



United States Steel Corporation

Blast Furnace Sludge Safety Data Sheet (SDS)

USS IHS Number: 26

(Replaces USS Code Number SRP-009)

Locations: ET, Fairfield, Gary, Granite City, Great Lakes, Hamilton, and Lake Erie

Original: 11/25/85

Revision: 09/02/2020

Section 1 – Identification

1(a) Product Identifier Used on Label: Blast Furnace Sludge

1(b) Other Means of Identification: BF Classifier Sludge, BF Belt Press

1(c) Recommended Use of the Chemical and Restrictions on Use: None

1(d) Name, Address, and Telephone Number:

United States Steel Corporation Phone number: (412) 433-6840 (8:00 am to 5:00 pm)
600 Grant Street, Room 1662 FAX: (412) 433-5019
Pittsburgh, PA 15219-2800

1(e) Emergency Phone Number: 1-800-262-8200 (CHEMTREC)

Section 2 – Hazard(s) Identification

2(a) Classification of the Chemical: Blast Furnace Sludge is considered a hazardous material according to the criteria specified in REACH [REGULATION (EC) No 1907/2006] and CLP [REGULATION (EC) No 1272/2008] and OSHA 29 CFR 1910.1200 Hazard Communication Standard. The categories of Health Hazards as defined in “GLOBALY HARMONIZED SYSTEM OF CLASSIFICATION AND LABELING OF CHEMICALS (GHS), Third revised edition ST/SG/AC.10/30/Rev. 3” United Nations, New York and Geneva, 2009 have been evaluated. Refer to Section 3, 8 and 11 for additional information.

2(b) Signal Word, Hazard Statement(s), Symbols and Precautionary Statement(s):

Hazard Symbol	Hazard Classification	Signal Word	Hazard Statement(s)
	Carcinogenicity -1A Single Target Organ Toxicity (STOT) Single Exposure - 2 STOT Repeated Exposure - 1	WARNING	May cause cancer. Causes damage to skin and lungs. Causes damage to lungs through prolonged or repeated exposure. Causes skin irritation. Causes serious eye irritation. Harmful if swallowed.
	Acute Toxicity-Oral - 4 Skin Irritation - 2 Eye Irritation - 2A		

Precautionary Statement(s):

Prevention	Response	Storage/Disposal
Do not breathe dusts or fume. Wear protective gloves / protective clothing / eye protection / face protection. Wash thoroughly after handling. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not eat, drink or smoke when using this product.	If exposed, concerned or feel unwell: Get medical advice/attention, call a poison center or doctor/physician. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention. If on skin: Take off contaminated clothing and wash it before reuse. Wash with plenty of water. If skin irritation occurs: Get medical advice/attention. If swallowed: Call a poison center or doctor/physician. Rinse mouth.	Store locked up. Dispose of contents in accordance with federal, state and local regulations.

2(c) Hazards Not Otherwise Classified: None Known

2(d) Unknown Acute Toxicity Statement (mixture): 1.2-4.9%

Blast Furnace Sludge

USS IHS No.: 26

Rev. 09/20

Section 3 – Composition/Information on Ingredients

3(a-c) Chemical Name, Common Name (Synonyms), CAS Number and Other Identifiers, and Concentration:

Chemical Name	CAS Number	EC Number	% weight
Iron and Iron Oxides	7439-89-6	231-096-4	23-73
	1309-38-2	215-169-8	
	1309-37-1	215-168-2	
Carbon	7440-44-0	231-153-3	10-50
Metallic Silicates and Aluminosilicates*	Varies	Varies	3-23
Crystalline Silica (as Quartz and Cristobalite)	14808-60-7	238-878-4	0-6.5
	14464-46-1	238-455-4	
Zinc Oxide	215-222-5	1314-13-2	0-3

EC- European Community

CAS- Chemical Abstract Service

* Some of the silica present in **Blast Furnace Sludge** occurs in the form of complex metallic silicates and aluminosilicates, including calcium silicate (CaSiO_3) 13983-17-0 and magnesium silicate (MgSiO_3) 63210-56-0.

Blast Furnace Sludge contains small amounts of various constituents in addition to those listed. These small quantities are frequently referred to as “trace” or “residual” constituents that generally originate in the raw materials used. Blast Furnace Sludge may contain the following trace or residual constituents: manganese, phosphorus pentoxide, titanium dioxide, sodium oxide, arsenic, and potassium oxide.

Section 4 – First-aid Measures

4(a) Description of Necessary Measures: If exposed, concerned or feel unwell: Get medical advice/attention, call a poison center or doctor/physician.

- **Inhalation:** If exposed, concerned or feel unwell: Get medical advice/attention, call a poison center or doctor/physician.
- **Eye Contact:** If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.
- **Skin Contact:** If on skin: Take off contaminated clothing and wash it before reuse. Wash with plenty of water. If skin irritation occurs: Get medical advice/attention.
- **Ingestion:** If swallowed: Call a poison center or doctor/physician. Rinse mouth.

4(b) Most Important Symptoms/Effects, Acute and Delayed (Chronic):

Acute Effects:

- **Inhalation:** Excessive exposure to high concentrations of dust may cause irritation to the mucous membranes of the upper respiratory tract.
- **Eye:** Particles of iron or iron compounds may become imbedded in the eye. Excessive exposure to high concentrations of dust may cause irritation to the eyes.
- **Skin:** Skin contact with dusts may cause irritation or sensitization, possibly leading to dermatitis. Skin contact with metallic fumes and dusts may cause physical abrasion.
- **Ingestion:** Ingestion of dust may cause nausea and/or vomiting.

Chronic Effects:

Individuals with chronic respiratory disorders (i.e., asthma, chronic bronchitis, emphysema, etc.) may be adversely affected by any fume or airborne particulate matter exposure. Persons with pre-existing skin disorders may be more susceptible to dermatitis.

4(c) Immediate Medical Attention and Special Treatment: Treat symptomatically.

Section 5 – Fire-fighting Measures

5(a) Suitable (and unsuitable) Extinguishing Media: Use extinguishers appropriate for surrounding materials.

5(b) Specific Hazards Arising from the Chemical: When burned, toxic smoke and vapor may be emitted including, oxides of carbon, metal oxides and other toxic vapors.

5(c) Special Protective Equipment and Precautions for Fire-fighters: Self-contained NIOSH approved respiratory protection and full protective clothing should be worn when fumes and/or smoke from fire are present. Heat and flames cause emittance of acrid smoke and fumes. Do not release runoff from fire control methods to sewers or waterways. Firefighters should wear full face-piece self-contained breathing apparatus and chemical protective clothing with thermal protection. Direct water stream will scatter and spread flames and, therefore, should not be used.

Section 6 - Accidental Release Measures

6(a) Personal Precautions, Protective Equipment and Emergency Procedures: Use only outdoors or in a well-ventilated area. If material is in a dry state, avoid inhalation of dust. Personnel should be protected against contact with eyes and skin. 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.

6(b) Methods and Materials for Containment and Clean Up: Collect material in appropriate, labeled containers for recovery or disposal in accordance with federal, state, and local regulations. Follow applicable OSHA regulations (29 CFR 1910.120) and all other pertinent state and federal requirements.

Blast Furnace Sludge

USS IHS No.: 26

Rev. 09/20

Section 7 - Handling and Storage

7(a) Precautions for Safe Handling: Do not eat, drink or smoke when using this product. Wash thoroughly after handling. Do not breathe dusts or fumes. Wear protective gloves / protective clothing / eye protection / face protection. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Avoid direct contact on skin, eyes or on clothing. Emergency safety showers and eye wash stations should be present.

7(b) Conditions for Safe Storage, including any Incompatibilities: Whenever feasible, store locked up.

Section 8 - Exposure Controls / Personal Protection

8(a) Occupational Exposure Limits (OELs): The following exposure limits are offered as reference, for an experience industrial hygienist to review.

Ingredients	OSHA PEL ¹	ACGIH TLV ²	NIOSH REL ³	IDLH ⁴
Iron and Iron Oxides	10 mg/m ³ (iron oxide fume)	5.0 mg/m ³ (iron oxide, respirable fraction ⁵)	5.0 mg/m ³ (iron oxide dust and fume)	2,500 mg/m ³ (as Fe)
Carbon	NE	NE	NE	NE
Metallic silicates* and Aluminosilicates	NE	NE	NE	NE
Crystalline Silica (as Quartz and Cristobalite)	0.05 mg/m ³ "AL" 0.025 mg/m ³	0.025 mg/m ³ (as respirable fraction)	0.05 mg/m ³ (as respirable dust), Ca	50 mg/m ³ (as quartz, Tripoli) 25 mg/m ³ (as cristobalite, tridymite), Ca
Zinc Oxide	15 mg/m ³ (total dust) 5.0 mg/m ³ (respirable fraction and fume)	2.0 mg/m ³ (respirable fraction) "STEL" 10 mg/m ³ (respirable fraction)	5.0 mg/m ³ (respirable fraction, dust only & fume) "C" 15 mg/m ³ (respirable fraction, dust only & fume)	500 mg/m ³

NE - None Established

* Varying metallic silicates may be present in varying forms.

1. OSHA 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. A Short Term Exposure Limit (STEL) is defined as a 15-minute exposure, which should not be exceeded at any time during a workday. An Action level (AL) is used by OSHA and NIOSH to express a health or physical hazard. They indicate the level of a harmful or toxic substance/activity, which requires medical surveillance, increased industrial hygiene monitoring, or biological monitoring. Action Levels are generally set at one half of the PEL but the actual level may vary from standard to standard. The intent is to identify a level at which the vast majority of randomly sampled exposures will be below the PEL.
2. Threshold Limit Values (TLV) established by the American Conference of Governmental Industrial Hygienists (ACGIH) are 8-hour TWA concentrations unless otherwise noted. ACGIH TLVs are for guideline purposes only and as such are not legal, regulatory limits for compliance purposes. DSEN – May cause dermal sensitization. This notation is used to indicate the potential for dermal sensitization resulting from the interaction of an absorbed agent and ultraviolet light (i.e. photosensitization). RSEN – May cause respiratory sensitization.
3. The National Institute for Occupational Safety and Health Recommended Exposure Limits (NIOSH-REL)- Compendium of Policy and Statements. NIOSH, Cincinnati, OH (1992). NIOSH is the federal agency designated to conduct research relative to occupational safety and health. As is the case with ACGIH TLVs, NIOSH RELs are for guideline purposes only and as such are not legal, regulatory limits for compliance purposes.
4. The "immediately dangerous to life or health air concentration values (IDLHs)" are used by NIOSH as part of the respirator selection criteria and were first developed in the mid-1970's by NIOSH. The Documentation for Immediately Dangerous to Life or Health Concentrations (IDLHs) is a compilation of the rationale and sources of information used by NIOSH during the original determination of 387 IDLHs and their subsequent review and revision in 1994. Ca is designated as carcinogen.
5. 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 ACGIH 2020 TLVs[®] and BEIs[®] Appendix D, paragraph C.

8(b) Appropriate Engineering Controls: Local exhaust ventilation should be used to control the emission of air contaminants. General dilution ventilation may assist with the reduction of air contaminant concentrations. Emergency eye wash stations and deluge safety showers should be available in the work area.

8(c) Individual Protection Measures:

- **Respiratory Protection:** Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, use only 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. Concentration in air of the various contaminants determines the extent of respiratory protection needed. Half-face, negative-pressure, air-purifying respirator equipped with P100 filter is acceptable for concentrations up to 10 times the exposure limit. Full-face, negative-pressure, air-purifying respirator equipped with P100 filter is acceptable for concentrations up to 50 times the exposure limit. Protection by air-purifying negative-pressure and powered air respirators is limited. Use a positive-pressure-demand, full-face, supplied air respirator or self contained breathing apparatus (SCBA) for concentrations above 50 times the exposure limit. If exposure is above the IDLH (Immediately dangerous to life or health) for any of the constituents, or there is a possibility of an uncontrolled release or exposure levels are unknown, then use a positive-demand, full-face, supplied air respirator with escape bottle or SCBA.

Warning! Air-purifying respirators both negative-pressure and powered-air do not protect workers in oxygen-deficient atmospheres.

- **Eyes:** Wear appropriate eye protection to prevent eye contact. Use safety glasses with side shields or chemical goggles.
- **Skin:** Persons handling this product should wear appropriate clothing to prevent skin contact. Wear protective gloves.
- **Other Protective Equipment:** An eyewash fountain and deluge shower should be readily available in the work area.

Blast Furnace Sludge

USS IHS No.: 26

Rev. 09/20

Section 9 - Physical and Chemical Properties

<p>9(a) Appearance (physical state, color, etc.): Black to grey Sludge</p> <p>9(b) Odor: Negligible</p> <p>9(c) Odor Threshold: NA</p> <p>9(d) pH: NA</p> <p>9(e) Melting Point/Freezing Point: >2700°F (>1482°C)</p> <p>9(f) Initial Boiling Point and Boiling Range: NA</p> <p>9(g) Flash Point: NA</p> <p>9(h) Evaporation Rate: NA</p> <p>9(i) Flammability (solid, gas): Not flammable</p> <p>NA - Not Applicable ND - Not Determined for product as a whole</p>	<p>9(j) Upper/lower Flammability or Explosive Limits: NA</p> <p>9(k) Vapor Pressure: NA</p> <p>9(l) Vapor Density (Air = 1): NA</p> <p>9(m) Relative Density: NA</p> <p>9(n) Solubility(ies): <1% (water)</p> <p>9(o) Partition Coefficient n-octanol/water: NA</p> <p>9(p) Auto-ignition Temperature: ND</p> <p>9(q) Decomposition Temperature: ND</p> <p>9(r) Viscosity: ND</p>
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Section 10 - Stability and Reactivity

10(a) Reactivity: Not Determined (ND)

10(b) Chemical Stability: Blast Furnace Sludge is stable under normal storage and handling conditions.

10(c) Possibility of Hazardous Reaction: None Known





10(d) Conditions to Avoid: Storage with strong acids or calcium hypochlorite.

10(e) Incompatible Materials: Iron oxide dusts in contact with calcium hypochlorite evolve oxygen and may cause an explosion.

10(f) Hazardous Decomposition Products: Toxic fumes and vapors may be released at elevated temperatures.

Section 11 - Toxicological Information

11(a-e) Information on Toxicological Effects: The following toxicity data has been determined for **Blast Furnace Sludge** by using the information available for its components applied to the guidance on the preparation of an SDS under the GHS requirements of OSHA and the EU CPL:

Hazard Classification	Hazard Category		Hazard Symbols	Signal Word	Hazard Statement
	EU	OSHA			
Acute Toxicity Hazard (covers Categories 1-4)	4	4 ^a		Warning	Harmful if swallowed.
Skin Irritation (covers Categories 1A, 1B, and 2)	2	2 ^b		Warning	Causes skin irritation.
Eye Damage/Irritation (covers Categories 1, 2A and 2B)	2	2A ^c		Warning	Causes serious eye irritation.
Germ Cell Mutagenicity (covers Categories 1A, 1B and 2)	2	NR*	NA	NA	NA
Carcinogenicity (covers Categories 1A, 1B and 2)	1A	1A ^d		Danger	May cause cancer.
Specific Target Organ Toxicity (STOT) Following Single Exposure (covers Categories 1-3)	2	2 ⁱ		Warning	May cause mechanical irritation to skin and lung irritation.
STOT Following Repeated Exposure (covers Categories 1 and 2)	1	1 ^j		Danger	Causes damage to lungs through prolonged or repeated exposure.

* NR Not Rated - Available data does not meet criteria for classification.

The Toxicological data listed below are presented regardless to classification criteria. Individual hazard classification categories where the toxicological information has met or exceeded a classification criteria threshold are listed above.

- a. No LC₅₀ or LD₅₀ has been established for **Blast Furnace Sludge**. The following data has been determined for the components:
- **Iron Oxide:** LD₅₀= >10,000 mg/kg (Oral/ Rat)
 - **Calcium Silicate:** LD₅₀= 3400 mg/kg (Oral)
 - **Silica:** Rat LD₅₀ = 500 mg/kg (IUCLID)
 - **Zinc Oxide:** LC₅₀= >5700 mg/m³ (Inhalation/Rat)
- b. No Skin (Dermal) Irritation data available for **Blast Furnace Sludge** as a mixture. The following Skin (Dermal) Irritation data has been determined for the components:
- **Iron Oxide:** Moderately irritating.

Section 11 - Toxicological Information (continued)

11(a-e) Information on Toxicological Effects (continued):

- c. No Eye Irritation data available for **Blast Furnace Sludge** as a mixture. The following Eye Irritation information was found for the components:
- **Iron Oxide:** Severely irritating; may cause burns.
 - **Silicon Dioxide:** Crystalline silica may cause abrasion of the cornea.
 - **Magnesium Silicate:** Expected to be a minimal eye irritant.
- d. No Skin (Dermal)/Respiratory Sensitization data available for **Blast Furnace Sludge** as a mixture or its individual components.
- e. No Aspiration Hazard data available for **Blast Furnace Sludge** as a mixture or its individual components.
- f. No Germ Cell Mutagenicity data available for **Blast Furnace Sludge** as a mixture. The following Germ Cell Mutagenicity information was found for the components:
- **Iron Oxide:** Both positive and negative data.
- g. Carcinogenicity: IARC, NTP, and OSHA do not list **Blast Furnace Sludge** as carcinogens. The following Carcinogenicity information was found for the components:
- **Iron Oxide (Fe₂O₃):** IARC-3, unclassifiable as to carcinogenicity in humans; ACGIH TLV-A4, not classifiable as a human carcinogen
 - **Silicon Dioxide:** IARC-1 (silica, crystalline), carcinogen to humans; ACGIH TLV-A2 (silica, crystalline), suspected human carcinogen; NTP-K, known to be a carcinogen; NIOSH-Ca, potential occupational carcinogen; OSHA-Ca, carcinogen.
 - **Zinc (compounds, oxide, as Zn):** EPA-II, inadequate information to assess carcinogenic potential & EPA-D not classifiable as to human carcinogenicity & EPA-I, data are inadequate for assessment of human carcinogenic potential
- h. No Toxic Reproduction data available for **Blast Furnace Sludge** as a mixture or its individual components.
- i. No Specific Target Organ Toxicity (STOT) following a Single Exposure data available for **Blast Furnace Sludge** as a mixture. The following STOT following a Single Exposure data was found for the components:
- **Iron Oxide:** May cause lung irritation.
 - **Silicon Dioxide:** Single exposure to very high airborne levels may cause lung irritation in exposed humans.
- j. No Specific Target Organ Toxicity (STOT) following Repeated Exposure data was available for **Blast Furnace Sludge** as a mixture. The following STOT following Repeated Exposure data was found for the components:
- **Iron Oxide:** Some pulmonary and lung effects reported.
 - **Silicon Dioxide:** Repeated exposure to crystalline silica causes silicosis and kidney damage as well as increased incidence of autoimmune disorders in humans.
 - **Calcium Silicate:** Evidence from wollastonite miners suggests that occupational exposure can cause impaired respiratory function and pneumoconiosis.
 - **Zinc and Zinc Oxide:** EU RAR has found rats repeatedly exposed by oral route to Zn salts developed reduced copper levels and changes in the pancreas (focal acinar degeneration and necrosis) and the spleen (decreased number of pigmented macrophages).

The above toxicity information was determined from available scientific sources to illustrate the prevailing posture of the scientific community. The scientific resources includes: The American Conference of Governmental Industrial Hygienist (ACGIH) Documentation of the Threshold Limit Values (TLVs) and Biological Exposure indices (BEIs) with Other Worldwide Occupational Exposure Values 2020, The International Agency for Research on Cancer (IARC), The National Toxicology Program (NTP) updated documentation, the World Health Organization (WHO) and other available resources, the International Uniform Chemical Information Database (IUCLID), European Union Risk Assessment Report (EU-RAR), Concise International Chemical Assessment Documents (CICAD), European Union Scientific Committee for Occupational Exposure Limits (EU-SCOEL), Agency for Toxic Substances and Disease Registry (ATSDR), Hazardous Substance Data Bank (HSDB), and International Programme on Chemical Safety (IPCS).

The following health hazard information is provided regardless to classification criteria and is based on the individual component(s):

Acute Effects by Component:

- **IRON (and Iron Oxide):** Iron is harmful if swallowed, causes skin irritation, and causes eye irritation. Contact with iron oxide has been reported to cause skin irritation and serious eye damage.
- **CARBON:** Not Reported/ Not classified
- **METALLIC SILICATES:** Magnesium Silicate may irritate the eyes. Potassium Silicate may be harmful if swallowed or contacts skin. Calcium silicate may be harmful if swallowed.
- **SILICA (Crystalline Quartz and Cristobalite):** Causes irritation and inflammation of the respiratory tract. May cause abrasion of the cornea. Inhalation may cause cough. A single exposure to very high airborne levels may cause lung irritation in exposed humans.
- **ZINC:** Not Reported/ Not Classified

Delayed (chronic) Effects by Component:

- **IRON (as Iron Oxide):** Chronic inhalation of excessive concentrations of iron oxide fumes or dusts may result in the development of a benign lung disease, 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 the International Agency for Research on Cancer (IARC).
- **CARBON:** Chronic inhalation may lead to decreased pulmonary function.
- **METALLIC SILICATES:** Magnesium Silicate is suspected of causing cancer by inhalation. Lifetime inhalation exposure of rats and mice to atmospheres of magnesium silicate resulted in interstitial fibrosis of the lung and reduced pulmonary function in rats at ≥ 6 mg/m³. Calcium Silicate exposure to wollastonite miners suggests that occupational exposure can cause impaired respiratory function and pneumoconiosis.
- **SILICA (Crystalline Quartz and Cristobalite):** Inhalation of quartz is classified by IARC as a probable human carcinogen. Chronic exposure can cause silicosis, a form of lung scarring that can cause shortness of breath, reduced lung function, and in severe cases, death. Repeated exposure may cause kidney damage as well as increased incidence of autoimmune disorder.

Blast Furnace Sludge

USS IHS No.: 26

Rev. 09/20

Section 11 - Toxicological Information (continued)

11(a-e) Information on Toxicological Effects (continued):

- **ZINC:** Zinc is a low health risk by inhalation and should be treated as a nuisance dust. Inhalation of zinc oxide fumes may cause metal fume fever, which is characterized by flu-like symptoms with metallic taste, fever, chills, cough, weakness, chest pain, muscle pain and increased white blood cell count.

Section 12 - Ecological Information

12(a) Ecotoxicity (aquatic & terrestrial): No data available for the product, **Blast Furnace Sludge** as a mixture. However, individual components of the product have been found to be toxic to the environment. Dusts may migrate into soil and groundwater and be ingested by wildlife as follows:

- **Iron Oxide:** LC₅₀: >1000 mg/L; Fish
- **Zinc:** EU RAR lists as Category 1 Very toxic to aquatic life with long lasting effects.

12(b) Persistence & Degradability: No Data Available

12(c) Bioaccumulative Potential: No Data Available

12(d) Mobility (in soil): No Data Available

12(e) Other Adverse Effects: None Known

Additional Information:

Hazard Category: Category 1

Signal Word: Warning

Hazard Symbol:



Hazard Statement: Very Toxic to aquatic life with long lasting effects.

Section 13 - Disposal Considerations

Disposal: Dispose of contents/container in accordance with local/regional/international regulations.

Container Cleaning and Disposal: Follow applicable federal, state and local regulations. Observe safe handling precautions. European Waste Catalogue 10-02-07 (solid wastes from gas treatment containing dangerous substances, or 10-02-08 (solid wastes from gas treatment other than those mentioned in 10-02-07).

Please note this information is for Blast Furnace Sludge in its original form. Any alterations can void this information.

Section 14 - Transport Information

14 (a-g) Transportation Information:

US Department of Transportation (DOT) under 49 CFR 172.101 does not regulate **Blast Furnace Sludge** as a hazardous material. All federal, state, and local laws and regulations that apply to the transport of this type of material must be adhered to.

<p>Shipping Name: Blast Furnace Sludge Shipping Symbols: Not Applicable (NA) Hazard Class: NA UN No.: NA Packing Group: NA DOT/IMO Label: NA Special Provisions (172.102): NA</p>	<p>Packaging Authorizations a) Exceptions: NA b) Non-bulk: NA c) Bulk: NA</p>	<p>Quantity Limitations a) Passenger Aircraft or Rail: NA b) Cargo Aircraft Only: NA Vessel Stowage Location: NA DOT Reportable Quantities: NA</p>
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International Maritime Dangerous Goods (IMDG) and the Regulations Concerning the International Carriage of Dangerous Goods by Rail (RID) classification, packaging and shipping requirements follow the US DOT Hazardous Materials Regulation.

Regulations Concerning the International Carriage of Dangerous Goods by Road (ADR) does not regulate **Blast Furnace Sludge** as a hazardous material.

<p>Shipping Name: Blast Furnace Sludge Classification Code: NA UN No.: NA Packing Group: NA ADR Label: NA Special Provisions: NA Limited Quantities: NA</p>	<p>Packaging a) Packing Instructions: NA b) Special Packing Provisions: NA c) Mixed Packing Provisions: NA</p>	<p>Portable Tanks & Bulk Containers a) Instructions: NA b) Special Provisions: NA</p>
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Blast Furnace Sludge

USS IHS No.: 26

Rev. 09/20

Section 16 - Other Information (continued)

ABBREVIATIONS/ACRONYMS:

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act		ORC	Organization Resources Counselors
CFR	Code of Federal Regulations		OSHA	Occupational Safety and Health Administration
CNS	Central Nervous System		PEL	Permissible Exposure Limit
GI, GIT	Gastro-Intestinal, Gastro-Intestinal Tract		PNOR	Particulate Not Otherwise Regulated
HMIS	Hazardous Materials Identification System		PNOC	Particulate Not Otherwise Classified
IARC	International Agency for Research on Cancer		PPE	Personal Protective Equipment
LC50	Median Lethal Concentration		ppm	parts per million
LD50	Median Lethal Dose		RCRA	Resource Conservation and Recovery Act
LD_{Lo}	Lowest Dose to have killed animals or humans		RTECS	Registry of Toxic Effects of Chemical Substances
LEL	Lower Explosive Limit		SARA	Superfund Amendment and Reauthorization Act
µg/m³	microgram per cubic meter of air		SCBA	Self-contained Breathing Apparatus
mg/m³	milligram per cubic meter of air		STEL	Short-term Exposure Limit
mppcf	million particles per cubic foot		TLV	Threshold Limit Value
SDS	Safety Data Sheet		TWA	Time-weighted Average
MSHA	Mine Safety and Health Administration		UEL	Upper Explosive Limit
NFPA	National Fire Protection Association			

Disclaimer: This information is taken from sources or based upon data believed to be reliable. However, United States Steel Corporation makes no warranty as to the absolute correctness or sufficiency of any of the foregoing or that additional or other measures may not be required under particular conditions.