



ArcelorMittal

## Material Safety Data Sheet

### Section 1 - Chemical Product and Company Identification

**Product/Chemical Name:** Clad Plate Products

**Synonyms:** Copper Clad Steel Plate, Stainless Clad Steel Plate, Nickel Clad Steel Plate

**Reference Number:** AM USA - 004

**CAS Number:** Mixture

**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

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### Section 2 - Composition / Information on Ingredients

#### Base Metal

| Ingredient Name | CAS Number | Percentage by wt. | OSHA PEL <sup>1</sup>   | ACGIH TLV <sup>2</sup>  |
|-----------------|------------|-------------------|---|---|
| Iron            | 7439-89-6  | 60– 95            | 10 mg/m <sup>3</sup> - Iron oxide fume  | 5 mg/m <sup>3</sup> - Iron oxide dust and fume  |
| Aluminum        | 7429-90-5  | 0 - 0.15          | 15 mg/m <sup>3</sup> - as total dust<br>5 mg/m <sup>3</sup> - as respirable fraction                      | 10 mg/m <sup>3</sup> - Metal Dust<br>5 mg/m <sup>3</sup> - Welding fume   |
| Carbon          | 7440-44-0  | 0 – 1.6           | 15 mg/m <sup>3</sup> - Total dust (PNOR) <sup>3</sup><br>5 mg/m <sup>3</sup> - Respirable fraction (PNOR) | 10 mg/m <sup>3</sup> - Inhalable fraction <sup>4</sup> (PNOS) <sup>5</sup><br>3 mg/m <sup>3</sup> - Respirable fraction <sup>6</sup> (PNOS) |
| Chromium        | 7440-47-3  | 0 – <10.0         | 1 mg/m <sup>3</sup> - Chromium metal  | 0.5 mg/m <sup>3</sup> - Chromium metal & Cr III compounds   |
| Copper          | 7440-50-8  | 0 – <40           | 0.1 mg/m <sup>3</sup> - Fume (as Cu)<br>1 mg/m <sup>3</sup> - Dusts & mists (as Cu)                       | 0.1 mg/m <sup>3</sup> - Fume<br>1 mg/m <sup>3</sup> - Dusts & mists (as Cu)   |
| Manganese       | 7439-96-5  | 0 – 2.0           | 5 mg/m <sup>3</sup> (C) - Fume & Mn compounds   | 0.2 mg/m <sup>3</sup>   |
| Molybdenum      | 7439-98-7  | 0 – 4.0           | 15 mg/m <sup>3</sup> – Total Dust<br>5 mg/m <sup>3</sup> – Soluble Compounds                              | 10 mg/m <sup>3</sup> – Insoluble Compounds<br>5 mg/m <sup>3</sup> – Soluble Compounds   |
| Nickel          | 7440-02-0  | 0 – <40           | 1 mg/m <sup>3</sup> - Metal & insoluble compounds (as Ni)   | 1.5 mg/m <sup>3</sup> - Elemental nickel (as Ni)<br>0.2 mg/m <sup>3</sup> - Insoluble compounds   |
| Phosphorus      | 7723-14-0  | 0 – 0.035         | 0.1 mg/m <sup>3</sup>   | 0.1 mg/m <sup>3</sup>   |
| Silicon         | 7440-21-3  | 0 – 2.25          | 15 mg/m <sup>3</sup> - Total dust<br>5 mg/m <sup>3</sup> - Respirable fraction                            | 10 mg/m <sup>3</sup>  |

#### 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%, cobalt 0.06%, niobium (columbium) 0.06%, sulfur 0.035%, tin 0.03%, titanium 0.05%, and vanadium 0.11%.
- 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.

- OSHA (Occupational Safety and Health 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.
- TLV (Threshold Limit Values) established by ACGIH (the American Conference of Governmental Industrial Hygienists) are 8-hour TWA concentrations unless otherwise noted.
- 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/m<sup>3</sup> for total dust and 5 mg/m<sup>3</sup> for the respirable fraction.
- 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 2008 TLVs ® and BEIs ® (Biological Exposure Indices) Appendix D, paragraph A.
- 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<sup>3</sup> for inhalable particulate and 3 mg/m<sup>3</sup> for respirable particulate has been recommended.
- 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 2008 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. 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.

**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. Steel surfaces may be treated with small amounts of corrosion resistant paints, epoxies, laminates, etc., generally applied at the customer's request. Refer to the coating manufacturer's MSDS for hazards associated with coatings.

**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. Molybdenum, 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. Molybdenum is an eye irritant.
- **Skin:** Skin contact with metallic fumes and dusts may cause physical abrasion. Chromium and molybdenum 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 (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. NTP (The National Toxicology Program) 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.

- **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 2007 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.

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 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:** 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 (National Institute for Occupational Safety and Health) -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.

### 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<sub>2</sub>O = 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 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 and 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

**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

**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: 30 g/kg oral (rat), Aluminum LD50: NIF, Carbon LD50: NIF, Chromium LD<sub>Lo</sub>: 71 mg/kg GIT oral (human), Copper LD<sub>Lo</sub>: 120 µg/kg GIT intrapleural (rat), Manganese LD50: 9 g/kg oral (rat), Molybdenum LD<sub>Lo</sub>: 114 mg/kg intrapleural (rat), Nickel LD<sub>Lo</sub>: 5 mg/kg oral (guinea pig), Phosphorous LD50: NIF, Silicon LD50: NIF

**Carcinogenicity:** Chromium and Nickel, Refer to Section 3

**Mutagenicity:** NIF

**Teratogenicity:** NIF

\* See NIOSH, *RTECS* (NO7400000), for additional toxicity data on iron oxide, (BD1200000) for aluminum oxide, (FF5250000) for carbon, (GB5425000) for chromium, (GL5325000) for copper, (OO9275000) for manganese, (QA4680000) for molybdenum, (QR5950000) for nickel, (TH3500000) for phosphorous, (WM0400000) for silicon,

### 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 Information Found (NIF)

**Environmental Degradation:** NIF

**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.

### Section 14 - Transport Information

**DOT Transportation Data (49 CFR 172.101):**

Clad Plate Steels 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 compounds, Nickel and Phosphorous 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 and Phosphorous 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 and Nickel are Section 307 Priority Pollutants. Phosphorus is a Section 311 hazardous chemical.

Safe Drinking Water Act: Aluminum, Chromium, Copper, Molybdenum, and Nickel 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, and Silicon.
- Environmental Hazards: Aluminum, Chromium, Copper, Manganese, Nickel, and Phosphorous.
- 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: Nickel is a material known 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:**

|                         |  |
|-------------------------|--|
| <b>ACGIH</b>            | - American Conference of Governmental Industrial Hygienists            |
| <b>BEIs</b>             | -Biological Exposure Indices   |
| <b>CAS</b>              | - Chemical Abstracts Service   |
| <b>CERCLA</b>           | -Comprehensive Environmental Response, Compensation, and Liability Act |
| <b>CFR</b>              | - Code of Federal Regulations  |
| <b>CNS</b>              | -Central Nervous System  |
| <b>GI, GIT</b>          | - Gastro-Intestinal, Gastro-Intestinal Tract                           |
| <b>HMIS</b>             | - Hazardous Materials Identification System                            |
| <b>IARC</b>             | - International Agency for Research on Cancer                          |
| <b>LC50</b>             | -Median Lethal Concentration   |
| <b>LD50</b>             | -Median Lethal Dose  |
| <b>LD<sub>Lo</sub></b>  | - Lowest Dose to have killed animals or humans                         |
| <b>LEL</b>              | -Lower Explosive Limit   |
| <b>µg/m<sup>3</sup></b> | - microgram per cubic meter of air                                     |
| <b>mg/m<sup>3</sup></b> | - milligram per cubic meter of air                                     |
| <b>mppcf</b>            | - million particles per cubic foot                                     |
| <b>MSDS</b>             | - Material Safety Data Sheet   |
| <b>MSHA</b>             | - Mine Safety and Health Administration                                |

|              |   |
|--------------|---|
| <b>NFPA</b>  | - National Fire Protection Association                  |
| <b>NIF</b>   | - No Information Found                                  |
| <b>NIOSH</b> | - National Institute for Occupational Safety and Health |
| <b>NTP</b>   | - National Toxicology Program                           |
| <b>ORC</b>   | - Organization Resources Counselors                     |
| <b>OSHA</b>  | - Occupational Safety and Health Administration         |
| <b>PEL</b>   | - Permissible Exposure Limit                            |
| <b>PNOR</b>  | - Particulate Not Otherwise Regulated                   |
| <b>PNOC</b>  | - Particulate Not Otherwise Classified                  |
| <b>PPE</b>   | - Personal Protective Equipment                         |
| <b>ppm</b>   | - parts per million                                     |
| <b>RTECS</b> | - Registry of Toxic Effects of Chemical Substances      |
| <b>SARA</b>  | -Superfund Amendments and Reauthorization Act           |
| <b>SCBA</b>  | - Self-contained Breathing Apparatus                    |
| <b>STEL</b>  | - Short-term Exposure Limit                             |
| <b>TLV</b>   | - Threshold Limit Value                                 |
| <b>TWA</b>   | - Time-weighted Average                                 |
| <b>UEL</b>   | - 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.