STARRFOAM MANUFACTURING, INC.

MATERIAL SAFETY DATA SHEET
STAR-R

Product/Material:	Expanded Polystyrene Foam
Manufacturer:	Star-R-Foam
Address:	1012 N. Commerce Fort Worth, Texas 76106

SECTION 1 PRODUCT IDENTIFICATION

Trade Name:	Star-R
Synonym:	Expanded Polystyrene Foam
Chemical Family:	Polystyrene

SECTION II HAZARDOUS INGREDIENTS

None

SECTION III PHYSICAL DATA

Boiling point (° F):	Not applicable
Vapor Pressure:	Not applicable
Vapor Density:	Not applicable
Solubility in Water:	Insoluble
Specific Gravity (h20=1):	0.016
Percent Volatile by Weight:	0
Evaporation Rate:	0
Appearance and Odor:	Solid/ no odor

SECTION IV FIRE AND EXPLOSION HAZARD DATA

Flash Point:	Not applicable
Flammable Limits: LEL UEL	Not applicable Not applicable
Extinguishing Media:	Dry chemical, Co2, water fog, foam
Special Fire Fighting Procedures:	Do not enter fire without proper protection.
Unusual Fire and Explosion Hazards:	Heat from fire will melt foam, and may cause dense black smoke.

SECTION V HEALTH HAZARD DATA

Inhalation:	Not expected to present a significant inhalation hazard under anticipated conditions of normal use.
Eye Contact:	Solid or dust may cause eye injury due to the custom fitting of material.
Skin Contact:	Not expected to present a significant skin hazard under anticipated conditions of normal use.
Ingestion:	Not expected to present a significant ingestion hazard under anticipated conditions of normal use.
Emergency Medical Treatment Procedure:	After adequate first aid, no further treatment is required, unless symptoms reappear.

SECTION VI REACTIVITY DATA

Product is:	Stable
Incompatibility:	None
Hazardous Decomposition Products:	None
Hazardous Polymerization:	Will not occur

SECTION VII SPILL OR LEAK PROCEDURES

Spills or leaks:	Sweep or shovel into suitable disposal container.
Disposal Methods:	Comply with federal/state or local regulations for solid waste disposal.

SECTION VIII SPECIAL PRECAUTIONS

Good industrial hygiene should be practiced. Good general ventilation is sufficient for most conditions. Use eye protection.

NOTICE:

The data and recommendations presented herein are based upon data which is considered to be accurate. However, Star-R-Foam makes no guarantee or warranty, either expressed or implied, of the accuracy or completeness of this data and recommendations.

MATERIAL SAFETY DATA SHEET

IFS EMERGENCY PHONE - (610) 378-1381 FOR CHEMICAL EMERGENCIES - (800) 424-9300

MANUFACTURER: IFS INDUSTRIES, INC.
ADDRESS: 400 ORRTON AVE. P.O. BOX 1053
READING, PA 19603
PHONE (610) 378-1381 *FAX* (610) 378-5080

PRODUCT IDENTIFICATION

TRADE NAME: DURA-PUR
IFS PRODUCT NO: UH 2082-2

Prepared By: David Frank
Date Prepared: 6/8/07 **Replaces Sheet Dated: 4/25/02**

SECTION 2: HAZARDOUS INGREDIENTS IDENTITY

Hazardous Component(s):	OSHA PEL	ACGIH TLV	CAS No.
4,4-Diphenylmethane Diisocyanate	0.02ppm	0.005ppm	101-68-8

SARA TITLE III

Section 313: This product contains the following chemical(s)which are subject to the reporting requirements of Section 313 Title III of the Superfund and Reauthorization Act of 1986 (SARA):

	%
4,4'-Diphenylmethane Diisocyanate CAS#101-68-8	4-7%

SECTION 3: PHYSICAL AND CHEMICAL CHARACTERISTICS

1). Boiling Point:	>392F (>200C) at 5mm Hg
2). Weight/Gallon (Lbs./Gal):	9.4
3). Vapor Pressure:	<1 X 10-5mm Hg @ 25C
4). Vapor Density:	Approx 8.8
5). Solubility in Water	Insoluble
6). Reactivity with Water	Reacts to liberate CO2
7). Appearance and Odor	Odorless Off-White Solid
8). Melting Point	N/A

MATERIAL SAFETY DATA SHEET

DURA-PUR UH 2082-2

SECTION 4: FIRE AND EXPLOSION DATA

1). Flash Point **>400F (>250C)**
Method Used: **PMCC ASTM-D93**

2). AutoIgnition Temperature: **N/A**

3). Extinguisher Media: CO2, water fog, foam, or very large quantities of water

4). Flammable Limits/% Volume in Air: **N/A**
Lower: **N/A** Upper: **N/A**

5). Special Fire Fighting Procedures: Self Contained breathing apparatus sho always be worn when fighting fires involving chemicals. If water is selected use large quantities.

6). Unusual Fire and Explosion Hazards: Water/Isocyanate reaction may be vigorous. Down wind personnel should be evacuated. Do not reseal contaminated containers as pressure buildup may cause rupture

SECTION 5: PHYSICAL/CHEMICAL HAZARDS (REACTIVITY DATA)

1). **Stability**: Stable X Unstable

2). **Conditions to Avoid:** **None Known**

3). **Incompatibility (Materials to Avoid):** Organic Acids and Strong Oxidizing Agents

4). **Hazardous Decomposition Products**: Isocyanate vapor and mists, nitrogen oxides, carbon monoxide, carbon dioxide and small amounts of hydrogen cyanide

5). **Hazardous Polymerization**: May Occur X Will Not Occur

MATERIAL SAFETY DATA SHEET

DURA-PUR UH 2082-2

SECTION 6: HEALTH HAZARDS

1). **Acute:** No known short term adverse health affects

2). **Chronic:** Repeated and prolonged over exposure may result in mild skin irritation and/or possible respiratory sensitization.

3). **Symptoms of Over Exposure:**
Excessive over exposure may cause sensitization of the eyes, upper respiratory tract and lungs. Effects may be delayed. Decreased ventilatory capacity has been associated with similar materials.

4). **Medical Conditions Generally Aggravated by Exposure:**
May cause aggravation of asthmatic symptoms

5). **Chemicals listed as Carcinogens or Potential Carcinogens:**

NTP	YES	**IARC**	YES	**OSHA**	YES
	No XX		NO XX		NO XX

SECTION 7: EMERGENCY AND FIRST AID PROCEDURES

If Symptoms of Over Exposure Develop, Always Seek Immediate Medical Attention.
Routes of Entry

1). **Inhalation:** Remove subject to fresh air. May cause respiratory sensitization.

2). **Eye Contact:** Flush with water for at least 15 minutes. May cause slight eye irritation.

3). **Skin Contact:** Wash with Soap and Water. Possible allergic reaction to succeptible individuals.

4). **Ingestion:** DO NOT INDUCE VOMITING. Seek immediate medical attention. Single oral doses of toxicity low. No hazards are anticipated from incidental exposure.

SECTION 8: SPECIAL PRECAUTIONS AND SPILL/LEAK PROCEDURES

1). **Precautions to be taken in Handling and Storage:**
Avoid contact with moisture or incompatible agents. Store in tightly sealed drums in dry areas at temperatures between 50-100F.

2). **Other Precautions:** None

3). **Steps to be taken in case material is released or spilled:**
Evacuate and ventilate spill area. Dike spill with absorbent materials and shovel into open containers for removal to well ventilated areas. Neutralize material with a mixture of water and 3-8% concentrated ammonium hydroxide.

4). **Waste Disposal Methods:**
Do Not dispose of in lakes or streams.

Always consult Federal, State, Regional, and Local Regulations pertaining to this material before using any disposal

MATERIAL SAFETY DATA SHEET

DURA-PUR UH UH-2082-2

SECTION 9: SPECIAL PROTECTION INFORMATION/CONTROL MEASURS

Always Use Protective Equipment/Clothing as Necessary to Keep Exposure to this Material Below Applicable Exposure Limits.

Respiratory Protection: Use with adequate local and mechanical ventilation

Ventilation-Local: Immediate local ventilation sufficient to maintain exposure to vapors below exposure limits

Ventilation-Mechanical: Air circulation

Ventilation-Special: None

Ventilation-Other: None

Gloves: Butyl Rubber or Neoprene Latex gloves recommended

Eye: Safety Glasses and/or Splash Goggles when splash potential exists

Other Clothing: Wear as required to use conditions

Hygienic Practices: Use in ventilated areas with good industrial hygiene practices. Avoid contact with skin. Wash exposed Areas with soap and water.

SECTION 10: TRANSPORTATION

DOT Proper Ship Name * Other Regulated Substances, Liquid, N.O.S. (Diphenylmethane Diisocyanate)
UN# *NA3077
Hazard Class *9
Packaging Group *III
RQ 84,874 lbs
Labels Required *Class 9 for shipments above listed RQ
Special Transportation Instructions: **When shipped in individual containers at less than listed RQ this material is Shipped as NOT REGULATED (Polyurethane Adhesive)**

SECTION 11: REGULATORY

TSCA Status with regards to TSCA 8 (b) Inventory of Chemical Substances:
TSCA Status: NON**COMPLIANT**

Canadian Domestic Substance List Status:
DSL Status: NON**COMPLIANT**

OSHA Hazardous Status under the criteria of Federal OSHA Hazard Communication Standard 29 CFR 1910.1200:
Hazardous YES **Non Hazardous**

CERCLA Reportable Status:
5000# FOR 4,4'-Diphenylmethane Diisocyanate(CAS# 101-68-8)

Metal Doors

United States Steel Corporation

Material Safety Data Sheet

USS Code Number: 3C011
Original Issue Date: 08/01/85 **Revised: 06/04**

Section 1 - Chemical Product and Company Identification

Product/Chemical Name: **Hot or Cold Rolled Carbon Steel Sheet/Strip and Hot Rolled Skelp**
Also Includes: Tack Plate and Vitrenamel 1-3

Manufacturer: United States Steel Corporation, 600 Grant Street, Room 2514H, Pittsburgh, PA 15219-2800
General Information: (412) 433-6840 (8:00 am to 5:00 pm); FAX: (412) 433-5016
Off-Hour Emergency Phone Number: (412) 433-5811

Section 2 - Composition / Information on Ingredients

Ingredient Name	CAS Number	Percentage by wt.	OSHA PEL [1]	ACGIH TLV [2]
Base Metal				
Iron	7439-89-6	>97.0	10 mg/m³ - Iron oxide fume	5 mg/m³ - Iron oxide dust and fume
Alloying Elements				
Calcium	7440-70-2	0.10 max.	5 mg/m³ – Calcium oxide	2 mg/m³ – Calcium oxide
Carbon	7440-44-0	0.60 max.	15 mg/m³ -Total dust (PNOR) [3] 5 mg/m³ - Respirable fraction (PNOR)	10 mg/m³ - Inhalable fraction[4] (PNOS) [5] 3 mg/m³ - Respirable fraction[6] (PNOS)
Copper	7440-50-8	0.50 max.	0.1 mg/m³ - Fume (as Cu) 1 mg/m³ - Dusts & mists (as Cu)	0.2 mg/m³ – Fume 1 mg/m³ – Dusts & mists (as Cu)
Manganese	7439-96-5	1.50 max.	5 mg/m³ (C) - Fume & Mn compounds	0.2 mg/m³
Phosphorus	8049-19-2	0.15 max.	15 mg/m³ - Total dust (PNOR) 5 mg/m³ - Respirable fraction (PNOR)	10 mg/m³ - Inhalable fraction (PNOS) 3 mg/m³ - Respirable fraction (PNOS)
Silicon	7440-21-3	0.60 max.	15 mg/m³ - Total dust 5 mg/m³ - Respirable fraction	10 mg/m³
Sulfur	7704-34-9	0.04 max.	15 mg/m³ - Total dust (PNOR) 5 mg/m³ - Respirable fraction (PNOR)	10 mg/m³ - Inhalable fraction (PNOS) 3 mg/m³ - Respirable fraction (PNOS)

Notes:

- Hot or Cold Rolled Carbon Steel Sheet/Strip surfaces may be treated with small amounts (<0.05%) of corrosion-inhibiting oil.
- All commercial steel products may contain small amounts of various elements in addition to those specified. These small quantities (less than 0.1%) may exist as intentional additions, or as "trace" or "residual" elements that generally originate in the raw materials used. These elements may include: aluminum, antimony, arsenic, boron, cadmium, calcium, chromium, cobalt, columbium, copper, lead, molybdenum, nickel, silicon, tin, titanium, vanadium, and zirconium.

[1] OSHA Permissible Exposure Limits (PELs) are 8-hour TWA (time-weighted average) concentrations unless otherwise noted. A ("C") designation denotes a ceiling limit, which should not be exceeded during any part of the working exposure unless otherwise noted. A Short Term Exposure Limit (STEL) is defined as a 15-minute exposure, which should not be exceeded at any time during a workday.

[2] Threshold Limit Values (TLV) established by the American Conference of Governmental Industrial Hygienists (ACGIH) are 8-hour TWA concentrations unless otherwise noted.

[3] PNOR (Particulates Not Otherwise Regulated). All inert or nuisance dusts, whether mineral, inorganic, or organic, not listed specifically by substance name are covered by the PNOR limit which is the same as the inert or nuisance dust limit of 15 mg/m³ for total dust and 5 mg/m³ for the respirable fraction.

[4] Inhalable fraction. The concentration of inhalable particulate for the application of this TLV is to be determined from the fraction passing a size-selector with the characteristics defined in the ACGIH TLVs and BEIs Appendix D, paragraph A.

[5] PNOS (Particulates Not Otherwise Specified). Particulates identified under the PNOS heading are "nuisance dusts" containing no asbestos and <1% crystalline silica. A TWA-TLV of 10 mg/m^3 for inhalable particulate and 3 mg/m^3 for respirable particulate has been recommended.

[6] Respirable fraction. The concentration of respirable dust for the application of this limit is to be determined from the fraction passing a size-selector with the characteristics defined in the ACGIH TLVs and BEIs Appendix D, paragraph C.

Section 3 - Hazards Identification

☆☆☆☆☆ Emergency Overview ☆☆☆☆☆

This formed solid metal product poses little or no immediate health or fire hazard. When product is subjected to welding, burning, melting, sawing, brazing, grinding, or other similar processes, potentially hazardous airborne particulate and fumes may be generated. Avoid inhalation of metal dusts and fumes. Operations having the potential to generate airborne particulates should be performed in well ventilated areas and, if appropriate, respiratory protection and other personal protective equipment should be used. Iron or steel foreign bodies imbedded in the cornea of the eye may produce rust stains unless removed fairly promptly.

Potential Health Effects

Primary Entry Routes: Inhalation and skin, if coated. Steel products in the natural state do not present an inhalation, ingestion or contact hazard. However, operations such as burning, welding, sawing, brazing, machining and grinding may result in the following effects if exposures exceed recommended limits as listed in Section 2.

Target Organs: Respiratory system

Acute Effects:

- **Inhalation:** Excessive exposure to high concentrations of dust may cause irritation to the eyes, skin and mucous membranes of the upper respiratory tract. Excessive inhalation of fumes of freshly formed metal oxide particles sized below 1.5 microns and usually between 0.02-0.05 microns from many metals can produce an acute reaction known as "metal fume fever". Symptoms consist of chills and fever (very similar to and easily confused with flu symptoms), metallic taste in the mouth, dryness and irritation of the throat followed by weakness and muscle pain. The symptoms come on in a few hours after excessive exposures and usually last from 12 to 48 hours. Long-term effects from metal fume fever have not been noted. Freshly formed oxide fumes of manganese and copper have been associated with causing metal fume fever.
- **Eye:** Excessive exposure to high concentrations of dust may cause irritation to the eyes. Particles of iron or iron compounds, which become imbedded in the eye, may cause rust stains unless removed fairly promptly. Torching or burning operations on steel products with oil coatings may produce emissions that can be irritating to the eyes.
- **Skin:** Skin contact with dusts may cause irritation or sensitization, possibly leading to dermatitis. Repeated or prolonged contact with oil residue may cause skin irritation, dermatitis or allergic reactions in sensitized individuals.
- **Ingestion:** Ingestion of harmful amounts of this product as distributed is unlikely due to its solid insoluble form. Ingestion of dust may cause nausea or vomiting.

Chronic Effects: Chronic inhalation of metallic fumes and dusts are associated with the following conditions:

- IRON OXIDE: Chronic inhalation of excessive concentrations of iron oxide fumes or dusts may result in the development of a benign pneumoconiosis, called siderosis, which is observable as an X-ray change. No physical impairment of lung function has been associated with siderosis.
- CALCIUM: Depending on the concentration and duration of exposure, repeated or prolonged inhalation may cause inflammation of the respiratory passages, ulcers of the mucous membranes, and possible perforation of the nasal septum. Repeated or prolonged skin contact may cause dermatitis.
- CARBON: Chronic inhalation of high concentrations to carbon may cause pulmonary disorders.
- COPPER: Chronic exposure to copper dusts may result in runny nose, irritation of mucous membranes, and atrophic changes with resultant dementia. Chronic inhalation of copper dust has caused, in animals, hemolysis of the red blood cells, deposition of hemofuscin in the liver and pancreas, injury to lung cells and gastrointestinal symptoms.
- MANGANESE: Chronic exposure to high concentrations of manganese fumes and dusts may adversely affect the central nervous system with symptoms including languor, sleepiness, weakness, emotional disturbances, spastic gait, mask-like facial expression and paralysis. Animal studies indicate that manganese exposure may increase susceptibility to bacterial and viral infections.
- PHOSPHOROUS: Inhalation of dusts and fumes of ferrophosphorous and phosphorus oxides may cause respiratory irritation.
- SILICON: Silicon dusts are a low health risk by inhalation and should be treated as a nuisance dust.

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

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

Chemical Surface Treatments/Coatings: The possible presence of oil coatings should be considered when evaluating potential employee health hazards and exposures during handling and welding or other fume generating activities. Removal of surface coatings should be considered prior to such activities. Repeated or prolonged contact with oil residue may cause skin irritation, dermatitis or allergic reactions in sensitized individuals. Torching or burning operations on steel products with oil coatings may produce emissions that can be irritating to the eyes and respiratory tract.

Carcinogenicity: The International Agency for Research on Cancer (IARC), The National Toxicology Program (NTP), and OSHA do not list steel products as carcinogens. IARC identifies welding fumes as a Group 2B carcinogen, a mixture that is possibly carcinogenic to humans.

Medical Conditions Aggravated by Long-Term 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: Immediate Acute Health Hazard; Delayed Chronic Health Hazard.

Section 4 - First Aid Measures

Inhalation: For over-exposure to airborne fumes and particulate, 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.
Eye Contact: Flush with large amounts of clean water to remove particles. Seek medical attention if irritation persists.
Skin Contact: Remove contaminated clothing. Wash affected areas with soap or mild detergent and water. If thermal burn has occurred, flush area with cold water and seek medical attention. If mechanical abrasion has occurred, seek medical attention.
Ingestion: Not a probable route of industrial exposure. However, if ingested, seek medical attention immediately.

Section 5 - Fire-Fighting Measures

Flash Point: Not applicable
Flash Point Method: Not applicable
Burning Rate: Not applicable
Flammability Classification: Non-flammable, non-combustible
LEL: Not applicable
UEL: Not applicable
Auto-ignition Temperature: Not applicable
Extinguishing Media: Not applicable for solid product. Use extinguishers appropriate for surrounding materials.
Unusual Fire or Explosion Hazards: Not applicable for solid product. Do not use water on molten metal.
Hazardous Combustion Products: At temperatures above the melting point, fumes containing metal oxides and other alloying elements may be liberated.
Fire-Fighting Instructions: Do not release runoff from fire control methods to sewers or waterways.
Fire-Fighting Equipment: Wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode and full protective clothing.

Section 6 – Accidental Release Measures

Spill/Leak Procedures: Not applicable to steel in solid state. For spills involving finely divided particles, clean-up personnel should be protected against contact with eyes and skin. If material is in a dry state, avoid inhalation of dust. Fine, dry material should be removed by vacuuming or wet sweeping methods to prevent spreading of dust. Avoid using compressed air. Do not release into sewers or waterways. Collect material in appropriate, labeled containers for recovery or disposal in accordance with federal, state, and local regulations.
Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120) and all other pertinent state and federal requirements.
Disposal: Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.

Section 7 – Handling and Storage

Handling Precautions: Operations with the potential for generating high concentrations of airborne particulates should be evaluated and controlled as necessary. Practice good housekeeping. Avoid breathing metal fumes and/or dust.
Storage Requirements: Store away from acids and incompatible materials.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Use controls as appropriate to minimize exposure to metal fumes and dusts during handling operations.
Ventilation: Provide general or local exhaust ventilation systems to minimize airborne concentrations. Local exhaust ventilation is preferred because it prevents contaminant dispersion into the work area by controlling it at its source.
Administrative Controls: Do not use compressed air to clean-up spills.
Respiratory Protection: Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a NIOSH-approved respirator. Select respirator based on its suitability to provide adequate worker protection for given working conditions, level of airborne contamination, and presence of sufficient oxygen.
Protective Clothing/Equipment: For operations which result in elevating the temperature of the product to or above its melting point or result in the generation of airborne particulates, use protective clothing, gloves and safety glasses to prevent skin and eye contact. Contact lenses should not be worn where industrial exposures to this material are likely. Use safety glasses or goggles as required for welding, burning, sawing, brazing, grinding or machining operations. Protective gloves should be worn as required for welding, burning or handling operations. Where an oil coating is applied to the product, wear gloves when handling. Do not continue to use gloves or work clothing that has become saturated or soaked through with oil coating. Wash skin that has been exposed to oil with soap and water or waterless hand cleaner.

Section 9 - Physical and Chemical Properties

Physical State: Solid
Appearance and Odor: Metallic Gray, Odorless
Odor Threshold: Not applicable
Vapor Pressure: Not applicable
Vapor Density (Air=1): Not applicable
Formula Weight: Not applicable
Density: 7.85 gm/cc
Specific Gravity (H_2O=1, at 4 °C): 7.85
pH: Not applicable

Water Solubility: Insoluble
Other Solubilities: Not applicable
Boiling Point: Not applicable
Viscosity: Not applicable
Refractive Index: Not applicable
Surface Tension: Not applicable
% Volatile: Not applicable
Evaporation Rate: Not applicable
Freezing/Melting Point: ~2750 °F

Section 10 - Stability and Reactivity

Stability: Steel products are stable under normal storage and handling conditions.
Polymerization: Hazardous polymerization cannot occur.
Chemical Incompatibilities: Will react with strong acids to form hydrogen. Iron oxide dusts in contact with calcium hypochlorite evolve oxygen and may cause an explosion.
Conditions to Avoid: Storage with strong acids or calcium hypochlorite.
Hazardous Decomposition Products: Thermal oxidative decomposition of steel products can produce fumes containing oxides of iron and manganese as well as other alloying elements.

Section 11- Toxicological Information

No information is available for the product as a mixture. The possible presence of oil coatings should be considered when evaluating potential employee health hazards and exposures during handling and welding or other fume generating activities.

Eye Effects:
Eye contact with the individual components may cause particulate irritation. Implantation of iron particles in guinea pig corneas have resulted in rust rings with corneal softening about rust ring.

Skin Effects:
Skin contact with individual dust components may cause physical abrasion, irritation, dermatitis, and sensitization.

Toxicity Data:*

Acute Inhalation Effects:
Inhalation of the individual alloy components has been shown to cause various respiratory effects.
Acute Oral Effects:
No data available
Other: No LC50 or LD50 has been established for the mixture as a whole. Iron LD50: 30 g/kg oral (rat). Calcium LD50: No data. Carbon LD50: No data. Copper TD_{Lo}: 120 ug/kg oral (human). Manganese LD50: 9 g/kg oral (rat). Phosphorous LD50: No data. Silicon LD50: 3160 mg/kg oral (rat). Sulfur LD50: >8437 mg/kg oral (rat).
Chronic Effects: See Section 3.
Carcinogenicity: See Section 3.
Mutagenicity: No data available
Teratogenicity: No data available

- See NIOSH, *RTECS* (NO4565500) for additional toxicity data on iron, (EV8040000) for calcium, (FF5250100) for carbon, (QT9900000) for columbium, (GL5325000) for copper, (OO9275000) for manganese, (VW0400000) for silicon, (WS4250000) for sulfur.

Section 12 - Ecological Information

Ecotoxicity: No data available for the product as a whole. However, individual components of the product have been found to be toxic to the environment. Metal dusts may migrate into soil and groundwater and be ingested by wildlife.
Environmental Fate: No data available.
Environmental Degradation: No data available.
Soil Absorption/Mobility: No data available for the product as a whole. However, individual components of the product have been found to be absorbed by plants from soil.

Section 13 - Disposal Considerations

Disposal: Steel scrap should be recycled whenever possible. Product dusts and fumes from processing operations should also be recycled, or classified by a competent environmental professional and disposed of in accordance with applicable federal, state or local regulations.
Container Cleaning and Disposal: Follow applicable Federal, state and local regulations. Observe safe handling precautions.

Section 14 - Transport Information

DOT Transportation Data (49 CFR 172.101):
Hot or Cold Rolled Carbon Steel Sheet/Strip and Hot Rolled Skelp are not listed as a hazardous substances under 49 CFR 172.101.

Shipping Name: Not applicable
Shipping Symbols: Not applicable
Hazard Class: Not applicable
ID No.: Not applicable
Packing Group: Not applicable
Label: Not applicable
Special Provisions (172.102): None

Packaging Authorizations
a) **Exceptions:** None
b) **Non-bulk Packaging:** Not applicable
c) **Bulk Packaging:** Not applicable

Quantity Limitations
a) **Passenger, Aircraft, or Railcar:** Not applicable
b) **Cargo Aircraft Only:** Not applicable

Vessel Stowage Requirements
a) **Vessel Stowage:** Not applicable
b) **Other:** Not applicable

Section 15 - Regulatory Information

Regulatory Information: *The following listing of regulations relating to a United States Steel Corporation product may not be complete and should not be solely relied upon for all regulatory compliance responsibilities.*
This product and/or its constituents are subject to the following regulations:

OSHA Regulations:

Air Contaminant (29 CFR 1910.1000, Table Z-1, Z-1-A): The product as a whole is not listed. However, individual components of the product are listed.

EPA Regulations:

RCRA(40CFR261): Steel scrap is not regulated as a solid waste or a hazardous waste under this act. If product dusts and/or fumes from processing operations are not recycled, they are considered to be a solid waste and may be classified as a hazardous waste depending on the toxicity characteristics of the dust as defined within 40CFR261.24.

CERCLA Hazardous Substance (40 CFR 302.4): The product as a whole is not listed. However, individual components of the product are listed: Copper (Reportable Quantity(RQ)-5000#). Manganese compounds are listed although no reportable quantity is assigned to this generic or broad class.

SARA 311/312 Codes (40CFR370): Immediate (acute) health hazard and delayed (chronic) health hazard.

SARA 313 (40CFR372.65): Manganese is subject to SARA 313 reporting requirements. Please note that if you prepackage or redistribute this product to industrial customers, SARA 313 requires that a notice be sent to those customers.

State Regulations: The product as a whole is not listed in any state regulations. However, individual components of the product are listed in various state regulations.

Pennsylvania Right to Know: Contains regulated material in the following categories:

- Hazardous Substances: Calcium, Silicon and Sulfur.
- Environmental Hazards: Copper and Manganese.

New Jersey Right to Know: Contains regulated material in the following categories:

- Hazardous Substance: Copper, Manganese, and Sulfur.
- Special Health Hazard Substances: Calcium.

California Prop. 65: The product may possibly contain trace quantities (generally much less than 0.1%) of metallic elements known to the State of California to cause cancer or reproductive toxicity. These include arsenic (inorganic), cadmium, lead and nickel.

Other Regulations: The product as a whole is not listed in any state regulations. However, individual components of the product are listed in various state regulations.

WHMIS Classification (Canadian): D-2

Section 16 - Other Information

Prepared By: United States Steel Corporation

Hazard Rating Systems:
NFPA Code: 0-0-0
HMIS Code: 1*-0-0 PPE: See Section 8 * Denotes possible chronic hazard if airborne dusts or fumes are generated.

Disclaimer: All information, recommendations, and suggestions appearing herein concerning this product are taken from sources or based upon data believed to be reliable. Although reasonable care has been taken in the preparation of this information, United States Steel Corporation extends no warranties or guarantees, express or implied, makes no representations, and assumes no responsibility as to the accuracy, reliability or completeness of the information presented. Since the actual use of the product described herein is beyond our control, United States Steel Corporation assumes no liability arising out of the use of the product by others. It is the user's responsibility to determine the suitability of the information presented herein, to assess the safety and toxicity of the product under their own conditions of use, and to comply with all applicable laws and regulations. Appropriate warnings and safe handling procedures should be provided to handlers and users.

HAZARDOUS COMMUNICATION LABEL

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 LUNGS 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, 1C004, 2C008, 2C009, 2C010, 3C011, 3C017, 4C018, 4C019, 4C020 FOR FURTHER INFORMATION ON SPECIFIC PRODUCTS.

United States Steel Corporation, 600 Grant Street, Room 2514H, Pittsburgh, PA 15219-2800

Metal Doors

Material Safety Data Sheet

ArcelorMittal

Section 1 - Chemical Product and Company Information

Product/Chemical Name: Metal Coated Steel

Reference Number: 002
CAS Number: Mixture

Synonyms: Electrogalvanized, Galvalume, Galvanneal, Hot Dipped Galvanized or Aluminized Steel
See Section 16 for other synonyms

Manufacturer: ArcelorMittal USA Inc.
1 South Dearborn Street
Chicago, IL 60603-9888

General Information: 219-391-3900 or email at: msdssupport@arcelormittal.com
CHEMTREC (Day or Night) 1-800-424-9300

Original Issue Date: 8/26/02
Revised: 11/16/07

Section 2 - Composition/Information on Ingredients

Base Metal

Ingredient Name	CAS Number	Percentage by wt.	OSHA PEL [1]	ACGIH TLV [2]
Iron	7439-89-6	95 – 99.9	10 mg/m³ - Iron oxide fume	5 mg/m³ - Iron oxide dust and fume
Aluminum	7429-90-5	0.01 – 0.5	15 mg/m³ - Total dust 5 mg/m³ - Respirable fraction	10 mg/m³ - Metal Dust 5 mg/m³ - Welding fume
Carbon	7440-44-0	0.001 - 0.6	15 mg/m³ -Total dust (PNOR) [3] 5 mg/m³ - Respirable fraction (PNOR)	10 mg/m³ - Inhalable fraction[4] (PNOS) [5] 3 mg/m³ - Respirable fraction[6] (PNOS)
Chromium	7440-47-3	0 - 0.7	1 mg/m³ - Chromium metal	0.5 mg/m³ - Chromium metal & Cr III compounds
Copper	7440-50-8	0.005 - 0.4	0.1 mg/m³ - Fume (as Cu) 1 mg/m³ - Dusts & mists (as Cu)	0.1 mg/m³ - Fume 1 mg/m³ - Dusts & mists (as Cu)
Manganese	7439-96-5	0.05 - 2.0	5 mg/m³ (C) - Fume & Mn compounds	0.2 mg/m³
Nickel	7440-02-0	0.004 - 0.5	1 mg/m³ - Metal & insoluble compounds (as Ni)	1.5 mg/m³ - Elemental nickel (as Ni) 0.2 mg/m³ - Insoluble compounds
Silicon	7440-21-3	0.001 - 1.05	15 mg/m³ - Total dust 5 mg/m³ - Respirable fraction	10 mg/m³

Notes:

- All commercial steel products contain small amounts of various elements in addition to those listed. These small quantities are frequently referred to as "trace" or "residual" elements that generally originate in the raw materials used. Steel products may contain the following trace or residual elements including typical percentages for the elements identified: boron (≤0.005 max, typically 0.001%), calcium (≤ 0.005 max, typically 0.0003%), columbium (≤0.15 max, typically 0.002%), molybdenum (≤0.4 max, typically 0.006%), phosphorous (≤0.1 max, typically 0.01%), sulfur (≤ 0.04 max, typically, 0.007%), tin (≤ 0.03 max, typically 0.002%), titanium (≤0.15 max, typically 0.002%), and vanadium (≤ 0.15 max, typically 0.001%). Other trace elements not frequently identified, may include antimony, arsenic, cadmium, cobalt, lead, and zirconium.
- **Percentages are expressed as typical ranges or maximum concentrations of trace elements for the purpose of communicating the potential hazards of the finished product. Consult product specifications for specific composition information.**
- Product surfaces may be treated with small amounts of corrosion-inhibiting oil that may contain mineral oil or petroleum distillates, or paints, epoxies, laminates, etc., generally applied at the customer's request. Refer to the coating manufacturer's MSDS for hazards associated with coatings. Refer to the following table for additional information.

[1] OSHA Permissible Exposure Limits (PELs) are 8-hour TWA (time-weighted average) concentrations unless otherwise noted. A ("C") designation denotes a ceiling limit, which should not be exceeded during any part of the working exposure unless otherwise noted.

[2] Threshold Limit Values (TLV) established by the American Conference of Governmental Industrial Hygienists (ACGIH) are 8-hour TWA concentrations unless otherwise noted.

[3] PNOR (Particulates Not Otherwise Regulated). All inert or nuisance dusts, whether mineral, inorganic, or organic, not listed specifically by substance name are covered by a limit which is the same as the inert or nuisance dust limit of 15 mg/m³ for total dust and 5 mg/m³ for the respirable fraction.

[4] Inhalable fraction. The concentration of inhalable particulate for the application of this TLV is to be determined from the fraction passing a size-selector with the characteristics defined in the ACGIH TLVs and BEIs Appendix D, paragraph A.

[5] PNOS (Particulates Not Otherwise Specified). Particulates identified under the PNOS heading are "nuisance dusts" containing no asbestos and <1% crystalline silica. A TWA-TLV of 10 mg/m³ for inhalable particulate and 3 mg/m³ for respirable particulate has been recommended.

[6] Respirable fraction. The concentration of respirable dust for the application of this limit is to be determined from the fraction passing a size-selector with the characteristics defined in the ACGIH TLVs and BEIs Appendix D, paragraph C.

Metal Coated Steel Sheet

Ref No. 002

Metallic Coating (if applicable)[1]				
Ingredient Name	**CAS Number**	**Percentage by wt.[2]**	**OSHA PEL**	**ACGIH TLV**
Aluminum	7429-90-5	0 - 85	15 mg/m³ - Total Dust 5 mg/m³ - Respirable Fraction	10 mg/m³ - Metal Dust as Al 5 mg/m³ - Fume as Al
Nickel (Ni) ZnNi EG	7440-02-0	10 - 30	1 mg/m³ - Metal as Ni 1 mg/m³ - Insoluble Compounds as Ni 1 mg/m³ - Soluble Compounds as Ni	1.5 mg/m³ - Elemental Metal as Ni 0.2 mg/m³ - Insoluble as Ni 0.1 mg/m³ - Soluble Compounds as Ni
Galvalume[3]	Mixture	98 min	Not Established	Not Established
Zinc Galvanize (GI) Galvanneal (GA) ZnNi EG	7440-66-6	GI 99 min. GA 85 min.[4] ZnNi – 70-90	5 mg/m³ - Fume 15 mg/m³ - Total dust 5 mg/m³ - Respirable fraction	5 mg/m³ - Fume 10 mg/m³ - Fume (STEL) 10 mg/m³ - Dust
Zincroplex Coating[5]	Mixture	0.5 - 4.9	Not Established	Not Established
Zincrometal®SL[6]	Mixture	0.5 – 4.9	Not Established	Not Established
Other Coatings (if applicable)		**<0.8 total**		
Barium Chromate	10-2944-03	10	0.5 mg/m³ - As Ba 5 ug/m³ – Cr VI 2.5 ug/m³ – Cr VI (action level)	0.5 mg/m³ - Soluble Compounds as Ba 0.05 mg/m³ - Chromium (VI) Compounds as Cr
Chem Phos 2007	Varies[7]	0.004 – 0.017[8]	Not Established	Not Established
Chem Treat – Chrome	7440-47-3	0.3-12 MG/FT2	1 mg/m³ - Chromium metal 0.5 mg/m³ - CrII and CrIII 5 ug/m³ – Cr VI 2.5 ug/m³ – Cr VI (action level)	0.5 mg/m³ – metal and Cr III 0.05 mg/m³ – soluble Cr VI 0.01 mg/m³ – insoluble Cr VI
Epoxy Resin	Varies	40 - 60	Not Established	Not Established
Phosphate Treat	7664-38-2	100-200MG/FT2	1 mg/m³ (as phosphoric acid) PEL for Zinc Phosphate is Not Established	1 mg/m³ (as phosphoric acid) TLV for Zinc Phosphate is Not Established
Silicates	Varies	3 -30	Not Established	Not Established
Zinc Potassium Chromate	11103-86-9	1	1 mg/m³ - Chromium metal 0.5 mg/m³ - CrII and CrIII 5 ug/m³ – Cr VI 2.5 ug/m³ – Cr VI (action level)	0.5 mg/m³ – metal and Cr III 0.05 mg/m³ – soluble Cr VI 0.01 mg/m³ – insoluble Cr VI

1 - Refer to product specifications for coating applicability.

2- Percentages are expressed as typical ranges or maximum concentrations of trace elements in the coating, for the purpose of communicating the potential hazards of the finished product. Consult product specifications for specific composition information.

3- Galvalume coated steel is steel that is plated on one or both sides with a 55% Aluminum, min. 40% Zinc Alloy coating. The balance is a mixture of silicon and potentially the trace elements found in steel products. See Section 2 Notes.

4 - In addition to trace elements, as stated in Section 2 Notes, the balance of the Galvanneal coating is alloyed Iron from the base metal.

5 - Zincroplex® coated steel is steel that is plated on one or both sides with a zinc or zinc alloy coating (such as electrogalvanized, hot dip galvanized, or galvanealed steel), followed by the application (on one side) of coatings of Dacromet ® III (an inorganic zinc dust/chromic oxide coating) and Zincromet® SPX (an organic coating containing zinc dust). For more information on Zincroplex® coating, see product MSDS: Zincroplex® Manufacturer: Metal Coatings International.

6- Zincrometal® coated steel is steel that is coated with Zincrometal® SL (an inorganic zinc dust/chromic oxide coating followed by an organic coating containing zinc dust). For more information on coating, see product MSDS: Zincrometal®SL. Manufacturer: Metal Coatings International.

7- The coating consists of a mixture of crystalline and amorphous forms of Phosphophylite and Hopeite.

8 – Percentages listed are calculated from typical coating weights of 0.3-0.8 gram/m² and substrate thicknesses of 0.6 – 1.1 mm (4.67 – 8.57 kg/m²)

Section 3 - Hazards Identification

☆☆☆☆☆ Emergency Overview ☆☆☆☆☆

This formed solid metal product poses little or no immediate health or fire hazard. When product is subjected to welding, burning, melting, sawing, brazing, grinding or other similar processes, potentially hazardous airborne particulate and fumes may be generated. These operations should be performed in well-ventilated areas. Avoid inhalation of metal dusts and fumes. Iron or steel foreign bodies imbedded in the cornea of the eye will produce rust stains unless removed fairly promptly. If appropriate, respiratory protection and other personal protective equipment should be used.

Chemical Surface Treatments/Coatings: The possible presence of chemical surface treatments and oil coatings should be considered when evaluating potential employee health hazards and exposures during handling and welding or other fume generating activities. Removal of surface coatings should be considered prior to such activities. Repeated or prolonged contact with chemical surface treatments or oil residue may cause skin irritation, dermatitis, ulceration or allergic reactions in sensitized individuals. Torching or burning operations on steel products with surface treatments, oil coatings, paint or acrylic films may produce emissions that can be irritating to the eyes and respiratory tract.

Potential Health Effects

Primary Entry Routes: Inhalation and skin, if coated. Steel products in the natural state do not present an inhalation, ingestion or contact hazard. However, operations such as burning, welding, sawing, brazing, machining and grinding may result in the following effects if exposures exceed recommended limits as listed in Section 2.

Target Organs: Respiratory system

Acute Effects:

- **Inhalation:** Excessive exposure to high concentrations of dust may cause irritation to the eyes, skin and mucous membranes of the upper respiratory tract. Excessive inhalation of fumes of freshly formed metal oxide particles sized below 1.5 microns and usually between 0.02-0.05 microns from many metals can produce an acute reaction known as "metal fume fever". Symptoms consist of chills and fever (very similar to and easily confused with flu symptoms), metallic taste in the mouth, dryness and irritation of the throat followed by weakness and muscle pain. The symptoms come on in a few hours after excessive exposures and usually last from 12 to 48 hours. Long-term effects from metal fume fever have not been noted. Freshly formed oxide fumes of manganese and copper have been associated with causing metal fume fever. Inhalation of chromium compounds may cause upper respiratory tract irritation. Sulfur compounds, present in generated fumes, may irritate the gastrointestinal tract. Boron oxide, molybdenum, nickel, phosphorus oxide and vanadium compounds, especially vanadium pentoxide, are respiratory tract irritants. Excessive inhalation of calcium oxide dusts may cause severe irritation and burns of the respiratory tract.
- **Eye:** Particles of iron or iron compounds could become imbedded in the eye. Torching or burning operations on steel products with surface treatments, oil coatings, or acrylic films may produce emissions that can be irritating to the eyes. Sulfur compounds, present in generated fumes, may irritate the eyes. Calcium oxide, molybdenum and vanadium compounds, especially vanadium pentoxide, are eye irritants.
- **Skin:** Skin contact with metallic fumes and dusts may cause physical abrasion. Sulfur compounds, present in generated fumes, may irritate the skin. Calcium oxide, chromium, molybdenum and vanadium compounds, especially vanadium pentoxide, are skin irritants. Exposure to nickel may cause contact and atopic dermatitis and allergic sensitization. Repeated or prolonged contact with chemical surface treatments or oil residue may cause skin irritation, dermatitis, ulceration or allergic reactions in sensitized individuals.
- **Ingestion:** Ingestion of harmful amounts of this product as distributed is unlikely due to its solid insoluble form. Ingestion of dust may cause nausea or vomiting.

Chronic Effects: Chronic inhalation of metallic fumes and dusts are associated with the following conditions:

- IRON OXIDE: Chronic inhalation of excessive concentrations of iron oxide fumes or dusts may result in the development of a benign pneumoconiosis, called siderosis, which is observable as an X-ray change. No physical impairment of lung function has been associated with siderosis. Inhalation of excessive concentrations of ferric oxide may enhance the risk of lung cancer development in workers exposed to pulmonary carcinogens. Iron oxide is listed as a Group 3 (not classifiable) carcinogen by IARC.
- ALUMINUM: Aluminum dusts/fines are a low health risk by inhalation and should be treated as a nuisance dust. Aluminum dust is a respiratory and eye irritant.
- BORON: Boron oxide dusts and fumes may cause upper respiratory tract and eye irritation, dryness of the mouth, nose or throat, and sore throat and productive cough.
- CALCIUM: Depending on the concentration and duration of exposure, repeated or prolonged inhalation may cause inflammation of the respiratory passages, ulcers of the mucous membranes, and possible perforation of the nasal septum. Repeated or prolonged skin contact may cause dermatitis.
- CARBON: Chronic inhalation of high concentrations to carbon may cause pulmonary disorders.
- CHROMIUM: The health hazards associated with exposure to chromium are dependent upon its oxidation state. The metal form (chromium as it exists in this product) is of very low toxicity. The hexavalent form is very toxic. Repeated or prolonged exposure to hexavalent chromium compounds may cause respiratory irritation, nosebleed, ulceration and perforation of the nasal septum. Industrial exposure to certain forms of hexavalent chromium has been related to an increased incidence of cancer. The National Toxicology Program (NTP) Fourth Annual report on Carcinogens cites "certain Chromium compounds" as human carcinogens. ACGIH has reviewed the toxicity data and concluded that chromium metal is not classifiable as a human carcinogen.
- COLUMBIUM: No reports of human intoxication. There is no evidence of a human health hazard due to inhalation. Can cause eye and skin irritation.

- COPPER: Inhalation of high concentrations of freshly formed oxide fumes and dusts of copper can cause metal fume fever. Chronic inhalation of copper dust has caused, in animals, hemolysis of the red blood cells, deposition of hemofuscin in the liver and pancreas, injury to lung cells and gastrointestinal symptoms.
- MANGANESE: Chronic exposure to high concentrations of manganese fumes and dusts may adversely affect the central nervous system with symptoms including languor, sleepiness, weakness, emotional disturbances, spastic gait, mask-like facial expression and paralysis. Animal studies indicate that manganese exposure may increase susceptibility to bacterial and viral infections.
- MOLYBDENUM: Certain handling operations, such as burning and welding, may generate both insoluble molybdenum compounds (metal and molybdenum dioxide) and soluble molybdenum compounds (molybdenum trioxide). Molybdenum compounds generally exhibit a low order of toxicity with the trioxide the more toxic. However, some reports indicate that the dust of the molybdenum metal, molybdenum dioxide and molybdenum trioxide may cause eye, skin, nose and throat irritation in animals.
- NICKEL: Exposure to nickel dusts and fumes can cause sensitization dermatitis, respiratory irritation, asthma, pulmonary fibrosis, edema and may cause nasal or lung cancer in humans. IARC lists nickel and certain nickel compounds as Group 2B carcinogens (sufficient animal data). ACGIH 2001 TLVs® and BEIs® lists insoluble nickel compounds as confirmed human carcinogens.
- PHOSPHOROUS: Inhalation of phosphorous oxides may cause respiratory irritation.
- SILICON: Silicon dusts are a low health risk by inhalation and should be treated as a nuisance dust. Eye contact with pure material can cause particulate irritation. Skin contact with silicon dusts may cause physical abrasion.
- SULFUR: Sulfur compounds, present in the fumes, may irritate the skin, eyes, lungs and gastrointestinal tract.
- TIN: No systemic effects have been reported from industrial exposure to tin. However, exposure to dust and fume of tin (oxide) is recognized to result in a benign pneumoconiosis called stannosis. No cases of massive fibrosis from over-exposure to tin have been reported.
- TITANIUM: There is no evidence of a health hazard from inhalation of titanium dioxide at airborne concentrations below 10 mg/m3. The toxicity of titanium dioxide has been found to be relatively inert. Eye contact with pure material can cause particulate irritation. Skin contact with titanium dusts may cause physical abrasion.
- VANADIUM: Excessive long term or repeated exposures to vanadium compounds, especially the pentoxide, may result in chronic pulmonary changes such as emphysema or bronchitis.
- ZINC: Welding and burning on zinc-coated steel has been implicated in cases of metal fume fever. Latent liver dysfunction and gastrointestinal disturbances with pressure in the stomach region, nausea, and weakness have been reported from repeated inhalation zinc oxide. Repeated or prolonged skin contact to zinc oxide, coupled with poor personal hygiene, may result in "oxide pox" due to clogging of sebaceous glands. "Oxide pox", especially localized to moist areas, is characterized by small red, hard projecting papules with a central white plug, which develops into a pustule with intense itching. The lesions usually clear within 7-10 days. Repeated or prolonged eye contact with zinc oxide fume may produce conjunctivitis.

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

Carcinogenicity: IARC, NTP, and OSHA do not list steel products as carcinogens. The International Agency for Research on Cancer (IARC) identifies nickel and certain nickel compounds and welding fumes as Group 2B carcinogens that are possibly carcinogenic to humans. IARC lists chromium metal and trivalent chromium compounds as Group 3 carcinogens, not classifiable as to their human carcinogenicity. Hexavalent chromium compounds are listed by IARC as Group 1 carcinogens that are carcinogenic to humans.

Medical Conditions Aggravated by Long-Term 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: Immediate Acute Health Hazard, Delayed Chronic Health Hazard.

Section 4 – First Aid Measures

Inhalation: For over-exposure to airborne fumes and particulate, remove exposed person to fresh air. If breathing is difficult or has stopped, administer artificial respiration or oxygen as indicated. Seek medical attention promptly.

Eye Contact: Flush with large amounts of clean water to remove particles. Seek medical attention if irritation persists.

Skin Contact: Remove contaminated clothing. Wash affected areas with soap or mild detergent and water. If thermal burn has occurred, flush area with cold water and seek medical attention. If mechanical abrasion has occurred, seek medical attention.

Ingestion: Not a probable route of industrial exposure. However, if ingested, seek medical attention immediately.

Section 5 – Fire-Fighting Measures

Flash Point: Not applicable

Flash Point Method: Not applicable

Burning Rate: Not applicable

Flammability Classification: Non-flammable, non-combustible.

LEL: Not applicable

UEL: Not applicable

Auto-ignition Temperature: Not applicable

Extinguishing Media: Not applicable for solid product. Use extinguishers appropriate for surrounding materials.

Unusual Fire or Explosion Hazards: High concentrations of airborne metallic fines may present an explosion hazard. Not applicable for solid product. **Molten metal may react violently with water. Do not use water on molten metal.**

Hazardous Combustion Products: At temperatures above the melting point, fumes containing metal oxides and other alloying elements may be liberated. If present, surface treatments such as corrosion-inhibiting oils, resin, or coatings on the product may yield noxious gases such as the oxides of carbon.

Fire-Fighting Instructions: Do not release runoff from fire control methods to sewers or waterways.

Fire-Fighting Equipment: Wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode and full protective clothing.

Section 6 – Accidental Release Measures

Spill/Leak Procedures: Not applicable to metal in solid state. For spills involving finely divided particles, personnel should be protected against contact with eyes and skin. If material is in a dry state, avoid inhalation of dust. Fine, dry material should be removed by vacuuming or wet sweeping methods to prevent spreading of dust. Avoid using compressed air. Do not release into sewers or waterways. Collect material in appropriate, labeled containers for recovery or disposal in accordance with federal, state, and local regulations.

Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120) and all other pertinent state and federal requirements.

Disposal: Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.

Section 7 – Handling and Storage

Handling Precautions: Use lifting and work devices, e.g., crane, hoist, etc., within rated capacities and in accordance with manufacturer's instructions when handling these products. Operations with the potential for generating high concentrations of airborne particles should be evaluated and controlled as needed. Minimize generation of airborne dust and fume. Avoid breathing metal dust or fumes. Practice good housekeeping.

Storage Requirements: Store away from acids and incompatible materials.

Section 8 – Exposure Controls/Personal Protection

Engineering Controls: Use controls as appropriate to minimize exposure to metal fumes and dusts during handling operations.

Ventilation: Provide general or local exhaust ventilation systems to minimize airborne concentrations. Local exhaust ventilation is preferred because it prevents contaminant dispersion into the work area by controlling it at its source.

Administrative Controls: Do not use compressed air to clean-up accumulated material or dust. Minimize generation of airborne emissions.

Respiratory Protection: Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a NIOSH-approved respirator. Select respirator based on its suitability to provide adequate worker protection for given working conditions, level of airborne contamination, and presence of sufficient oxygen.

Protective Clothing/Equipment: For operations which result in elevating the temperature of the product to or above its melting point or result in the generation of airborne particulates, use protective clothing, gloves and safety glasses to prevent skin and eye contact. Contact lenses should not be worn where industrial exposures to this material are likely. Use safety glasses or goggles as required for welding, burning, sawing, brazing, grinding or machining operations. Protective gloves should be worn as required for welding, burning or handling operations. Where the oil coating is applied to the product, wear gloves when handling, do not continue to use gloves or work clothing that has become saturated or soaked through with oil coating. Wash skin that has been exposed to oil with soap and water or waterless hand cleaner.

Section 9 – Physical and Chemical Properties

Physical State: Solid

Appearance and Odor: Metallic Gray, Odorless

Odor Threshold: Not applicable

Vapor Pressure: Not applicable

Vapor Density (Air=1) : Not applicable

Formula Weight: Not applicable

Density: 7.85

Specific Gravity (H_2O=1, at 4 °C): 7.85

pH: Not applicable

Water Solubility: Insoluble

Other Solubilities: Not applicable

Boiling Point: Not applicable

Viscosity: Not applicable

Refractive Index: Not applicable

Surface Tension: Not applicable

% Volatile: Not applicable

Evaporation Rate: Not applicable

Freezing/Melting Point: Base Metal – 2750 °F

Section 10 – Stability and Reactivity

Stability: Steel products are stable under normal storage and handling conditions.

Polymerization: Hazardous polymerization will not occur.

Chemical Incompatibilities: Will react with strong acids to form hydrogen. Iron oxide dusts in contact with calcium hypochlorite evolve oxygen and may cause an explosion.

Conditions to Avoid: Avoid storage with strong acids or calcium hypochlorite. **Molten metal may react violently with water.**

Hazardous Decomposition Products: Thermal oxidative decomposition of steel products can produce fumes containing oxides of iron, zinc, manganese as well as other elements. If present, surface treatments such as corrosion-inhibiting oils, resin, or coatings on the product may yield noxious gases such as the oxides of carbon upon thermal oxidative decomposition.

Section 11 - Toxicological Information

No information is available for the product as a mixture. The possible presence of chemical surface treatments and oil coatings should be considered when evaluating potential employee health hazards and exposures during handling and welding or other fume generating activities.

Eye Effects:
Eye contact with the individual components may cause particulate irritation. Implantation of iron particles in guinea pig corneas have resulted in rust rings with corneal softening about rust ring.

Skin Effects:
Not anticipated to pose significant skin hazards. Skin contact with the individual components may cause physical abrasion, irritation, dermatitis, ulcerations and sensitizations.

Chronic Effects: See section 3

Toxicity Data:*

Acute Inhalation Effects:
Inhalation of the individual alloy components has been shown to cause various respiratory effects.

Acute Oral Effects:
No data available

Other: No LC50 or LD50 has been established for the mixture as a whole. Iron LD50: 30 g/kg oral (rat). Aluminum LD50: No data. Boron LD50: 2000 mg/kg orl (mouse). Calcium LD50: No data. Carbon LD50: No data. Chromium LD_{Lo}: 71 mg/kg GIT orl (human). Columbium LD50: No data. Copper LD_{Lo}: 120 ug/kg GIT ipl (rat). Manganese LD50: 9 g/kg oral (rat). Molybdenum LD_{Lo}: 114 mg/kg ipr (rat). Nickel LD_{Lo}: 5 mg/kg orl (guinea pig) Phosphorous LD50: No data. Silicon LD50: No data. Sulfur LD50: No data. Tin LD50: No data. Titanium LD50: No data. Vanadium LD50: 59 mg/kg scu (rabbit).

Carcinogenicity: Chromium and Nickel

Mutagenicity: No data available **Teratogenicity:** No data available

* See NIOSH, *RTECS* (NO7400000), for additional toxicity data on iron oxide, (BD1200000) for aluminum oxide, (EV8040000) for calcium, (ED7350000) for boron, (FF5250000) for carbon, GB5425000) for chromium, (GL5325000) for copper, (OO9275000) for manganese, (QA4680000) for molybdenum, (QR5950000) for nickel, (TH3500000) for phosphorous, (WM0400000) for silicon, (WS4250000) for sulfur, (XP7320000) for tin, (XR1700000) for titanium, (YW2460000) for vanadium pentoxide.

Section 12 - Ecological Information

Ecotoxicity: No data available for the product as a whole. However, individual components of the product have been found to be toxic to the environment. Metal dusts may migrate into soil and groundwater and be ingested by wildlife.

Environmental Fate: No data available.

Environmental Degradation: No data available.

Soil Absorption/Mobility: No data available for the product as a whole. However, individual components of the product have been found to be absorbed by plants from soil.

Section 13 - Disposal Considerations

Disposal: This material is considered to be a solid waste, not a hazardous waste. Follow applicable Federal, state, and local regulations for disposal of solid waste and airborne particulates accumulated during handling operations of the product. Waste steel products can be recycled for further use.

Disposal Regulatory Requirements: None

Container Cleaning and Disposal: Follow applicable Federal, state and local regulations. Observe safe handling precautions.

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Section 14 – Transport Information

DOT Transportation Data (49 CFR 172.101):
Metal Coated steel are not listed as hazardous substances under 49 CFR 172.101.

Shipping Name: Not applicable
Shipping Symbols: Not applicable
Hazard Class: Not applicable
ID No.: Not applicable
Packing Group: Not applicable
Label: Not applicable
Special Provisions (172.102): None

Packaging Authorizations
a) Exceptions: None
b) Non-bulk Packaging: Not applicable
c) Bulk Packaging: Not applicable

Quantity Limitations
a) Passenger, Aircraft, or Railcar: Not applicable
b) Cargo Aircraft Only: Not applicable

Vessel Stowage Requirements
a) Vessel Stowage: Not applicable
b) Other: Not applicable

Section 15 – Regulatory Information

Regulatory Information: *The following listing of regulations relating to an ArcelorMittal USA Inc. product may not be complete and should not be solely relied upon for all regulatory compliance responsibilities.*

This product and/or its constituents are subject to the following regulations:

OSHA Regulations:
Air Contaminant (29 CFR 1910.1000, Table Z-1, Z-1-A): Steel products as a whole is not listed. However, individual components of the product are listed.

EPA Regulations:
RCRA: Chromium and Nickel are regulated under this act.
CERCLA Hazardous Substance (40 CFR 302.4): The product as a whole is not listed. However, individual components of the product are listed: Chromium, Copper, Manganese, Nickel, Phosphorous and Zinc compounds, and are listed under SARA 302.
SARA 311/312 Codes: Immediate (acute) health hazard and delayed (chronic) health hazard.
SARA 313: Aluminum (fume or dust), Chromium, Copper, Manganese, Nickel, Phosphorous and Zinc (fume or dust) 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.
Clean Water Act: Chromium, Copper, Nickel, and Zinc are Section 307 Priority Pollutants. Phosphorus is a Section 311 hazardous chemical.
Safe Drinking Water Act: Aluminum, Boron, Chromium, Copper, Iron, Manganese, Molybdenum, Nickel, Vanadium and Zinc are regulated under this act.

State Regulations: The product as a whole is not listed in any state regulations. However, individual components of the product are listed in various state regulations.
Pennsylvania Right to Know: Contains regulated material in the following categories:
- Hazardous Substances: Calcium, Molybdenum, Silicon, Sulfur and Tin.
- Environmental Hazards: Aluminum, Chromium, Copper, Manganese, Nickel, Phosphorous, Vanadium and Zinc
- Special Hazard Substances: Chromium and Nickel

New Jersey Right to Know: Contains regulated material in the following categories:
- Environmental Hazardous Substance: Aluminum (fume or dust), Chromium, Copper, Manganese, Nickel, Phosphorous and Vanadium (fume or dust)
- Special Health Hazard Substances: Not regulated.

California Prop. 65: This product may contain an extremely small amount of lead in the metallic coating. Per customer specification, an extremely small amount of hexavalent chromium passivation treatment may be applied to the surface of product. Lead, nickel and hexavalent chromium are materials known to the State of California to cause cancer or reproductive toxicity.

Other Regulations: The product as a whole is not listed in any state regulations. However, individual components of the product are listed in various state regulations.
WHMIS (Canadian): D2B Product Classification.

Section 16 – Other Information

Prepared By: ArcelorMittal USA Inc.

Metal Coated Steel Sheet **Ref No. 002**

Hazard Rating Systems: NFPA Code: 0-0-0 HMIS Code: 0-0-0 PPE: See Section 8

See attached table for product synonyms.

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Synonyms for Metal Coated Steel

ALUMINIZED Sheet including HI-FORM
Brush Bright & Weirbright Clear
DÉCOR ™ Embossed Zinkote
DURGRIP Galvanized and Sheet HFT
DURGRIP Galvannealed Sheet incl. HI-FORM and HFY
DURGRIP-E Galvannealed Sheet incl. HI-FORM and HFT
DURZINKLITE
EG Carbon Sheet
EG Rephos Sheet
Electrosite
ElectroFORM
ElectroDI-FORM
GALVALUME Steel
GALVEX DURGRIP Galvanized Sheet incl. HI-FORM and HFY
GALVEX DURGRIP Galvanized Sheet HFT
GALVEX DURGRIP-E Galvanized Sheet incl. HI-FORM and HFT
GALVEX TI-CO Galvanized Sheet incl. HI-FORM and HFY
Hot Dipped Galvanized Carbon Steel Sheet
Hot Dipped Galvanized HSLA Steel Sheet
Hot Dipped Galvannealed Carbon Sheet
TI-CO Galvanized Culvert Sheet
TI-CO ™ Galvanized DÉCOR ™ Embossed
TI-CO ™ Galvanized MINdent
TI-CO ™ Galvanized Sheet including HI-FORM and HFY
Weirkote HDG Steel
Weirkote jp Galvanized (galvanneal)
Weirzin Regular
Zincrometal
Zincroplex
ZinKote (Electrolytic Galvanized)
ZnNi EG Sheet
ZnNI UC EG Sheet