



Material Safety Data Sheet

ArcelorMittal

Section 1 - Chemical Product and Company Identification

Product/Chemical Name: Metal Coated Steel Sheet

MSDS ID Number: AM USA - 002

Synonyms: Electrogalvanized, Galvalume, Galvaneal, Hot Dipped Galvanized or Aluminized Steel (Refer to Section 16 for other synonyms)

CAS Number: Mixture

Manufacturer: ArcelorMittal USA Inc.
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Chicago, IL 60603-9888

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CHEMTREC (Day or Night): 1-800-424-9300

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Emergency Contact: 1-760-476-3962, 3E Company Code: 333211

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/m ³ - Iron oxide fume	5 mg/m ³ - Iron oxide dust and fume
Aluminum	7429-90-5	0.01 – 0.5	15 mg/m ³ - as total dust 5 mg/m ³ - as respirable fraction	10 mg/m ³ - Metal Dust 5 mg/m ³ - Welding fume
Carbon	7440-44-0	0.001 - 0.6	15 mg/m ³ -as total dust (PNOR) ³ 5 mg/m ³ - as respirable fraction (PNOR)	10 mg/m ³ - Inhalable fraction ⁴ (PNOS) ⁵ 3 mg/m ³ - as respirable fraction ⁶ (PNOS)
Chromium	7440-47-3	0 - 0.7	1 mg/m ³ - Chromium metal	0.5 mg/m ³ - Chromium metal & Cr III compounds
Copper	7440-50-8	0.005 - 0.4	0.1 mg/m ³ - Fume (as Cu) 1 mg/m ³ - Dusts & mists (as Cu)	0.1 mg/m ³ - Fume 1 mg/m ³ - Dusts & mists (as Cu)
Manganese	7439-96-5	0.05 - 2.0	5 mg/m ³ (C) - Fume & Mn compounds	0.2 mg/m ³
Nickel	7440-02-0	0.004 - 0.5	1 mg/m ³ - Metal & insoluble compounds (as Ni)	1.5 mg/m ³ - Elemental nickel (as Ni) 0.2 mg/m ³ - Insoluble compounds
Silicon	7440-21-3	0.001 - 1.05	15 mg/m ³ - as total dust 5 mg/m ³ - as respirable fraction	10 mg/m ³

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 (Occupational Health and Safety Administration) PELs (Permissible Exposure Limits) 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 TLV (Threshold Limit Values) established by ACGIH (the American Conference of Governmental Industrial Hygienists) 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 2009 TLVs® and BEIs® (Biological Exposure Indices) 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 2009 TLVs® and BEIs® Appendix D, paragraph C.

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/m ³ - as total Dust 5 mg/m ³ - as respirable Fraction	10 mg/m ³ - Metal Dust as Al 5 mg/m ³ - Fume as Al
Nickel (Ni) ZnNi EG	7440-02-0	10 - 30	1 mg/m ³ - Metal as Ni 1 mg/m ³ - Insoluble Compounds as Ni 1 mg/m ³ - Soluble Compounds as Ni	1.5 mg/m ³ - Elemental Metal as Ni 0.2 mg/m ³ - Insoluble as Ni 0.1 mg/m ³ - 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/m ³ - Fume 15 mg/m ³ - as total dust 5 mg/m ³ - as respirable fraction	5 mg/m ³ - Fume 10 mg/m ³ - Fume (STEL) 10 mg/m ³ - 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/m ³ - As Ba 5 µg/m ³ - Cr VI 2.5 µg/m ³ - Cr VI (action level)	0.5 mg/m ³ - Soluble Compounds as Ba 0.05 mg/m ³ - 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/m ³ - Chromium metal 0.5 mg/m ³ - CrII and CrIII 5 µg/m ³ - Cr VI 2.5 µg/m ³ - Cr VI (action level)	0.5 mg/m ³ - metal and Cr III 0.05 mg/m ³ - soluble Cr VI 0.01 mg/m ³ - insoluble Cr VI
Epoxy Resin	Varies	40 - 60	Not Established	Not Established
Phosphate Treat	7664-38-2	100-200MG/FT2	1 mg/m ³ (as phosphoric acid) PEL for Zinc Phosphate is Not Established	1 mg/m ³ (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/m ³ - Chromium metal 0.5 mg/m ³ - CrII and CrIII 5 µg/m ³ - Cr VI 2.5 µg/m ³ - Cr VI (action level)	0.5 mg/m ³ - metal and Cr III 0.05 mg/m ³ - soluble Cr VI 0.01 mg/m ³ - 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 Phosphophyllite and Hopeite.
8. Percentages listed are calculated from typical coating weights of 0.3-0.8 g/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 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. Torch 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. Nickel and phosphorus oxide are respiratory tract irritants.
- **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.
- **Skin:** Skin contact with metallic fumes and dusts may cause physical abrasion. 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 (The International Agency for Research on Cancer).
- **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.
- **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.
- **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.
- **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 2009 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.
- **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. IARC identifies nickel and certain nickel compounds and welding fumes as Group 2B carcinogens that are possibly carcinogenic to humans. ACGIH lists insoluble nickel compounds as confirmed human carcinogens. 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. 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.

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

LEL: Not Applicable

Flash Point Method: Not Applicable

UEL: Not Applicable

Burning Rate: Not Applicable

Auto-ignition Temperature: Not Applicable

Flammability Classification: Non-Flammable, Non-Combustible

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 face-piece 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 that 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	Water Solubility: Insoluble
Appearance and Odor: Metallic Gray, Odorless	Other Solubilities: Not Applicable
Odor Threshold: Not Applicable	Boiling Point: Not Applicable
Vapor Pressure: Not Applicable	Viscosity: Not Applicable
Vapor Density (Air=1): Not Applicable	Refractive Index: Not Applicable
Formula Weight: Not Applicable	Surface Tension: Not Applicable
Density: 7.85	% Volatile: Not Applicable
Specific Gravity (H₂O=1, at 4 °C): 7.85	Evaporation Rate: Not Applicable
pH: Not Applicable	Freezing/Melting Point: Base Metal 1510°C (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

Base Metal Toxicity Data:* 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: Refer to Section 3

Carcinogenicity: Chromium and Nickel, Refer to Section 3

* See NIOSH, *RTECS* (NO7400000) for additional toxicity data on iron oxide, (BD0330000) for aluminum metal, (BD1200000) for aluminum oxide, (FF5250100) for carbon, (GB4200000) for chromium, (GL5325000) for copper, (OO9275000) for manganese, (QR5950000) for nickel, (VW0400000) for silicon.

Coating Toxicity Data: **

Eye Effects: Consult individual coating product MSDS

Skin Effects: Consult individual coating product MSDS

Chronic Effects: Refer to Section 3

Carcinogenicity: Nickel, Refer to Section 3

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

Acute Oral Effects: No Information Found (NIF)

Other: No LC50 or LD50 has been established for the mixture as a whole. Iron LD50: NIF, Aluminum Metal LD50: NIF, Aluminum Oxide LD50: >3,600 mg/kg (intraperitoneal mouse), Carbon LD50: 440 mg/kg (intravenous mouse), Chromium LD50: 27,500 µg/kg (unreported route rat), Copper LD50: 413 mg/kg (oral mouse), Manganese LD50: 9 g/kg oral (rat), Nickel LD50: 250 mg/kg (intraperitoneal rat), Silicon LD50: 3,160mg/kg (oral rat)

Mutagenicity: NIF

Teratogenicity: NIF

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

Acute Oral Effects: No Information Found (NIF)

Other: No LC50 or LD50 has been established for the mixture as a whole. Aluminum Metal LD50: NIF, Aluminum Oxide LD50: >3,600 mg/kg (intraperitoneal mouse), Nickel LD50: 250 mg/kg (intraperitoneal rat), Zinc LC50: 23 g/m³/24 hour, Phosphoric Acid LC50: 25.5 mg/m³ (inhalation mouse), Silicates: NIF.

Mutagenicity: NIF

Teratogenicity: NIF

** See NIOSH, *RTECS* (BD0330000) for additional toxicity data on aluminum metal, (BD1200000) for aluminum oxide, (QR5950000) for nickel, (ZG8600000) for zinc, (TB6300000) for phosphoric acid, (Varies) for silicates.

Section 12 - Ecological Information

Ecotoxicity: No information found 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 Information Found (NIF)

Environmental Degradation: NIF

Soil Absorption/Mobility: No information found 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.

Section 14 - Transport Information

DOT Transportation Data (49 CFR 172.101):

Metal Coated steel is 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-2, Z-3): 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, Chromium, Copper, Iron, Manganese, Nickel, 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: Silicon, Sulfur and Tin
- Environmental Hazards: Aluminum, Chromium, Copper, Manganese, Nickel, Phosphorous, 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, and Phosphorous
- 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.

Hazard Rating Systems:

NFPA Code: 0-0-0

HMIS Code: 0-0-0

PPE: See Section 8

ABBREVIATIONS/ACRONYMS:

ACGIH	American Conference of Governmental Industrial Hygienists
BEIs	Biological Exposure Indices
CAS	Chemical Abstracts Service
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CNS	Central Nervous System
GI, GIT	Gastro-Intestinal, Gastro-Intestinal Tract
HMIS	Hazardous Materials Identification System
IARC	International Agency for Research on Cancer
LC50	Median Lethal Concentration
LD50	Median Lethal Dose
LD_{Lo}	Lowest Dose to have killed animals or humans
LEL	Lower Explosive Limit
µg/m³	microgram per cubic meter of air
mg/m³	milligram per cubic meter of air
mppcf	million particles per cubic foot
MSDS	Material Safety Data Sheet
MSHA	Mine Safety and Health Administration
NFPA	National Fire Protection Association

NIF	No Information Found
NIOSH	National Institute for Occupational Safety and Health
NTP	National Toxicology Program
ORC	Organization Resources Counselors
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
PNOR	Particulate Not Otherwise Regulated
PNOC	Particulate Not Otherwise Classified
PPE	Personal Protective Equipment
ppm	parts per million
RCRA	Resource Conservation and Recovery Act
RTECS	Registry of Toxic Effects of Chemical Substances
SARA	Superfund Amendment and Reauthorization Act
SCBA	Self-contained Breathing Apparatus
STEL	Short-term Exposure Limit
TLV	Threshold Limit Value
TWA	Time-weighted Average
UEL	Upper Explosive Limit

Disclaimer: This information is taken from sources or based upon data believed to be reliable. Our objective in sending this information is to help you protect the health and safety of your personnel and to comply with the OSHA Hazard Communication Standard and Title III of the Superfund Amendment and Reauthorization Act of 1986. ArcelorMittal USA Inc. makes no warranty as to the absolute correctness, completeness, or sufficiency of any of the foregoing, or any additional, or other measures that may not be required under particular conditions. ARCELORMITTAL USA INC. MAKES NO WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE IMPLIED WARRANTY OF MERCHANTABILITY, OR ANY IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, AND ANY IMPLIED WARRANTIES OTHERWISE ARISING FROM COURSE OF DEALING OR TRADE.

Products covered for Metal Coated Steel include:

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

LABEL

Metal Coated Steel Sheet

GENERAL HAZARD STATEMENT: This formed solid 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 promptly. 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.

If appropriate, respiratory protection and other personal protective equipment should be used.

CAUTION

DUST OR FUME GENERATED DURING WELDING OR OTHER PROCESSING MAY CAUSE:

RESPIRATORY TRACT, SKIN, AND EYE IRRITATION AND/OR SENSITIZATION, AND MAY CAUSE METAL FUME FEVER.

CANCER HAZARD (CONTAINS NICKEL AND CHROMIUM*). RISKS WILL DEPEND UPON TYPE OF PROCESSING. EFFECTS WILL DEPEND ON DURATION AND LEVEL OF EXPOSURE.

Consult MSDS for more information

** The chromium metal in these alloys is in the zero valence state. As such, chromium metal does not present any unusual health hazard. However, welding, torch cutting, brazing or perhaps grinding on this product may generate airborne concentrations of hexavalent chromium (Cr⁺⁶), metallic nickel and nickel alloys. The International Agency for Research on Cancer classified hexavalent chromium as a category 1 confirmed human carcinogen and metallic nickel and alloys as a category 2B possibly carcinogenic to humans.*

PRECAUTIONS: Avoid breathing or contact with dust or fume. Adequate ventilation is required while welding burning, melting, cutting, brazing, grinding, and machining. Wear appropriate personal protective equipment.

FIRST AID:

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, obtain medical advice.

For additional information refer to appropriate Material Safety Data Sheet available at:

<http://www.arcelormittal.com/environment/us/datasheets.html>

Product Name: Metal Coated Steel Sheet

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