructions: None

Stability: Stable under normal conditions of use, storage and transport. May react with strong acids to liberate hydrogen.

Hazardous Combustion Products:

At temperatures above the melting point, may liberate fumes containing oxides of iron and alloying elements.

Oxidizing Material:

Does Not Cause or Contribute to Combustion of Other Material by Yielding Oxidizer

PRODUCT INFORMATION

Product/Common Name: Galvanized Sheet — Electrolytic

CAS No: 65997-19-5 **USS Code No:** 3C013

Original Issue Date: 8/1/85 **Reference:** 6/97

REGULATORY INFORMATION

U.S. OSHA R-T-K — Contains regulated material

Pennsylvania R-T-K — Contains regulated material

- A = Hazardous Substance
- E = Environmental Hazard
- S = Special Hazard Substance

New Jersey R-T-K — Contains regulated material

- B = Hazardous Substance
- H = Special Health Hazard Substance

SARA 313: MANGANESE, ZINC

The above materials are subject to SARA 313 reporting requirements. Please also note that if you prepackage or otherwise redistribute this product to industrial customers, SARA 313 requires that a notice be sent to those customers.

WHMIS: (Canadian): D-2B Product Classification

1995 NIOSH Registry of Toxic Effects

of Chemical Substances Reference —
 NO4565500, BD0330000, FF5250100, QT9900000,
 OO9275000, TH3500000, WS4250000, XR1700000,
 ZG8600000

Definitions:

- C Ceiling
- PNOC Particulates not otherwise classified
- PNOR Particulates not otherwise regulated
- STEL Short Term Exposure Limit. A 15-minute Time-Weighted Average Value.

INGREDIENTS AND RECOMMENDED OCCUPATIONAL EXPOSURE LIMIT

Ingredient Name	CAS No.	% wt.	LD50 Species/Route	OSHA PEL	ACGIH TLV
Base Metal					
Iron	7439-89-6	Balance	30 gm/kg rat/oral	Iron Oxide Fume - 10 mg/M ³ Total Dust - 15 mg/M ³ (PNOR) Respirable Fraction - 5 mg/M ³ (PNOR)	5 mg/M ³ (iron oxide dust and fume)
Alloying Elements					
Aluminum (E/B)	7429-90-5	.10 max.	No information	Total Dust - 15 mg/M ³ Respirable Fraction - 5 mg/M ³	10 mg/M ³ (dust) 5 mg/M ³ (welding fume)
Carbon	7440-44-0	.005/.60	440 mg/kg mouse/intravenous	Total Dust - 15 mg/M ³ (PNOR) Respirable Fraction - 5 mg/M ³ (PNOR)	10 mg/M ³ (Inhalable PNOC) 3 mg/M ³ (Respirable PNOC)
Columbium	7440-03-1	.10 max.	LD > 10 gm/kg rat/oral	Total Dust - 15 mg/M ³ (PNOR) Respirable Fraction - 5 mg/M ³ (PNOR)	10 mg/M ³ (Inhalable PNOC) 3 mg/M ³ (Respirable PNOC)
Manganese (E/B)	7439-96-5	.05/1.50	9 gm/kg rat/oral	Dust & Fume - 5 mg/M ³ (C)	.2 mg/M ³
Phosphorus (E/H)	7723-14-0	.15 max.	3030 ug/kg rat/oral	.1 mg/M ³	.1 mg/M ³
Sulfur (A/B)	7704-34-9	.05 max.	LD > 8437 mg/kg rat/oral	Total Dust - 15 mg/M ³ (PNOR) Respirable Fraction - 5 mg/M ³ (PNOR)	10 mg/M ³ (Inhalable PNOC) 3 mg/M ³ (Respirable PNOC)
Titanium (B)	7440-32-6	.08 max.	No information	Total Dust - 15 mg/M ³ (PNOR) Respirable Fraction - 5 mg/M ³ (PNOR)	10 mg/M ³
Metallic Coating		*			
Zinc (E/B)	7440-66-6	.17/4.2	TCLo—124 mg/M ³ /50 min inhalation/human	Fume - 5 mg/M ³ Total Dust - 15 mg/M ³ Respirable Fraction - 5 mg/M ³	5 mg/M ³ (fume) 10 mg/M ³ (fume—STEL) 10 mg/M ³ (dust)

NOTES:

All commercial metals contain small amounts of various elements in addition to those specified. These small quantities, frequently referred to as "trace" or "residual" elements, generally originate in the raw materials used. Typical levels of commonly involved trace or residual elements that may be encountered in steel products are provided in Annex I so that their potential hazards may be considered. All exposure limits are based on 8-hour time-weighted average values unless stated otherwise. (STEL) denotes "Short-Term Exposure Limit", a 15-minute time-weighted average value.

* % wt/metallic coating is a percent of total product.

HEALTH DATA

Primary Routes of Entry:
Inhalation, and skin, if coated.

Effects of Overexposure:

Chronic inhalation of high concentrations of iron oxide fumes or dusts may lead to a benign pneumoconiosis (siderosis). Inhalation of high concentrations of ferric oxide may possibly enhance the risk of lung cancer development in workers exposed to pulmonary carcinogens.

The inhalation of high concentrations of freshly formed oxide fumes and dusts of Manganese and/or Zinc in the respirable particle size range can cause an influenza-like illness termed metal fume fever. Typical symptoms last 12 to 48 hours and are characterized by metallic taste in mouth, dryness and irritation of the throat, followed by weakness, muscle pain, fever and chills. Continuous exposures to high concentrations of manganese can cause central nervous system disorders and "manganese pneumonia". Fibrosis of lung tissue from manganese exposures has also been reported for products containing manganese only.

Inhalation of phosphorus oxides may cause respiratory irritation.

Sulfur compounds, present in the fumes, may irritate the skin, eyes, lungs and gastrointestinal tract.

Longterm inhalation exposure to high concentrations (overexposure) to pneumoconiotic agents may act synergistically with inhalation of oxides, fumes or dusts of this product to cause toxic effects.

OIL COATING MAY BE USED: Prolonged or repeated contact with unprotected skin may result in skin irritation. Torchng or burning operations on steel products with oil coating may produce emissions which can be irritating to the eyes and respiratory tract.

Emergency and First Aid Procedures:

Respiratory: For overexposure to airborne fumes and particulates, remove exposed person to fresh air. If breathing is difficult or has stopped, administer artificial respiration or oxygen as indicated. Seek medical attention promptly. Metal fume fever may be treated by bed rest, and administering a pain and fever reducing medication. Seek medical attention.

Skin: If thermal burn has occurred, flush area with cold water. Seek medical attention. For mechanical abrasions, seek medical attention.

Eyes: Flush eyes with large amounts of water to remove particles. If irritation persists, seek medical attention.

Special Protection Information:

Respiratory: NIOSH/MSHA-approved dust and fume respirators should be used to avoid excessive inhalation of particulates. Appropriate respirator selection depends on the magnitude of exposure.

Skin: Protective gloves should be worn as required for welding, burning or handling operations. Oil coating may be used: Wear gloves when handling; do not continue to use gloves or work clothing that has become saturated or soaked through with oil coating. Wash hands, and any area of skin after contact, with soap and water or waterless hand cleaner.

Eyes: Use safety glasses or goggles as required for welding, burning, sawing, brazing, grinding or machining operations.

Ventilation: Local exhaust ventilation should be provided when welding, burning, sawing, brazing, grinding or machining to prevent excessive dust or fume exposure.

Other Protective Equipment: Depending upon the conditions of use and specific work situations, additional protective equipment and/or clothing may be required to control exposures.

Precautions in Handling and Storage: Operations with the potential for generating high concentrations of airborne particulates should be evaluated and controlled as necessary. Avoid breathing metal fumes and/or dusts.

Spill or Leak Procedures: Not applicable to steel in solid state. Dispose in accordance with state and local regulation.

U. S. STEEL GROUP

A Division of USX Corporation
Material Safety Data Sheet

PRODUCT INFORMATION

Product/Common Name: Galvanized Sheet —
Electrolytic

CAS No.: 65997-19-5

USS Code No.: 3C013

Reference: 6/97

Health Hazard Data

NOTE: Steel products under normal conditions do not present an inhalation, ingestion, contact health or environmental hazard. However, operations such as burning, welding, sawing, brazing, grinding, and possibly machining, etc., 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 health hazards.

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.

SARA Potential Hazard Categories are:

- Immediate Acute Health Hazard
- Delayed Chronic Health Hazard

Carcinogen Information:

IARC identifies welding fumes as a Group 2B carcinogen, a mixture which is possibly carcinogenic to humans. (Lists of IARC Evaluations, May, 1995)

Regulatory Information Components

NOTE: The listing of regulations relating to a USS product may not be complete and should not be solely relied upon for all regulatory compliance responsibilities.

Components: Regulation

Al = SARA 313 if > 1.0%; SDWA; RCRA

Mn = SARA 313 if > 1.0%

P = SARA 313 if > 1.0%; CWA; CERCLA; SARA 302

Zn = SARA 313 if > 1.0%; CWA 304 and 307; SDWA; RCRA; CERCLA

Abbreviations

ACGIH American Conference of Governmental Industrial Hygienists

CAA Clean Air Act

CAS Chemical Abstract Service

CERCLA Comprehensive Environmental Response, Compensation and Liability Act

CWA Clean Water Act

IARC International Agency for Research on Cancer

NIOSH National Institute of Occupational Safety and Health
National Toxicology Program

OSHA Occupational Safety and Health Administration

PEL Permissible Exposure Limit

RCRA Resource Conservation Recovery Act

SARA Superfund Amendments and Reauthorization Act of 1986

SDWA Safe Drinking Water Act

TLV Threshold Limit Value

TSCA Toxic Substances Control Act

WHMIS Workplace Hazardous Materials Information System



U. S. STEEL GROUP
Material Safety Data Sheet
 P.O. Box 206, Pittsburgh, PA 15230-0206

Telephone Information:
 8:00 am-5:00 pm: (412) 433-6840
 Off-Hour Emergencies: (412) 433-5811
 Fax: (412) 433-6601

This information is taken from sources or based upon data believed to be reliable; however, USS Corporation makes no warranty as to the absolute correctness or sufficiency of any of the following or that additional or other measures may not be required under particular conditions.

PHYSICAL DATA:

Boiling Point:	<u>Not Applicable</u>
Freezing Point	<u>Not Applicable</u>
Melting Point—Base Metal:	<u>2750°F</u>
Melting Point—Metallic Coating:	<u>800-900°F</u>
Specific Gravity:	<u>7.85</u>
Vapor Pressure—at 20 °C:	<u>Not Applicable</u>
Vapor Density (air = 1):	<u>Not Applicable</u>
Solubility in Water:	<u>Not Soluble</u>
% Volatiles:	<u>Not Applicable</u>
Evaporation Rate:	<u>Not Applicable</u>
pH:	<u>Not Applicable</u>
Oil/Water Dist. Coefficient:	<u>Not Applicable</u>
Odor Threshold Conc.:	<u>Not Applicable</u>
Appearance (Physical State and Color):	<u>Metallic Gray Solid</u>
Odor:	<u>No Odor</u>

FIRE AND EXPLOSION HAZARDS:

Not flammable or combustible. Steel products in the solid state present no fire or explosion hazard and do not contribute to the combustion of other materials.

FIRE AND EXPLOSION DATA

Extinguishing Media: Not Applicable
Special Fire Fighting Instructions: None

Stability: Stable under normal conditions of use, storage and transport. May react with strong acids to liberate hydrogen.

Hazardous Combustion Products:

At temperatures above the melting point, may liberate fumes containing oxides of iron and alloying elements.

Oxidizing Material:

Does Not Cause or Contribute to Combustion of Other Material by Yielding Oxidizer

PRODUCT INFORMATION

Product/Common Name: Galvanized Sheet-Carbon Steel (Hot Dipped)
CAS No: 65997-19-5 **USS Code No:** 3C012
Original Issue Date: 8/1/85 **Reference:** 6/97

REGULATORY INFORMATION

U.S. OSHA R-T-K — Contains regulated material
Pennsylvania R-T-K — Contains regulated material

A = Hazardous Substance
E = Environmental Hazard
S = Special Hazard Substance

New Jersey R-T-K — Contains regulated material

B = Hazardous Substance
H = Special Health Hazard Substance

California Prop. 65 — This product may contain small amounts of lead, a material known to the State of California to cause cancer or reproductive toxicity.

SARA 313: MANGANESE, ZINC

The above materials are subject to SARA 313 reporting requirements. Please also note that if you prepackage or otherwise redistribute this product to industrial customers, SARA 313 requires that a notice be sent to those customers.

WHMIS: (Canadian): D-2B Product Classification

1995 NIOSH Registry of Toxic Effects of Chemical Substances Reference —

NO4565500, BD0330000, FF5250100, QT9900000
 OO9275000, TH3500000, WS4250000, XR1700000,
 CC4025000, OF7525000

Definitions:

C Ceiling
PNOC Particulates not otherwise classified
PNOR Particulates not otherwise regulated
STEL Short Term Exposure Limit. A 15-minute Time-Weighted Average Value.

INGREDIENTS AND RECOMMENDED OCCUPATIONAL EXPOSURE LIMIT

Ingredient Name	CAS No.	% wt.	LD50 Species/Route	OSHA PEL	ACGIH TLV
Base Metal					
Iron	7439-89-6	Balance	30 gm/kg rat/oral	Iron Oxide Fume - 10 mg/M ³ Total Dust - 15 mg/M ³ (PNOR) Respirable Fraction - 5 mg/M ³ (PNOR)	5 mg/M ³ (iron oxide dust and fume)
Alloying Elements					
Aluminum (E/B)	7429-90-5	.10 max.	No information	Total Dust - 15 mg/M ³ Respirable Fraction - 5 mg/M ³	10 mg/M ³ (dust) 5 mg/M ³ (welding fume)
Carbon	7440-44-0	.005/.60	440 mg/kg mouse/intravenous	Total Dust - 15 mg/M ³ (PNOR) Respirable Fraction - 5 mg/M ³ (PNOR)	10 mg/M ³ (Inhalable PNOC) 3 mg/M ³ (Respirable PNOC)
Columbium	7440-03-1	.08 max.	LD > 10 gm/kg rat/oral	Total Dust - 15 mg/M ³ (PNOR) Respirable Fraction - 5 mg/M ³ (PNOR)	10 mg/M ³ (Inhalable PNOC) 3 mg/M ³ (Respirable PNOC)
Manganese (E/B)	7439-96-5	.05/1.50	9 gm/kg rat/oral	Dust & Fume - 5 mg/M ³ (C)	.2 mg/M ³
Phosphorus (E/H)	7723-14-0	.15 max.	3030 ug/kg rat/oral	.1 mg/M ³	.1 mg/M ³
Sulfur (A/B)	7704-34-9	.05 max.	LD > 8437 mg/kg rat/oral	Total Dust - 15 mg/M ³ (PNOR) Respirable Fraction - 5 mg/M ³ (PNOR)	10 mg/M ³ (Inhalable PNOC) 3 mg/M ³ (Respirable PNOC)
Titanium (B)	7440-32-6	.10 max.	No information	Total Dust - 15 mg/M ³ (PNOR) Respirable Fraction - 5 mg/M ³ (PNOR)	10 mg/M ³
Metallic Coating		*			
Aluminum (E/B)	7429-90-5	.055 max.	No information	Total Dust - 15 mg/M ³ Respirable Fraction & Welding Fume - 5 mg/M ³	10 mg/M ³ (dust) 5 mg/M ³ (welding fume)
Antimony (E/B)	7440-36-0	.011 max.	No information	.5 mg/M ³	.5 mg/M ³
Iron	7439-89-6	.092 max.	5.5 gm/kg rat/intraperitoneal	Iron Oxide Dust & Fume - 10 mg/M ³ Total Particulates (as Fe)	5 mg/M ³ (iron oxide dust and fume)
Lead (E/H)	7439-92-1	.004 max.	TDLo—450 mg/kg/6 yrs. oral/human	.05 mg/M ³	.05 mg/M ³
Zinc (E/B)	7440-66-6	.18/9.1	TCLo—124 mg/M ³ /50 min inhalation/human	Fume - 5 mg/M ³ Total Dust - 15 mg/M ³ Respirable Fraction - 5 mg/M ³	5 mg/M ³ (fume) 10 mg/M ³ (fume—STEL) 10 mg/M ³ (dust)

NOTES:
 All commercial metals contain small amounts of various elements in addition to those specified. These small quantities, frequently referred to as "trace" or "residual" elements, generally originate in the raw materials used. Typical levels of commonly involved trace or residual elements that may be encountered in steel products are provided in Annex I so that their potential hazards may be considered. All exposure limits are based on 8-hour time-weighted average values unless stated otherwise. (STEL) denotes "Short-Term Exposure Limit", a 15-minute time-weighted average value.

* % wt/metallic coating is a percent of total product.

HEALTH DATA

Primary Routes of Entry:
Inhalation, ingestion and skin,
if coated.

Effects of Overexposure:

Chronic inhalation of high concentrations of iron oxide fumes or dusts may lead to a benign pneumoconiosis (siderosis). Inhalation of high concentrations of ferric oxide may possibly enhance the risk of lung cancer development in workers exposed to pulmonary carcinogens.

Chronic inhalation of high concentrations, or ingestion, of lead may affect a variety of organ systems, including the nervous system, kidneys, reproductive system, blood formation, and gastrointestinal tract.

The inhalation of high concentrations of freshly formed oxide fumes and dusts of Manganese and/or Zinc in the respirable particle size range can cause an influenza-like illness termed metal fume fever. Typical symptoms last 12 to 48 hours and are characterized by metallic taste in mouth, dryness and irritation of the throat, followed by weakness, muscle pain, fever and chills. Continuous exposures to high concentrations of manganese can cause central nervous system disorders and "manganese pneumonia". Fibrosis of lung tissue from manganese exposures has also been reported for products containing manganese only.

Inhalation of phosphorus oxides may cause respiratory irritation.

Sulfur compounds, present in the fumes, may irritate the skin, eyes, lungs and gastrointestinal tract.

Longterm inhalation exposure to high concentrations (overexposure) to pneumoconiotic agents may act synergistically with inhalation of oxides, fumes or dusts of this product to cause toxic effects.

OIL COATING MAY BE USED: Prolonged or repeated contact with unprotected skin may result in skin irritation. Torchng or burning operations on steel products with oil coating may produce emissions which can be irritating to the eyes and respiratory tract.

Emergency and First Aid Procedures:

Respiratory: For overexposure to airborne fumes and particulates, remove exposed person to fresh air. If breathing is difficult or has stopped, administer artificial respiration or oxygen as indicated. Seek medical attention promptly.

Metal fume fever may be treated by bed rest, and administering a pain and fever reducing medication. Seek medical attention.

Skin: If thermal burn has occurred, flush area with cold water. Seek medical attention. For mechanical abrasions, seek medical attention.

Eyes: Flush eyes with large amounts of water to remove particles. If irritation persists, seek medical attention.

Special Protection Information:

Respiratory: NIOSH/MSHA-approved dust and fume respirators should be used to avoid excessive inhalation of particulates. Appropriate respirator selection depends on the magnitude of exposure.

Skin: Protective gloves should be worn as required for welding, burning or handling operations. Oil coating may be used: Wear gloves when handling; do not continue to use gloves or work clothing that has become saturated or soaked through with oil coating. Wash hands, and any area of skin after contact, with soap and water or waterless hand cleaner.

Eyes: Use safety glasses or goggles as required for welding, burning, sawing, brazing, grinding or machining operations.

Ventilation: Local exhaust ventilation should be provided when welding, burning, sawing, brazing, grinding or machining to prevent excessive dust or fume exposure.

Other Protective Equipment: Depending upon the conditions of use and specific work situations, additional protective equipment and/or clothing may be required to control exposures.

Precautions in Handling and Storage: Operations with the potential for generating high concentrations of airborne particulates should be evaluated and controlled as necessary. Avoid breathing metal fumes and/or dusts.

Spill or Leak Procedures: Not applicable to steel in solid state. Dispose in accordance with state and local regulation.

U. S. STEEL GROUP

A Division of USX Corporation
Material Safety Data Sheet

PRODUCT INFORMATION

Product/Common Name: Galvanized Sheet-Carbon Steel (Hot Dipped)

CAS No.: 65997-19-5

USS Code No.: 3C012

Reference: 6/97

Health Hazard Data

NOTE: Steel products under normal conditions do not present an inhalation, ingestion, contact health or environmental hazard. However, operations such as burning, welding, sawing, brazing, grinding, and possibly machining, etc., 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 health hazards.

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.

SARA Potential Hazard Categories are:

- Immediate Acute Health Hazard
- Delayed Chronic Health Hazard

Carcinogen Information:

IARC identifies lead and welding fumes as Group 2B carcinogens, that are possibly carcinogenic to humans. (Lists of IARC Evaluations, May, 1995)

Regulatory Information Components

NOTE: The listing of regulations relating to a USS product may not be complete and should not be solely relied upon for all regulatory compliance responsibilities.

Components: Regulation

Al = SARA 313 if > 1.0%; SDWA; RCRA
Mn = SARA 313 if > 1.0%
P = SARA 313 if > 1.0%; CWA; CERCLA; SARA 302
Pb = SARA 313 if > 0.1%; Calif. Prop. 65; CWA 304 and 307; SDWA; CAA 109; RCRA; SARA 302; SARA 110; OSHA Specific Requirements; CERCLA
Sb = SARA 313 if > 1.0%; TSCA 8(a)(d); CWA 304 and 307; SDWA; RCRA; CERCLA
Zn = SARA 313 if > 1.0%; CWA 304 and 307; SDWA; RCRA; CERCLA; SARA 110

Abbreviations

ACGIH American Conference of Governmental Industrial Hygienists
CAA Clean Air Act
CAS Chemical Abstract Service
CERCLA Comprehensive Environmental Response, Compensation and Liability Act
CWA Clean Water Act
IARC International Agency for Research on Cancer
NIOSH National Institute of Occupational Safety and Health
NTP National Toxicology Program
OSHA Occupational Safety and Health Administration
PEL Permissible Exposure Limit
RCRA Resource Conservation Recovery Act
SARA Superfund Amendments and Reauthorization Act of 1986
SDWA Safe Drinking Water Act
TLV Threshold Limit Value
TSCA Toxic Substances Control Act
WHMIS Workplace Hazardous Materials Information System



U. S. STEEL GROUP
P.O. Box 206
Pittsburgh, PA 15230-0206

June, 1997

Enclosed is a package of revised Material Safety Data Sheets including the specific MSDS for the U. S. Steel product that you purchased. It is the continuing policy of U. S. Steel to provide to our customers health, safety and environmental protection information that is appropriate for handling and using our products.

These Material Safety Data Sheets contain information that is valuable to your employee health and safety program and may be required to be in your possession by the Federal OSHA Hazard Communication Standard or other right-to-know legislation. It is important that your facility hazard communication coordinator, industrial hygiene, or safety personnel receive this information so that it can be communicated to those employees having contact with these products.

Revised Material Safety Data Sheets are promptly forwarded to you when significant changes of the information contained therein necessitate publication of an updated copy.

This package contains an index listing our products. The Material Safety Data Sheet for the specific product that you purchased can be located by referencing the USS code number and the product category shown in this index. The products in this index are categorized as carbon steel, alloy steel or high strength low alloy steel.

Annex I of this package lists the typical levels of trace or residual elements that may be contained in steel products. These elements are listed to provide as much information as is reasonably possible regarding the composition of our steel products, and are in addition to the materials listed on the individual MSDS.

Annex II lists the most commonly used rust preventative or protective coatings that are applied to products requiring such treatment, if a coating is not specified by you. This annex lists the steel-producing facility, the products to which the coatings are applied and the manufacturer's or supplier's identification and address. This information is provided to enable you to obtain a Material Safety Data Sheet directly from the manufacturer or supplier for the rust preventative or coating that is applied to the product that you purchase. Material Safety Data Sheets for specified coatings should also be requested from the manufacturer or supplier of the coating. This procedure makes it possible for the manufacturers or suppliers to send copies of the latest revision of their Material Safety Data Sheets directly to you as a user of their products.

Annex III lists rust preventative or protective coatings which, in addition to the products already covered in Annex II, may be applied by outside processors under contract to U. S. Steel.

Also contained in the package are labels that can be reproduced or the information contained thereon extracted for label-producing purposes. The information contained on the labels varies according to the composition of the steel product and the varying degrees of hazards associated with the alloys.

The OSHA Hazard Communication Standard and most other right-to-know legislation consider ingredients of steel as hazardous substances. Consequently, the appropriate MSDS and warning label should be forwarded to other employers so the information contained therein can be communicated to their employees working with these materials.

Hazard Communication Programs are of the uppermost importance to U. S. Steel. We believe this information will be very beneficial to your Hazard Communication Program and we welcome any inquiries regarding any additional information that you may require.

A handwritten signature in cursive script that reads 'J. F. Quealy'.

J. F. Quealy
Manager—Industrial Hygiene

LABELS
ALLOY STEEL (CODE NOS. 1A001 THROUGH 4A019)



ALLOY STEEL

WARNING! CANCER HAZARD (CONTAINS CHROMIUM AND NICKEL). EXPOSURE TO HIGH CONCENTRATIONS OF DUST OR FUME DURING WELDING, BURNING, MELTING, CUTTING, BRAZING, GRINDING AND POSSIBLY MACHINING, ETC., MAY PRODUCE IMMEDIATE OR DELAYED DAMAGE TO LUNG OR OTHER ORGANS.

THIS PRODUCT MAY BE COATED WITH MATERIALS THAT COULD RESULT IN SKIN IRRITATION WITH PROLONGED CONTACT.

PRECAUTIONS: AVOID BREATHING OR INGESTING DUST OR FUME. ADEQUATE VENTILATION IS REQUIRED WHILE WELDING, BURNING, MELTING, CUTTING, BRAZING, GRINDING AND MACHINING.

AVOID SKIN CONTACT IF MATERIAL IS COATED.

FIRST AID: FOR OVEREXPOSURE TO AIRBORNE DUST AND FUME, REMOVE EXPOSED PERSON TO FRESH AIR. IF BREATHING IS DIFFICULT OR HAS STOPPED, ADMINISTER ARTIFICIAL RESPIRATION OR OXYGEN AS INDICATED. SEEK MEDICAL ATTENTION PROMPTLY.

IF PRODUCT IS COATED AND EXCESSIVE SKIN CONTACT OCCURS, WASH WITH SOAP AND WATER. IF IRRITATION DEVELOPS, SEEK MEDICAL ATTENTION.

ADDITIONAL INFORMATION: REFER TO MATERIAL SAFETY DATA SHEETS USS CODE NOS. 1A001 THROUGH 4A019 FOR FURTHER INFORMATION.

U. S. Steel Group, a division of USX Corp., PO Box 206 (MSDS), Pittsburgh, PA 15230-0206

LABELS
CARBON STEEL (CODE NOS. 1C001 THROUGH 4C020)



CARBON STEEL

WARNING! EXPOSURE TO HIGH CONCENTRATIONS OF DUST OR FUME DURING WELDING, BURNING, MELTING, CUTTING, BRAZING, GRINDING AND POSSIBLY MACHINING, ETC., MAY PRODUCE IMMEDIATE OR DELAYED DAMAGE TO LUNG OR OTHER ORGANS.

THIS PRODUCT MAY BE COATED WITH MATERIALS THAT COULD RESULT IN SKIN IRRITATION WITH PROLONGED CONTACT.

PRECAUTIONS: AVOID BREATHING OR INGESTING DUST OR FUME. ADEQUATE VENTILATION IS REQUIRED WHILE WELDING, BURNING, MELTING, CUTTING, BRAZING, GRINDING AND MACHINING.

AVOID SKIN CONTACT IF MATERIAL IS COATED.

FIRST AID: FOR OVEREXPOSURE TO AIRBORNE DUST AND FUME, REMOVE EXPOSED PERSON TO FRESH AIR. IF BREATHING IS DIFFICULT OR HAS STOPPED, ADMINISTER ARTIFICIAL RESPIRATION OR OXYGEN AS INDICATED. SEEK MEDICAL ATTENTION PROMPTLY.

IF PRODUCT IS COATED AND EXCESSIVE SKIN CONTACT OCCURS, WASH WITH SOAP AND WATER. IF IRRITATION DEVELOPS, SEEK MEDICAL ATTENTION.

ADDITIONAL INFORMATION: REFER TO MATERIAL SAFETY DATA SHEETS — USS CODE NOS. 1C001 THROUGH 4C020 FOR FURTHER INFORMATION.

U. S. Steel Group, a division of USX Corp., PO Box 206 (MSDS), Pittsburgh, PA 15230-0206



HIGH STRENGTH LOW ALLOY

WARNING! EXPOSURE TO HIGH CONCENTRATIONS OF DUST OR FUME DURING WELDING, BURNING, MELTING, CUTTING, BRAZING, GRINDING AND POSSIBLY MACHINING, ETC., MAY PRODUCE IMMEDIATE OR DELAYED DAMAGE TO LUNG OR OTHER ORGANS.

THIS PRODUCT MAY BE COATED WITH MATERIALS THAT COULD RESULT IN SKIN IRRITATION WITH PROLONGED CONTACT.

PRECAUTIONS: AVOID BREATHING OR INGESTING DUST OR FUME. ADEQUATE VENTILATION IS REQUIRED WHILE WELDING, BURNING, MELTING, CUTTING, BRAZING, GRINDING AND MACHINING.

AVOID SKIN CONTACT IF MATERIAL IS COATED.

FIRST AID: FOR OVEREXPOSURE TO AIRBORNE DUST AND FUME, REMOVE EXPOSED PERSON TO FRESH AIR. IF BREATHING IS DIFFICULT OR HAS STOPPED, ADMINISTER ARTIFICIAL RESPIRATION OR OXYGEN AS INDICATED. SEEK MEDICAL ATTENTION PROMPTLY.

IF PRODUCT IS COATED AND EXCESSIVE SKIN CONTACT OCCURS, WASH WITH SOAP AND WATER. IF IRRITATION DEVELOPS, SEEK MEDICAL ATTENTION.

ADDITIONAL INFORMATION: REFER TO MATERIAL SAFETY DATA SHEETS — USS CODE NOS. 3H011, 3H016, 4H020 FOR FURTHER INFORMATION.

U. S. Steel Group, a division of USX Corp., PO Box 206 (MSDS), Pittsburgh, PA 15230-0206

LABELS
CARBON STEEL LEADED (CODE NO. 3C012, 3C014, 3H012)



CARBON STEEL-METALLIC COATING

WARNING! CANCER HAZARD (CONTAINS LEAD). EXPOSURE TO HIGH CONCENTRATIONS OF DUST OR FUME DURING WELDING, MELTING, CUTTING, BRAZING, GRINDING AND POSSIBLY MACHINING, ETC., MAY PRODUCE IMMEDIATE OR DELAYED DAMAGE TO KIDNEYS, LUNGS OR OTHER ORGANS. EXPOSURE MAY ALSO CAUSE REPRODUCTIVE DISORDERS THROUGH INHALATION OR INGESTION OF LEAD.

THIS PRODUCT MAY BE COATED WITH MATERIALS THAT COULD RESULT IN SKIN IRRITATION WITH PROLONGED CONTACT.

PRECAUTIONS: AVOID BREATHING OR INGESTING DUST OR FUME. ADEQUATE VENTILATION IS REQUIRED WHILE WELDING, BURNING, MELTING, CUTTING, BRAZING, GRINDING AND MACHINING. AVOID SKIN CONTACT IF MATERIAL IS COATED.

FIRST AID: FOR OVEREXPOSURE TO AIRBORNE DUST AND FUME, REMOVE EXPOSED PERSON TO FRESH AIR. IF BREATHING IS DIFFICULT OR HAS STOPPED, ADMINISTER ARTIFICIAL RESPIRATION OR OXYGEN AS INDICATED. SEEK MEDICAL ATTENTION PROMPTLY.

IF PRODUCT IS COATED AND EXCESSIVE SKIN CONTACT OCCURS, WASH WITH SOAP AND WATER. IF IRRITATION DEVELOPS, SEEK MEDICAL ATTENTION.

ADDITIONAL INFORMATION: REFER TO MATERIAL SAFETY DATA SHEETS — USS CODE NO. 3C012, 3C014, 3H012 FOR FURTHER INFORMATION.

U. S. Steel Group, a division of USX Corp., PO Box 206 (MSDS), Pittsburgh, PA 15230-0206

LABELS
CARBON STEEL LEADED (CODE NO. 3C015)



CARBON STEEL-METALLIC COATING

WARNING! CANCER HAZARD (CONTAINS LEAD AND NICKEL). EXPOSURE TO HIGH CONCENTRATIONS OF DUST OR FUME DURING WELDING, MELTING, CUTTING, BRAZING, GRINDING AND POSSIBLY MACHINING, ETC., MAY PRODUCE IMMEDIATE OR DELAYED DAMAGE TO KIDNEYS, LUNGS OR OTHER ORGANS. EXPOSURE MAY ALSO CAUSE REPRODUCTIVE DISORDERS THROUGH INHALATION OR INGESTION OF LEAD.

THIS PRODUCT MAY BE COATED WITH MATERIALS THAT COULD RESULT IN SKIN IRRITATION WITH PROLONGED CONTACT.

PRECAUTIONS: AVOID BREATHING OR INGESTING DUST OR FUME. ADEQUATE VENTILATION IS REQUIRED WHILE WELDING, BURNING, MELTING, CUTTING, BRAZING, GRINDING AND MACHINING. AVOID SKIN CONTACT IF MATERIAL IS COATED.

FIRST AID: FOR OVEREXPOSURE TO AIRBORNE DUST AND FUME, REMOVE EXPOSED PERSON TO FRESH AIR. IF BREATHING IS DIFFICULT OR HAS STOPPED, ADMINISTER ARTIFICIAL RESPIRATION OR OXYGEN AS INDICATED. SEEK MEDICAL ATTENTION PROMPTLY.

IF PRODUCT IS COATED AND EXCESSIVE SKIN CONTACT OCCURS, WASH WITH SOAP AND WATER. IF IRRITATION DEVELOPS, SEEK MEDICAL ATTENTION.

ADDITIONAL INFORMATION: REFER TO MATERIAL SAFETY DATA SHEETS — USS CODE NO. 3C015 FOR FURTHER INFORMATION.

U. S. Steel Group, a division of USX Corp., PO Box 206 (MSDS), Pittsburgh, PA 15230-0206



HIGH STRENGTH LOW ALLOY
(CONTAINING CHROMIUM AND/OR NICKEL)

WARNING! CANCER HAZARD (CONTAINS CHROMIUM AND/OR NICKEL). EXPOSURE TO HIGH CONCENTRATIONS OF DUST OR FUME DURING WELDING, BURNING, MELTING, CUTTING, BRAZING, GRINDING AND POSSIBLY MACHINING, ETC., MAY PRODUCE IMMEDIATE OR DELAYED DAMAGE TO LUNG OR OTHER ORGANS.
THIS PRODUCT MAY BE COATED WITH MATERIALS THAT COULD RESULT IN SKIN IRRITATION WITH PROLONGED CONTACT.

PRECAUTIONS: AVOID BREATHING OR INGESTING DUST OR FUME. ADEQUATE VENTILATION IS REQUIRED WHILE WELDING, BURNING, MELTING, CUTTING, BRAZING, GRINDING AND MACHINING.

AVOID SKIN CONTACT IF MATERIAL IS COATED.

FIRST AID: FOR OVEREXPOSURE TO AIRBORNE DUST AND FUME, REMOVE EXPOSED PERSON TO FRESH AIR. IF BREATHING IS DIFFICULT OR HAS STOPPED, ADMINISTER ARTIFICIAL RESPIRATION OR OXYGEN AS INDICATED. SEEK MEDICAL ATTENTION PROMPTLY.

IF PRODUCT IS COATED AND EXCESSIVE SKIN CONTACT OCCURS, WASH WITH SOAP AND WATER. IF IRRITATION DEVELOPS, SEEK MEDICAL ATTENTION.

ADDITIONAL INFORMATION: REFER TO MATERIAL SAFETY DATA SHEETS USS CODE NOS. 1H001, 1H004, 4H019 FOR FURTHER INFORMATION.

U. S. Steel Group, a division of USX Corp., PO Box 206 (MSDS), Pittsburgh, PA 15230-0206



MSDS INDEX FOR STEEL PRODUCTS

PRODUCT CATEGORY	USS Code Number		
	CARBON	ALLOY	HIGH STRENGTH LOW ALLOY
Ingots, Blooms, Slabs	1C001	1A001	1H001
Plate	1C004	1A004	1H004
Black Plate	2C008		
Tin Plate and Tin Coated Sheet - Electrolytic	2C009		
Tin Free Steel	2C010		
Hot or Cold Rolled Sheet/Strip and Hot Rolled Skelp	3C011	3A011	3H011
Galvanized Sheet - Hot Dipped	3C012		3H012
Galvanized Sheet - Electrolytic	3C013		
Terne Sheet	3C014		
Ni-Terne Sheet	3C015		
GALVALUME® Sheet	3C016		3H016
Electrical Sheet	3C017	3A017	
Standard Pipe	4C018		
Oil Country Goods	4C019	4A019	4H019
Line Pipe and Couplings	4C020		4H020

ANNEX I
TYPICAL LEVELS OF TRACE OR RESIDUAL ELEMENTS IN STEELS

ELEMENT			% WEIGHT
Aluminum	Al	(7429 - 90 - 5)	0.002 - 0.1
Arsenic	As	(7440 - 38 - 2)	0.005 - 0.008
Boron	B	(7440 - 42 - 8)	0.0002 - 0.0004
Cadmium	Cd	(7440 - 43 - 9)	<.001
Calcium	Ca	(7440 - 70 - 2)	0.0002
Chromium	Cr	(7440 - 47 - 3)	0.02 - 0.08
Cobalt	Co	(7440 - 48 - 4)	<0.005 - 0.009
Copper	Cu	(7440 - 50 - 8)	0.009 - 0.18
Lead	Pb	(7440 - 92 - 1)	<0.001
Molybdenum	Mo	(7440 - 98 - 7)	<0.004 - 0.04
Nickel	Ni	(7440 - 02 - 0)	0.011 - 0.04
Niobium	Nb	(7440 - 03 - 1)	0.002 - 0.005
Silicon	Si	(7440 - 21 - 3)	<0.004 - 0.02
Tin	Sn	(7440 - 31 - 5)	<0.004 - 0.02
Titanium	Ti	(7440 - 32 - 6)	0.001 - 0.004
Vanadium	V	(7440 - 62 - 3)	0.001 - 0.003
Zirconium	Zr	(7440 - 67 - 7)	0.002



INDEX FOR ANNEX II SUPPLIERS OF PROTECTIVE COATINGS

Atochem North America, Inc.
Chemicals Specialties Division
2375 State Street
Cornwells Heights, PA 19020
215-245-3164

Bestolife Corporation
2777 Stemmons Freeway
Suite 1800
Dallas, TX 75207
214-631-6070

Castrol Industrial Inc.
1001 West 31st Street
Downers Grove, IL 60515-1280
708-241-4000

Chem and Lube
1901 South 12th Street
Allentown, PA 18103-4777
215-295-5222

D. A. Stuart Company
7575 Plaza Court
Willowbrook, IL 60521
708-655-4595

Dacar Chemical Company
1007 McCartney Street
Pittsburgh, PA 15220
412-921-3620

Daubert Chemical Company
4700 S. Central Avenue
Chicago, IL 60638
708-496-7350

Harry Miller Corporation
4th & Bristol Streets
Philadelphia, PA 19140
215-324-4000

Houghton International Inc.
Madison & Van Buren Avenues
P.O. Box 930
Valley Forge, PA 19482-0930
610-666-4105

**Kendall/Amalie Division
Witco Chemical Corp.**
77 North Kendall Avenue
Bradford, PA 16701
814-368-6111

Metal Lubricants Co.
17050 Lothrop Avenue
Harvey, IL 60426
708-733-8900

Mill Chemicals & Lubricants Inc.
2470 Windy Hill Road
Suite 248
Marietta, GA 30067
404-952-7639

Moreflex, Inc.
2110 Highpoint Road
Greensboro, NC 27403
910-292-1781

Nalco Chemical Company
One Nalco Center
Naperville, IL 60563-1198
630-305-1000

Oakite Products Inc.
50 Valley Road
Berkeley Heights, NJ 07922
908-464-6900

PPG Chemfil
1330 Piedmont
Troy, MI 48083
810-689-0720

Prochemco, Inc.
Ripley & Schneider Streets
Lake Station, IN 46405
219-962-8554

Quaker Chemical Corporation
Elm Street
Conshohocken, PA 19428-0809
610-832-4000

Ranbar Technology, Inc.
1114 William Flinn Highway
Glenshaw, PA 15116
412-486-1111

Research Metal Fluids
Division of Research Solvents
and Chemicals, Inc.
133 Bain Drive
LaVergne, TN 37086
615-793-6737

T.G. Chemicals
2515 Elkridge Drive
Wexford, PA 15090
412-231-2099

Texaco Lubricants Company
P.O. Box 4427
Houston, TX 77210-4427
914-831-3400

Titan Coatings, Inc.
2025 Exchange Place
Bessemer, AL 35023
205-426-8149

Vulcan Oil & Chemical Products
5353 Spring Grove Avenue
Cincinnati, OH 45217
513-242-2672



ANNEX II — RUST PREVENTATIVES AND PROTECTIVE COATINGS

FAIRFIELD WORKS

Sheet Products

Nalco 6292BD Rust Preventative	Nalco Chemical Company
Nalco 6292 Rust Preventative	Nalco Chemical Company
Nalco 6925 Temper Mill Coolant	Nalco Chemical Company
Ferrocote 61A-US	Quaker Chemical Corporation
Gen05 Meropa Oils	Texaco Lubricants Company
Stripclean 37XL	Atochem North America, Inc.
KS 6-900	Atochem North America, Inc.
SF 4000	Atochem North America, Inc.

Pickle Line

RPO 50 SI Pickle Oil	Mill Chemicals & Lubricants
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Galvanized Products

Oakite Okemcoat F1	Oakite Products, Inc.
O2601 Meropa 100 (Gen05 Meropa Oils)	Texaco Lubricants Company
Pennsteel 100	Atochem North America, Inc.
Oakite Gardobond VP 4918	Oakite Products, Inc.

Pipe Products

Kendex OCTG Orange Corrosion Inhibitor	Kendall/Amalie Division Witco Chemical Corp.
Rust Veto 4225	Houghton International, Inc.
Rust Veto 76-T	Houghton International, Inc.
API Modified Thread Compound	Bestolife Corporation
Bestolife 2000	Bestolife Corporation
Bestolife 2000 Arctic Grade	Bestolife Corporation
Resco Alpha Grind RD	Research Metal Fluids - Research Solvents & Chemicals
G-4823 S/A Pipe Coatings	Ranbar Technology, Inc.
G-4815-P1 Ultraviolet Cured Clear Coating	Ranbar Technology, Inc.
HAP Free Clear Pipe Coating	Titan Coatings, Inc.

FAIRLESS WORKS

Black Plate, Cold and Hot Rolled Products

K-14FN	D. A. Stuart Company
KS 6-200A	Atochem North America, Inc.

Double Cold Reduction

Prolube MR 500EP Rolling Oil	Prochemco, Inc.
Temper Shield 33	D. A. Stuart Company

Electrolytic Tin Products

Citroflex A-4	Moreflex, Inc.
Sodium Dichromate, Dihydrate	T. G. Chemicals

Galvanized Products

Draw Clean V	Oakite Products, Inc.
Ferrocote 61-MAL-HCL-1	Quaker Chemical Corporation
Ferrocote 61A-US	Quaker Chemical Corporation

Tin Free Steel Products

B-55 K Lubricant	Prochemco, Inc.
Citroflex A-4	Moreflex, Inc.

#1 Recoiler

DOS-CS	Chem and Lube
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GARY WORKS

Hot Rolling Division — Hot Roll Finishing

Ferrocote 61A-US	Quaker Chemical Corporation
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Sheet Products Division — East Galvanize

Ferrocote 61A-US (Strip Oil)	Quaker Chemical Corporation
Ferrocote 61-MAL-HCL (Pre Lube)	Quaker Chemical Corporation
Chem Treat CT-4	Dacar Chemical Company

Sheet Products Division — 2-Stand Temper Mill

Ferrocote 61-MAL-HCL-1	Quaker Chemical Corporation
Ferrocote 61A-US	Quaker Chemical Corporation
Nalco 6292	Nalco Chemical Company
Nalco 6295	Nalco Chemical Company

Sheet Products Division — Electro-Galvanize Line

Ferrocote 61A-US	Quaker Chemical Corporation
Ferrocote EGL-1-ST	Quaker Chemical Corporation
Ferrocote EGL-1	Quaker Chemical Corporation
Ferrocote 61-MAL-HCL-1	Quaker Chemical Corporation
015D-P3 Coating Oil	Vulcan Oil & Chemical Products

Sheet Division — North Sheet Mill

Ferrocote 61A-US	Quaker Chemical Corporation
Daubert Nox Rust X-111	Daubert Chemical Co.
ESTL-634	Vulcan Oil & Chemical Products
ESTL-636	Vulcan Oil & Chemical Products

Sheet Division — Continuous Pickle

Steel Shield PL-910 S	D. A. Stuart Company
CRPS-90 GW Pickle Oil	Vulcan Oil & Chemical Products
Steel Shield PL-955 GW	D. A. Stuart Company
Ferrocote 61A-US	Quaker Chemical Corporation
Ferrocote 61-MAL-HCL-1	Quaker Chemical Corporation
Chemseal 20	PPG Chemfil
Tru-Zite #2-107F	PPG Chemfil
Rinse Conditioner	PPG Chemfil
Chem Treat CT-4	Dacar Chemical Company

Tin Products — Electrolytic Tin Products

Proclean-LG-1	Prochemco, Inc.
B-55K	Prochemco, Inc.
Prolube 500 EP	Prochemco, Inc.
Progrind 357 Coolant & RP	Prochemco, Inc.
Hydrashield 51	D. A. Stuart Company

Tin Products — Tin Finishing

Proclean LG-1	Prochemco, Inc.
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ANNEX II MON VALLEY WORKS

Hot Rolled Products — Pickle Line

KS 5-910 (Summer Grade)	Atochem North America, Inc.
KS 5-915 (Winter Grade)	Atochem North America, Inc.
Ferrocote 61 MAL HCL 1	Quaker Chemical Corporation

Cold Rolled Products — Cold Reduction Mill

KS 6-100	Atochem North America, Inc.
Stripclean 41XL-A	Atochem North America, Inc.

Cold Rolled Products — Temper Mill

Qwerl 599 USX	Quaker Chemical Corporation
Ferrocote 61 A-US	Quaker Chemical Corporation
Steelgard 2005	Harry Miller Corporation
6292 Rust Preventative	Nalco Chemical Company
Metalub PL-7105A	Metal Lubricants Co.

Terne Products

Ferrocote 61 A-US	Quaker Chemical Corporation
Chem Treat CT-9	Dacar Chemical Company

Galvanized Products

Chem Treat CT-4	Dacar Chemical Company
Ferrocote 61A-US	Quaker Chemical Corporation

Galvalume Products

Rustilo DW 924 HF	Castrol Industrial Inc.
Oakite Okemcoat F1	Oakite Products, Inc.
Oakite Gardobond VP 4918	Oakite Products, Inc.



**ANNEX III
RUST PREVENTATIVES AND PROTECTIVE COATINGS
OUTSIDE PROCESSING CONTRACTORS
(These are in addition to Annex II)**

Paint Systems

Product	Manufacturer	Product	Manufacturer	
Ceram-a-sil Si-Polyester	AKZO-NOBEL Coatings 313 Windsor P.O. Box 147 Columbus, OH 43211	Ultralure Waterbase	Lilly Industrial Coatings (continued)	
Ceram-a-Star 900 Si-Polyester		Ultradoor Waterbase		
Ceram-a-Star 950 Si-Polyester		Ultraflexar Polyester		
Drawable Polyester		Ultraflexar Post Embossed		
Epoxy Primers Epoxy		System Polyester		
Fluorostar Kynar 70% Fluorocarbon		Urethane Primers		
Hydrasea II Water Base Primer		Visulure Fluorocarbon		
Modified Urethane Primer		Waterbase Backers		
Phase II Standard Appliance Polyester		Waterbase Primers		
Phase II Standard Appliance Post Embossed Polyester				
Phase V Polyester		Dorrform Epoxy A31	Magni International 2771 Hammond Detroit, MI 48209	
Polyester Backers		Dorrform Epoxy A32		
Polyester Primer		Dorrldraw 102		
Polydure 500 Polyester		Industrias Aries Monterrey, Mexico	Acrylics	Morton International 100 North Riverside Plaza Chicago, IL 60606-1598 or 1500 Lathem Street Batavia, IL 60510
Polydure 1000 Polyester			Clear Alkyd Polyester	
Rel-Shield Vinyl Plastisol			Epoxy Barrier Coat	
Trinar Kynar 70% Fluorocarbon			Epoxy Clear	
Urethane			Epoxy Primers	
Urethane Primers			First Coat MP	
Waterbase Primers			First Coat XL	
Zincrometal	Flexceram II Polyester			
	Fluoroceram Kynar 70% Fluorocarbon			
	Fluoroceram TF & LG Fluorocarbon			
	Fluoroceram Acrylic Primer			
	HG Backer			
	Inks			
	Modified Polyester Primer			
	Polyester Backers			
	Polyester Primers			
	Polyceram 100 Polyester			
	Polyceram 320, 320H, 329XL Polyester			
	Polyceram 580 Polyester			
	Polyceram 610 Polyester			
	Polyceram 620 Polyester			
	Polyceram 640 Polyester			
	Polyceram 660 Polyester			
	Polyceram 780 Polyester			
	Polyceram 2100 Polyester			
	Polyceram 3100 Polyester			
	Polyceram 3200 Linear Polyester			
	Polycron C			
	Polyester Backer			
	Plastisols			
	Super SP Si-Polyester			
	UltraMet Fluorocarbons			
	Urethane Primers			
		PPG Industries 760 Pittsburgh Dr. Delaware, OH 43015		
	Acrylic Backers			
	Acrylic Primers			
	Duracron Acrylic			
	Duracron 630 Acrylic			
	Duranar Kynar 70% Fluorocarbons			
	Duranar Plus Fluorocarbons			
	Duranar LG Fluorocarbons			
	Duranar XL Kynar 70% Fluorocarbons			
	Duranar XL Plus Kynar 70% Fluorocarbons			
	Duranar XLE Kynar 70%			
	Environ ST Waterbase			
		(continued)		



**ANNEX III (Continued)
RUST PREVENTATIVES AND PROTECTIVE COATINGS
OUTSIDE PROCESSING CONTRACTORS
(These are in addition to Annex II)**

Paint Systems (continued)

Product	Manufacturer	Product	Manufacturer
Epoxy Backers Epoxy Primers Omniprime Primer Polycron AP Polyester Polyester Backers Polyester Primers Trudraw Polyester Truform Polyester Urethane Primers	PPG Industries (continued)	Modified Polyester Backer Polyester Backers Polyester Primers Polyester Topcoats (Alamo White) Sparclad VII Si-Polyester Ultraflex Polyester Ultraflex Polyurethane Primer Valcoat Polyester Valshield Plastisol	Valspar Corp. (continued)
Coil Clad 10S Si-Polyester Dynapon Polyester Epoxy Primers Fluroclear Fluorocarbon Fluropon Fluorocarbons Fluropon Classic & Classic II Fluropon Kynar 70% Fluorocarbons Fluropon Polyester Fluropon Satin Fluorocarbon Flurothane II & IV Kynar 70% Flurocarbons	Valspar Corp. 901 North Greenwood Ave. Kankakee, IL 60901	Polyester Topcoats Polyester Backers Polyester Primers Urethane Primers Epoxy Primers Polyester Backers Polyester Topcoats	Specialty Coatings Co. Inc. 2500 - 26 Delta Lane Elk Grove, IL 60007 Yenkin-Majestic Paint Corp. 1920 Leonard Avenue Columbus, OH 43219

Lubricants

Product	Manufacturer	Product	Manufacturer
Corelub Dry Lube	Coral 135 LeBaron Waukegan, IL 60085	Chemform	PPG Industrial Coatings 760 Pittsburgh Dr. Delaware, OH 43015
Liquid Naptha	Lilly Industrial Coatings 546 West Abbott St. Indianapolis, IN 46225		

Pretreatments

Product	Manufacturer	Product	Manufacturer
B3010 Permatreat 1510 Permatreat 2105 Permatreat 2600 Permatreat 3010 Serlgand 7760	Betz-Metchem 33 Kensington Parkway Abington, MD 21009	Bonderite 37SA Bonderite 902 Bonderite 1303 Bonderite 1310 Bonderite 1402W Bonderite 1421 Bonderite 4800 Parco Cleaner 338 Parco Cleaner 363 Parco Cleaner 1200 Parcolene 62 Parker 348 37S Zinc Phosphate 1402W Dry-In-Place	Parker Am-Chem 32100 Stephenson Highway Madison Heights, MI 48071
Gardobond 1303 Gardal 1310 Gardobond 901 Gardolene 62 Gardoclean 338	Oakite Products, inc. 50 Valley Road Berkeley Heights, NJ 07922		



ANNEX III (Continued)
RUST PREVENTATIVES AND PROTECTIVE COATINGS
OUTSIDE PROCESSING CONTRACTORS
(These are in addition to Annex II)

Coating Oils—Hot Rolled

Product	Manufacturer	Processors Who Use
Daubert Chem X-241	Daubert Chemical Co. 4700 S. Central Ave. Chicago, Illinois 60638	National Processing Co. WorldClass
Nalco 6579	NALCO Chemical Co. 1 Nalco Center Naperville, IL 60563	Worthington — Porter
Prochem 832-8	Prochemco Inc. Ripley & Schneider Sts. Lake Station, IN 46405	Indiana Pickling & Processing
Metalub RP 4107A Metalub RP 4107H	Metal Lubricants Co. 17050 Lathrop Ave. Harvey, Illinois 60426	Steel Warehouse Voss — Lantz
Vulcan HRPS-W Vulcan WSS-ESW	Vulcan Oil Co. 5353 Spring Grove Ave. Cincinnati, Ohio 45217	Steel Warehouse Worthington — Monroe

Dry Lubes

Product	Manufacturer	Processors Who Use
MAN-GIL Gilcote 4127	Man-Gil Chemical 23000 St. Clair Ave. Cleveland, Ohio 44117	Valley City Steel Voss — Lantz Steel Warehouse
MAN-GIL Gilcote R2500		Steel Warehouse
Montgomery MIL-BOND MC-560-RI	The H. A. Montgomery Co. 17191 WP Chrysler Freeway Detroit, Michigan 48203	Steel Warehouse Voss — Lantz
TruChem 1800-1 TruChem 1800-3	Tru-Chem Co., Inc. P.O. Box 261001 Columbus, OH 43226	Worthington — Monroe National Processing Co. Voss-Clark
Chemform	PPG Chemfil 1300 Piedmont Troy, MI 48083	Voss-Clark