

September 2, 2014

City of Chicago, Department of Public Health
Attn: Environmental Permitting and Inspections
333 South State Street, Room 200
Chicago, IL 60604

Re: North American Stevedoring Variance Request

To Whom It May Concern:

Thank you for the opportunity to comment on the application of North American Stevedoring for variances from the Department of Health's Rules and Regulations for Control of Emissions from the Handling and Storage of Bulk Material Piles ("Rules"). These comments are submitted on behalf of the Natural Resources Defense Council ("NRDC") and our nearly 10,000 members and activists in the City of Chicago, including those who reside on the Southeast Side in the Calumet area, as well as the Southeast Environmental Task Force ("SETF"), an active community group dedicated to improving the Calumet neighborhood's environment. For the reasons set forth below, the application is incomplete and fails to demonstrate that the requested variances will not have an adverse impact on the community and environment, and thus the request should be denied.

According to information derived from the demographic feature of U.S. EPA's ECHO database, there are 12,862 people who live within a one mile radius of the applicant's facility. More than 90% of the people who live within this one mile radius are Hispanic (59.63%) or African-American (35.5%). U.S. EPA's ECHO database also indicates a total of 4,134 households in this one mile radius, with a total population of 4,281 children 17 years and younger.

The applicant's facility is located on Port District property that is immediately adjacent to Calumet Park, a Chicago Park District property that includes a field house and a public beach <http://www.chicagoparkdistrict.com/parks/Calumet-Park/>. The same road provides vehicle access for Calumet Park and for the Port District property that includes the applicant's facility. This access road connects to 95th Street and South Ewing Avenue in the midst of a densely populated residential neighborhood. The applicant's facility is also located immediately adjacent to the Calumet River and the Calumet Harbor, which are used extensively by recreational watercraft. The USX property – now in the process of mixed use redevelopment – is directly across the Calumet River from the applicant's facility.

According to the applicant, it handles and stores two kinds of materials that are subject to the City's bulk storage rules, ferromanganese and fluorspar. According to the Material Safety Data Sheet for fluorspar, "dust hazards exist when the product is either dried intentionally or through prolonged open storage." This MSDS further indicates that the signs and symptoms of exposure to fluorspar are "irritation to eyes, skin, or respiratory tract." See: NRDC/SETF Exhibit One. The MSDS for ferromanganese indicates that

“repeated, long term inhalation of ferromanganese alloy dust in excess of exposure limits may cause adverse health effects. Flammable and noxious gases may be formed in contact with moisture and/or acids.” The MSDS further characterizes potential health hazards as follows:

Finely divided dust may irritate and dehydrate mucus membranes.
Phosphine/arsine may be absorbed from dust deposited on mucus membranes.
The toxic mechanism for phosphine is not clear. Phosphine irritates exposed mucous membranes, depresses the central nervous system (CNS) and can cause edema of the lungs. Acute, non-fatal poisoning with phosphine gives temporary effects, including but not limited to malaise, vomiting, stomach pains, cough, and difficulty in breathing.

In addition to manganese, the MSDS further indicates that “this product contains chromium in the metallic state” and nickel, a carcinogen which is subject to State of California Proposition 65. According to the MSDS “..care should be taken to minimize airborne dust generation and prevent material contamination of water systems.” See NRDC/SETF Exhibit Two.

Satellite images obtained from Google Earth of the applicant’s facility depict multiple bulk storage piles throughout its site, including several material piles in a row along the property boundary with Calumet waterways.

Industrial Impacts to City Residents and Environment

Earlier this year, the City adopted the new Rules to help address the problem of harmful dust pollution from industrial sources. Dust pollution can cause permanent harm to people’s lungs, significantly limit the uses and enjoyment (and so market values) of private property as well as public parks, and inhibit the growth of plants and wildlife.¹ While a significant impetus for the Rules was the clouds of petroleum coke and coal dust from several handlers along the Calumet River, the City appropriately sought to reduce dust from bulk materials more generally, adopting rules that apply city-wide to handlers of a range of bulk materials. This action represented a much-needed update to the City’s existing measures to combat dust.

We continue to believe that the Rules are too lax in some areas; however, they represent a significant step forward in providing increased protections to Chicago communities. Moreover, as set forth below in more detail, we believe it is imperative that the Commissioner stringently assess applications for variances to ensure the purposes of the Rules are not circumvented on a case-by-case basis.

¹ Comments of NRDC et al. (“Comments”) at 3-7, available at [http://www.cityofchicago.org/content/dam/city/depts/cdph/environmental health and fo od/PetCoke Public Comments/NRDC SETF Alliance for the Great Lakes ELPC Fa ith in Place RHAMC and Sierra Club Recvd 2-7-14.pdf](http://www.cityofchicago.org/content/dam/city/depts/cdph/environmental_health_and_fo od/PetCoke_Public_Comments/NRDC_SETF_Alliance_for_the_Great_Lakes_ELPC_Fa ith_in_Place_RHAMC_and_Sierra_Club_Recvd_2-7-14.pdf).

Objections to Variance Provisions

In our prior comments on the City's proposed dust rules, we noted significant concerns with both the scope of the variance provision and the lack of procedural safeguards for making variance determinations.² We urged the City to dispense with the variance provision altogether, or at minimum to include additional safeguards both in terms of substance and process. The City responded by adding requirements for variance applications, an opportunity for public comment, and criteria for reviewing a variance application.³ With these improvements, the Commissioner is empowered to hold applicants' demonstrations to high standards and to pay close attention to the interests of the public articulated through their written comments.

At the outset, we provide two general comments to guide this review. First, the area of fugitive dust regulation generally is plagued by a history of poor emissions estimates, overblown claims of control efficiencies, and vague requirements. As such, it is especially important that applications for variances are supported by detailed, site-specific information, robust technical demonstrations, and specific, enforceable proposed requirements. Second, obligations and costs above what the facility would have borne under prior city, state and federal obligations are to be expected under this new set of regulations. Mere reference to some increase in burden should not qualify as grounds for a variance.

Blast Furnace Iron Is Subject to Chicago's Rules For The Handling and Storage of Bulk Materials

According to the applicant, a third material managed at the site, blast furnace iron also known as pig iron, is not a bulk storage material subject to CDPH's regulations and "cannot leave the property or cause adverse impacts." NRDC and SETF strongly disagree with the applicant's assertion.

First, the applicant concedes that BFI is "used as ingredient in the manufacturing process"; that iron oxide "may slough or scale off the BFI during handling" and that iron oxide scale "may become airborne" and form particles in sizes that can travel "a few hundred feet" at wind speeds as low as ten miles per hour. These features of BFI bring it within the scope of the "bulk solid material" definition. (The applicant's unsubstantiated assertion that it only accumulates a small amount of material, even if true, would not insulate BFI from regulation as bulk solid material; the definition includes "ores" and encompasses materials that have the potential to form particles that can become airborne).

Second, fugitive dusts generated from the storage and handling of BFI can threaten human health and the environment. According to the Material Data Safety Sheet for Blast Furnace Iron, BFI contains iron, carbon, manganese, phosphorus, silicon and sulfur, each of which have their own hazard characteristics and corresponding OSHA and Threshold Limit Value standards. The MSDS hazard characterization includes this description

² Comments at 38-40.

³ Rules Section 8.0

“...Potentially hazardous quantities of airborne particulate and fume may be generated...Avoid inhalation of metal dusts and fumes.” Chronic inhalation of metallic fumes and dusts are associated with the conditions like benign pneumoconiosis, pulmonary disorders, central nervous system disorders, respiratory irritation, particulate irritation and other irritations of the skin, eyes, lungs and gastrointestinal tract. As to ecological risks, the MSDS notes “...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.” Moreover, “...individual components of the product have been found to be absorbed by plants from soil.” See: NRDC/SETF Attachment Three.

In light of the CDPH regulations’ plain language, the nature and scope of the potential risks of Blast Furnace Iron to human health and the environment, and NAS’ proximity to waterways, residential neighborhoods and a public park and beach, we urge the Commissioner to conclude that this material is subject to the Rules.

CDPH Must Deny The Applicant’s Request To Avoid Installing PM Monitors

The scope of the Commissioner’s authority and responsibility is broad, extending to “...any matter, material or substance susceptible to being windborne and for the handling, transportation, disposition or other operation with respect to any material subject to being windborne.” Municipal Code of Chicago 11-4-770. As pointed out by CDPH in its March 13, 2014 Response To Public Comments, the intent in establishing regulations is to protect public health and the environment from activities that have the potential to cause windborne dust, even “...existing businesses that are lawfully operating under current Chicago land use laws.” City of Chicago Department of Public Health, Official Response to Public Comments on the Proposed Rules and Regulations For The Handling and Storage of Bulk Material Piles, March 13, 2014, at 3. As asserted by CDPH, there are four categories of material and handling and storage activities that its own experts concluded can create airborne dust as part of the outdoor storage of materials - bulldozing and grading, material dropping operations, equipment travel on the surfaces of stockpiles and vehicle travel on paved roads. Id. at 4.

Consistent with the MCC, CDPH appropriately requires that these facilities have the capacity to prevent, detect and respond to potential releases of windborne material. To this end, CDPH mandates the development and implementation of a proactive fugitive dust plan. Every fugitive dust plan must contain some required elements, but CDPH also expressly allows flexibility for businesses to develop plans that make the most sense based on their unique operations. Id. at 21. However, the actual success of a fugitive dust plan is not left to guesswork. For CDPH, the most reliable means to demonstrate the success of a fugitive dust plan for operators, regulators and residents is through uniform, empirically verifiable PM monitoring. It is not an exaggeration to state that PM monitoring is the lynchpin of the new CDPH protocol. As stated by CDPH:

The requirement for fugitive dust monitoring is a critical component of the regulations to ensure that the facility’s dust control measures are working. CDPH inspectors cannot observe facility operations on a daily basis. And facility workers who are occupied in doing their jobs may not always realize when there

is a dust problem. Therefore, the PM monitors are important for alerting facility operators when there might be an issue with their dust control systems. They are also important to ensure compliance with the fugitive dust prohibition, as well as to give neighbors a level of comfort in knowing the air is being monitored. Id. at 23.

Because of the importance of PM monitoring, the variance standard is the most difficult of any requirement in the CDPH regulations. In addition to the exacting variance standards in Section 8.0, the standard for a variance from PM monitoring is also addressed in Section 3.0(4), which establishes the following threshold criteria:

Unless...the Facility Owner or Operator establishes that the Facility's operations do not result in off-site fugitive dust emissions, the Facility Owner or Operator must install, operate, and maintain, according to manufacturer's specifications, permanent, continuous Federal Equivalent Method (FEM) real-time PM 10 monitors around the perimeter of the facility...

Simply, the applicant in this case must establish its operations do not result in off-site fugitive dust emissions as a result of any of its activities, for example, bulldozing and grading, material dropping operations, equipment travel on the surfaces of stockpiles and vehicle travel on paved roads. The applicant must establish these kinds of operations do not result in off-site fugitive dust emissions over the full range of weather and operating conditions. The applicant must establish "no off-site fugitive dust emissions" for every compass point around the perimeter of its facility, be it a waterway, public road, or residential neighborhood. If it cannot establish the "no fugitive off-site dust emissions", it cannot be granted a variance from the requirement to establish a PM monitoring system in accordance with the regulations.

For the applicant, this does not mean a variance is impossible; instead, it means the applicant cannot meet this exacting standard now. Without irony, we would point out that the best way for the applicant to attempt to demonstrate there are no off-site fugitive dust emissions is to establish the PM monitoring network now required by the regulations. Following site improvements, if PM monitoring establishes there are "no off-site fugitive dust emissions" (at the locations and in the range of particle sizes measured by the monitors) over a representative period of time and range of conditions, then this is the point at which to seek a variance from an ongoing obligation to continue this monitoring. The monitoring would establish an objective empirical basis for the variance that would have credibility for regulators, other regulated entities and residents. In the meantime, in the event the monitoring system detects off-site dust emissions not anticipated by the applicant, it will provide a basis for further refinement of its fugitive dust plan. In any event, it is much more likely the task of developing and implementing a fugitive dust plan will be taken seriously if the results are verified by perimeter PM monitors, operated according to a uniform regulatory protocol.

The Applicant Has Not Met The Standard for Receiving A Variance From Several Operational Requirements

In addition to its variance request from PM monitoring requirements, the applicant also requests variances from several other requirements of the CDPH regulations.

In its variance application, the applicant must describe the process or activity for which the variance is sought, and demonstrate why the variance will not result in a public nuisance or “adversely impact the surrounding area, the surrounding, environment, or surrounding property values.”⁴ The applicant also must explain why compliance would impose an arbitrary or unreasonable hardship.⁵ In turn, in making a determination on a variance application, the Commissioner is to consider public comments, and give particular consideration to, among other things, whether a demonstration has been made that any adverse impacts will be minimal.⁶ Because the application falls short in many respects, we urge the Commissioner to deny the variance requests.⁷

Of NAS’ variance requests, two are particularly objectionable. First, the applicant seeks to avoid wheel washing and rumble strip requirements. These requirements are designed to help prevent the tracking of material onto public roadways. These requirements are especially important for NAS because of its location. The facility is located on Kreiter Ave. which is the sole access road for the facility. Shortly after exiting the NAS property, Kreiter Avenue merges into 95th Street at exactly the same point that is used by cars, bikes and pedestrians to access Calumet Park, a Chicago Park District property that includes open space, a field house and a beach. Simply put, the same segment of 95th Street is the only way to access both the NAS facility on Kreiter Avenue and Calumet Park. Because of this configuration, the risk of public exposure to any materials adhering to trucks and subsequently deposited on roadways is particularly acute. This becomes even more of an issue as trucks proceed west on 95th Street or turn onto South Ewing Avenue. This is a residential neighborhood, again increasing the risk of direct public exposure to materials on the wheels and associated undercarriage of trucks.

⁴ Rules Section 8.0(2)(b) and (d).

⁵ *Id.* at (e)(i). While Section 8 does not lay out additional guidance on what constitutes an arbitrary or unreasonable hardship, guidance may be found in the City’s parallel criteria for review of a variation from the zoning ordinance, as summarized in City of Chicago, Dept. of Housing and Economic Development, “Zoning Board Rules and Regulations,” August 2011, at 12-13, available at http://www.cityofchicago.org/content/dam/city/depts/zlup/Administrative_Reviews_and_Approvals/Publications/ZBA_Rules_and_Regulations.pdf.

⁶ *See* Rules Section 8.0(3)(a).

⁷ *See* Rules Section 8.0(3)(b). At most, the Commissioner should only grant the portions of the variance for which the applicant has provided the requisite supporting information and require supplemental information to be provided moving forward, upon which the variance is conditioned. *Id.* at (3)(c) (“The Commissioner may grant a variance in whole or in part, and may attach reasonable conditions to the variance to ensure minimization of any adverse impacts.”)

The second request to which NRDC and SETF object is to avoid the installation of a permanent device to monitor wind speed and direction. As an alternative, the applicant proposes using wind data derived from a water intake crib located several hundred yards off-shore in Lake Michigan, or from Midway airport, which is more than 10 miles inland, far to the northwest of the applicant's facility. By virtue of distance and location, neither of these alternatives is likely to be as representative as properly designed onsite monitoring of onsite wind conditions that could affect the risk of the release of materials from the applicant's facility into nearby residential neighborhoods, public lands or waterways. Moreover, even though the applicant asserts no individual load of material is stored outside for more than 24-hours, the piles themselves are constantly being replenished. The outdoor piles are a permanent feature of facility operations, even if any individual load is moved into an indoor enclosure within a defined period of time. Having the ability to monitor wind conditions that could contribute to a greater risk of a release of dust is essential to trigger the proactive, protective measures in any credible fugitive dust plan.

For these reasons, we respectfully request that the Commissioner deny this application for a variance. Please do not hesitate to contact us if you have any questions.

Sincerely,



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Menu



Detailed Facility Report

Facility Summary

NORTH AMERICAN STEVEDORING CO
9301 S KREITER AVE, CHICAGO, IL 60617

Facility Information (FRS)

FRS ID: 110005934249
 EPA Region: 05
 Latitude: 41.726845
 Longitude: -87.537405
 Industry:
 Indian Country: N

Regulatory Interests

Clean Air Act: Operating Minor (1703105895)
 Clean Water Act: No Information
 Resource Conservation and Recovery Act: Inactive -- (ILR000006775)
 Safe Drinking Water Act: No Information

Also Reports

Air Emissions Inventory (EIS): No Information
 Greenhouse Gas Emissions (eGGRT): No Information
 Toxic Releases (TRI): No Information

Enforcement and Compliance Summary

Statute	Insp (5 Years)	Date of Last Inspection	Current Compliance Status	Qtrs in NC (of 12)	Qtrs in Significant Violation	Informal Enforcement Actions (5 years)	Formal Enforcement Actions (5 years)	Penalties from Formal Enforcement Actions (5 years)	EPA Cases (5 years)	Penalties from EPA Cases (5 years)
CAA	--	--	Noncompliance	0	0	1	--	--	--	--
RCRA	--	--	No Violation	0	0	--	--	--	--	--

Facility/System Characteristics

Facility/System Characteristics

Statute	Identifier	Universe	Status	Area	Permit Expiration Date	Indian Country	Latitude	Longitude
--	110005934249	--	--	--	--	N	41.726845	-87.537405
CAA	1703105895	Other Minor	Operating	SIP	--	N	--	--
RCRA	ILR00006775	--	Inactive	--	--	N	41.726708	-87.537375

Facility Contact Information

System	Identifier	Facility Name	Facility Address
FP5	110005934249	NORTH AMERICAN STEVEDORING CO	9301 S KREITER AVE, CHICAGO, IL 60617
AFS	1703105895	NORTH AMERICAN STEVEDORING CO (FORMERLY	9301 S KREITER AVE, CHICAGO, IL 60617
RCR	ILR00006775	CERES TERMINALS INC	9301 S KREITER AVE, CHICAGO, IL 60617

Facility SIC Codes

System	Identifier	SIC Code	SIC Desc
AFS	1703105895	9999	--

Facility NAICS Codes

System	Identifier	NAICS Code	NAICS Desc
AFS	1703105895	339999	All Other Miscellaneous Manufacturing

Facility Tribe Information

Tribal Name	EPA Tribal ID	Distance to Tribe (miles)
No data records returned		

Enforcement and Compliance

Compliance Monitoring History (5 years)

Statute	Source ID	System	Inspection Type	Lead Agency	Date	Finding
No data records returned						

Entries in italics are not considered inspections in official counts.

Compliance Summary Data

Statute	Source ID	Current S _{NC} /HPV	Description	Current A's Of	Qtrs in NC (of 12)
CAA	1703105895	No	--	08/02/2014	0
RCRA	ILR000006775	No	--	08/02/2014	0

Three Year Compliance Status by Quarter

Statute	Program/Pollutant/Violation Type	QTR 1	QTR 2	QTR 3	QTR 4	QTR 5	QTR 6	QTR 7	QTR 8	QTR 9	QTR 10	QTR 11	QTR 12
CAA (Source ID: 1703105895)		07/01-09/30/2011	10/01-12/31/2011	01/01-03/31/2012	04/01-06/30/2012	07/01-09/30/2012	10/01-12/31/2012	01/01-03/31/2013	04/01-06/30/2013	07/01-09/30/2013	10/01-12/31/2013	01/01-03/31/2014	04/01-06/30/2014
	Facility-Level Status	No Viol	No Viol	No Viol	No Viol	No Viol	No Viol	No Viol	No Viol	No Viol	No Viol	No Viol	No Viol
	HPV History	--	--	--	--	--	--	--	--	--	--	--	--
	Program/Pollutant in Current Violation												
CAA	SIP	--	--	--	--	--	--	--	--	--	--	--	--
	FACILITY-WIDE PERMIT REQUIREMENTS												V-EM&PRO
Statute	Program/Pollutant/Violation Type	QTR 1	QTR 2	QTR 3	QTR 4	QTR 5	QTR 6	QTR 7	QTR 8	QTR 9	QTR 10	QTR 11	QTR 12
RCRA (Source ID: ILR000006775)		07/01-09/30/2011	10/01-12/31/2011	01/01-03/31/2012	04/01-06/30/2012	07/01-09/30/2012	10/01-12/31/2012	01/01-03/31/2013	04/01-06/30/2013	07/01-09/30/2013	10/01-12/31/2013	01/01-03/31/2014	04/01-06/30/2014
	RCRA Facility-Level Status	--	--	--	--	--	--	--	--	--	--	--	--

Informal Enforcement Actions (5 Years)

Statute	Source ID	Type of Action	Lead Agency	Date
CAA	1703105895	STATE NOV ISSUED	State	04/22/2014

Formal Enforcement Actions (5 Years)

Statute	Source ID	Type of Action	Lead Agency	Date	Penalty	Penalty Description
No data records returned						

ICIS Case History (5 years)

Primary Law/Section	Case No.	Case Type	Lead Agency	Case Name	Issued/Filed Date	Settlement Date	Federal Penalty	State/Local Penalty	SEP Cost	Comp Action Cost
No data records returned										

Environmental Conditions

Water Quality

Permit ID	Watershed (HUC 8)	Watershed Name (HUC 8)	Watershed (HUC 12)	Watershed Name (HUC 12)	Receiving Waters	Impaired Waters	Combined Sewer System?
110005934249	04040001	LITTLE CALUMET-GALIEU	040400010603	Calumet River-Frontal Lake Michigan	--	No	--

Air Quality

Non-Attainment Area?	Pollutant(s)
Yes	Ozone
No	Lead
Yes	Particulate Matter

Pollutants

TRI History of Reported Chemicals Released in Pounds per Year at Site

TRI Facility ID	Year	Total Air Emissions	Surface Water Discharges	Off-Site Transfers to POTWs	Underground Injections	Releases to Land	Total On-site Releases	Total Off-site Releases
No data records returned								

TRI Total Releases and Transfers in Pounds by Chemical and Year

Chemical Name
No data records returned

Demographic Profile

Demographic Profile of Surrounding Area (1 Mile)

This section provides demographic information regarding the community surrounding the facility. ECHO compliance data alone are not sufficient to determine whether violations at a particular facility had negative impacts on public health or the environment. Statistics are based upon the 2010 US Census and American Community Survey data, and are accurate to the extent that the facility latitude and longitude listed below are correct. The latitude and longitude are obtained from the EPA Locational Reference Table (LRT) when available.

Radius of Area:	1	Land Area:	87%	Households in Area:	4,134
Center Latitude:	41.726845	Water Area:	13%	Housing Units in Area:	5,149
Center Longitude:	-87.537405	Population Density:	5.18/sq.mi.	Households on Public Assistance:	139
Total Persons:	12,862	Percent Minority:	95%	Persons Below Poverty Level:	9,007
Race Breakdown		Persons (%)		Age Breakdown	
White:	3,860 (30.01%)			Child 5 years and younger:	1,251 (9.73%)
African-American:	4,566 (35.5%)			Minors 17 years and younger:	4,281 (33.28%)
Hispanic-Origin:	7,670 (59.63%)			Adults 18 years and older:	3,580 (66.71%)
Asian/Pacific Islander:	35 (0.27%)			Seniors 65 years and older:	1,393 (10.83%)
American Indian:	183 (1.42%)				
Other/Multiracial:	4,218 (32.79%)				
Education Level (Persons 25 & older)		Persons (%)		Income Breakdown	
Less than 9th Grade:	1,691 (24.16%)			Less than \$15,000:	1,229 (29.82%)
9th through 12th Grade:	1,015 (14.5%)			\$15,000 - \$25,000:	662 (16.06%)
High School Diploma:	2,258 (32.26%)			\$25,000 - \$50,000:	1,329 (32.25%)
Some College/2-yr:	1,484 (21.2%)			\$50,000 - \$75,000:	437 (10.6%)
B.S./B.A. or More:	532 (7.85%)			Greater than \$75,000:	464 (11.26%)

Seaforth Mineral & Ore Co., Inc.

3690 Orange Place, Suite 495, Cleveland, Ohio, 44122 USA U.S. Watts 1-800-292-9022

Phone: (216) 292-5820 Fax: (216) 292-1033

Date Prepared: 01/01/2008

FLUORSPAR Material Safety Data Sheet

SECTION I – CHEMICAL PRODUCT

Product Name: Fluorspar
Chemical Name/Synonyms: Calcium Fluoride
Chemical Formula: CaF₂
CAS Registry Number: #7789-75-5

NFPA Classification:

Health 0
Flammability 0
Reactivity 0

SECTION II – HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

Hazardous Components: Fluorspar or Calcium Fluoride
OSHA Permissible Exposure Limit (PEL): 15mg. per cubic feet
ACGIH Threshold Limit Value (TLV): 2.5mg/m³

OVERVIEW:

Commercially available Fluorspar also contains about 0.8 to 1.5% SiO₂ plus minor trace impurities. The product is minimally hazardous when its delivered state combined with about 10% maximum water as a filtercake. Dust hazards exist when the product is either dried intentionally or through prolonged open storage.

SECTION III – PHYSICAL/CHEMICAL CHARACTERISTICS

Boiling Point	N/A	Specific Gravity (H₂O = 1)	3.18
Vapor Pressure (mm Hg.)	None	Melting Point	2450
Vapor Density (AIR = 1)	N/A	Evaporation Rate	N/A

(Butyl Acetate = 1)

Solubility in Water: 16 MG/L
Appearance and Odor: Mauve or Off-White, Odorless

EXHIBIT ONE

SECTION IV – FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used): N/A

LEL: N/A

Extinguishing Media: N/A

Unusual Fire and Explosion Hazards: N/A

Flammable Limits: N/A

LIEL: N/A

Special Fire Fighting Procedures: N/A

SECTION V – REACTIVITY DATA

Stability: Stable

Conditions to Avoid: Avoid presence of uncontrolled strong acid

Incompatibility (*Materials to Avoid*): Strong Acids

Hazardous Decomposition or Byproducts: No

Hazardous Polymerization: Will not occur

Conditions to Avoid: N/A

SECTION VI – HEALTH HAZARD DATA

Potential Health Effects: Overexposure when product is dry or dusty may result in eye, skin, or respiratory tract irritation.

Carcinogenicity:

NTP

N/A

RC Monographs

N/A

OSHA Regulated

No

Signs and Symptoms of Exposure: Irritation to eyes, skin, or respiratory tract

Medical Conditions due to exposure: None known

Emergency/First Aid Procedures:

1. **Eye Contact** – Flush thoroughly with tepid water.
2. **Skin Contact** – Wash thoroughly with soap and water.
3. **Inhalation** – Remove to fresh air.
4. **Ingestion** – Give plenty of water.

SECTION VII – PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to Be Taken in Case Material is Released or Spilled: Sweep and scoop up and remove.

Waste Disposal Method: Restock or dispose of in a manner to avoid dusting. Should large volumes require disposal, check with waste disposal regulatory agencies.

Precautions to Be Taken in Handling and Storing: Avoid strong acids.

Other Precautions: If bulk material is to be handled, caution regarding dust hazard be employed.

SECTION VIII – PERTINENT INFORMATION

The information in this MSDS was obtained from sources which we believe are reliable but cannot guarantee. Additionally, your use of this information is beyond our control and may be beyond our knowledge. Therefore, the information is provided without any presentation or warranty expressed or implied.

MATERIAL SAFETY DATA SHEET

Ferromanganese Alloys

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MSDS No.: EMI-MA1000

Revised: February 20, 2009



1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Identifier: High Carbon Ferromanganese, Standard Ferromanganese, Medium Carbon Ferromanganese, Low Carbon Ferromanganese

Product Codes: MA1005, MA1101, MA2000, MA2010, MA2210, MA2211, MA3010, MA9110 and MA9308

MANUFACTURER: Eramet / Comilog
Airport Office Park, Bldg. 4, 333 Rouser Road
Moon Township, PA 15108-2749
U.S. Phone Number: (800) 388-7025

EMERGENCY TELEPHONE NUMBER: CHEMTREC (800) 424-9300

2. COMPOSITION/INFORMATION ON INGREDIENTS ¹

	<u>wt. %</u>	<u>CAS Registry #</u>
Manganese	> 78	7439-96-5
Iron	< 20	7439-89-6
Carbon	< 7.5	7440-44-0
Silicon	< 1.5	7440-21-3
Chromium	< 0.5	7440-47-3
Nickel	< 0.5	7440-02-0

OSHA HAZARDOUS COMPONENTS (29 CFR 1910.1200):

	<u>EXPOSURE LIMITS 8 hrs. TWA (mg/m³)</u>	
	<u>OSHA PEL</u>	<u>ACGIH TLV</u>
Manganese	5 (ceiling)	0.2
Chromium	0.5	0.5
Nickel	1	1

¹ Elemental analysis of the alloy. The manufacturer can provide a more detailed analysis, including other trace elements.

3. HAZARDS IDENTIFICATION

This product does not represent a significant hazard to health, safety or the environment when handled and stored as advised (see Section 7). Repeated, long term inhalation of ferromanganese alloy dust in excess of exposure limits may cause adverse health effects (see Section 11). Flammable and noxious gases may be formed in contact with moisture and/or acids (see Sections 10 and 11). Ferromanganese alloy dust suspended in air may under certain conditions cause dust explosions (see Section 5).

4. FIRST AID MEASURES

INHALATION:

Emergency responders should use the appropriate respiratory protection when moving an affected victim to fresh air. Give artificial respiration if breathing has stopped. Call for prompt medical attention. (See Section 11)

SKIN CONTACT:

Wash skin with water and/or a mild detergent. If irritation develops, seek medical attention.

EYE CONTACT:

Rinse eyes with large amounts of water/saline solution until no particles remain in eye. See a physician on persistent feeling of discomfort or if irritation occurs.

INGESTION:

Incidental ingestion of small quantities of material fines as a result of inattention to proper personal hygiene does not represent a significant acute hazard. If large amounts are swallowed, get prompt medical attention.

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5. FIRE FIGHTING MEASURES

COMBUSTIBILITY:

Ferromanganese alloy, as packaged, is not combustible. When suspended in air, dust of ferromanganese alloy can be ignited, will propagate flame readily, and may generate considerable pressure and/or a mild explosion. Avoid generating sparks or ignition sources in areas of high airborne dust levels or in areas with accumulated dust. The degree of combustibility in air is dependent upon particle size, oxide coating, and quality of dispersion. The hazard increases with particle fineness. Thoroughly clean areas or equipment to be maintained prior to dust disturbing or ignition source generation activities. (See Section 10)

AUTO IGNITION TEMPERATURE (dust layer):

Ferromanganese alloy - 555°F (290°C).

LOWER EXPLOSIVE LEVEL (airborne dust):

Ferromanganese alloy - 130 gr/m³.

COMBUSTION PRODUCTS:

Oxides of constituent elements.

MINIMUM IGNITION ENERGY:

Manganese - 80 millijoules; iron - 100 millijoules.

EXTINGUISHING MEDIA:

Class D fire: Use dry powder, dry sand, or CO₂ to smother fire. Fire may also be isolated and allowed to burn itself out. Do not disturb metal while extinguishing the fire.

6. ACCIDENTAL RELEASE MEASURES

LAND SPILL:

Ferromanganese alloy spilled on the land represents minimal hazard. Cleanup personnel should wear appropriate respiratory protective equipment when addressing fine material.

Avoid the use of compressed air to maneuver spills or leaks of fine material. Fine material should be swept up or vacuumed using explosion-proof equipment. Keep dry material and wet material separated. Place recovered material in disposal container. Avoid repackaging wet materials in sealed containers.

WATER SPILL:

Remove spilled product from water body by dipping, filtering, or other appropriate means. Avoid repackaging wet materials in sealed containers.

7. HANDLING AND STORAGE

HANDLING:

Avoid handling that generates dust formation and generation. Avoid inhalation of dust (see Section 8). Avoid ignition sources (e.g. welding) in areas with high dust concentrations. Addition of wet product to molten metal may cause explosions (see Section 10).

STORAGE:

Ferromanganese alloy should be stored in a dry location at ambient temperatures. Avoid contact with hydrochloric acid (HCl) and nitric acid (HNO₃)

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS:

The use of local exhaust ventilation is recommended to control emissions near the source. Provide appropriate ventilation of confined spaces. Use explosion-proof ventilation equipment. See Section 2 for Component Exposure Guidelines.

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PERSONAL PROTECTION:

Eye protection, eye flushing facilities and protective gloves are recommended. Ensure adequate ventilation. Wear an appropriate particulate respirator in accordance with 29 CFR 1910.134 or CSA Standard Z94.4-M1982 for dust exposure that may exceed exposure limits. Area and/or personal air monitoring is recommended to determine whether exposures are below permissible limits. If exposure to phosphine and arsine is suspected (see section 10), or if adequate ventilation is not possible, a self contained breathing apparatus or an air supplied respirator is recommended.

OCCUPATIONAL EXPOSURE LIMITS (OSHA and ACGIH):

	8-hour TWA (mg/m ³)	
	<u>OSHA PEL</u>	<u>ACGIH TLV</u>
Total inhalable dust	15	10
Respirable dust	5	3
Manganese	5 (ceiling)	0.2
Chromium	0.5	0.5
Nickel	1	1
Phosphine gas (PH ₃)	0.4	0.42
Arsine gas (AsH ₃)	0.2	0.16

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Lump or Granule
Color:	Silvery grey, metallic surface
Odor:	Odorless
Solubility:	Insoluble in Water
Melting Point (°C):	1243°C
Specific Gravity (water = 1):	Approx. 4.5

10. STABILITY AND REACTIVITY

GENERAL:

Ferromanganese alloy is stable and hazardous polymerization will not occur.

CONDITIONS TO AVOID:

Avoid generating sparks and other ignition sources (e.g. welding) in areas with high dust concentrations. Ferromanganese alloy particles suspended in air can cause dust explosions. Addition of wet material to molten metal may cause explosions.

MATERIALS TO AVOID:

Avoid contact with water and/or acids.

HAZARDOUS REACTION/DECOMPOSITION PRODUCTS:

Highly flammable hydrogen gas (H₂) and the highly flammable and very toxic gases phosphine and arsine (garlic-like smell), both heavier than air, may be formed if ferromanganese alloy comes in contact with moisture, acids or bases. Contact with acids (pH<7) may result in generation of silane (SiH₄), a spontaneously combustible gas. Wet product will form highly flammable hydrogen gas if added to molten metal, due to decomposition of water.

11. TOXICOLOGICAL INFORMATION

ACUTE EFFECTS:

INHALATION:

Finely divided dust may irritate and dehydrate mucous membranes. Phosphine/arsine may be absorbed from dust deposited on mucous membranes. The toxic mechanism for phosphine is not clear. Phosphine irritates exposed mucous membranes, depresses the central nervous system (CNS) and can cause edema of the lungs. Acute, non-fatal poisoning with phosphine gives temporary effects, including but not limited to malaise, vomiting, stomach pains, cough, and difficulty in breathing. Symptomatic treatment: Corticosteroids, prophylactic for edema of the lungs.

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SKIN CONTACT:

Frequent or prolonged contact may irritate the skin and cause a skin rash (dermatitis).

EYE CONTACT:

Dust may irritate and cause dryness but will not permanently injure eye tissue.

INGESTION:

Minimal hazard in normal industrial use.

CHRONIC EFFECTS:

Manganese poisoning (Manganism) can occur from excessive intake of manganese via inhalation and ingestion. The most notable effects of manganese poisoning are central nervous system disorders which may occur as early as six months after initial exposure. Symptoms include apathy, drowsiness, sleep disturbance, muscular twitching, spastic gait, and emotion control problems. Permanent injury of the central nervous system may occur if chronic manganese poisoning is not treated.

Prolonged exposure (years) to phosphine may lead to chronic effects such as difficulty in movement and speech problems. Epidemiological studies in the Norwegian ferroalloy industry have neither shown an increased rate of mortality, nor an increased incidence of cancer.

Fumes produced through heating metal to high temperatures may be associated with pneumoconiosis. Ferromanganese alloys are not known to be reproductive toxins, teratogens, or mutagens.

POTENTIAL HEALTH EFFECTS:

This product contains chromium in the metallic state. The International Agency for Research on Cancer has determined that chromium and certain chromium compounds are "casually associated with cancer in humans" but "the compounds responsible for the carcinogenic effect in humans cannot be specified". This requires that chromium in all forms be identified as carcinogenic under OSHA. The American Conference of Governmental Industrial Hygienists has reviewed the available data and concluded that specific water soluble and insoluble hexavalent chromium compounds are carcinogenic to humans.

NIOSH/OSHA "Guide for Chemical Hazards" conclusions are consistent with ACGIH; however, NIOSH recommended that all hexavalent chromium compounds be considered carcinogenic until proven otherwise. No recommendations have been made by ACGIH or NIOSH to include chromium metal or chromous and chromic salts as carcinogenic.

The International Agency for Research on Cancer has determined that nickel and certain nickel compounds are "probably carcinogenic to humans" but the nickel compounds responsible for the effect have not been specified. This requires that nickel in all forms be identified as carcinogenic under OSHA. The American Conference of Governmental Industrial Hygienists has reviewed the available data and concluded that not all forms of nickel are carcinogenic. The American Industrial Hygiene Association has also concluded that there is no epidemiological evidence of increased risk of respiratory cancer in the refining of oxide ores or "in any other specifically nickel occupational exposures".

12. ECOLOGICAL INFORMATION

Although ferromanganese alloy is not characterized as a hazard to the land through bulk storage or similar activities, care should be taken to minimize airborne dust generation and prevent material contamination of water systems.

13. DISPOSAL CONSIDERATIONS

Avoid repackaging wet material in sealed containers. Dispose of in accordance with applicable federal, state, and local regulations. Ferromanganese alloy is not a listed or characteristic RCRA Hazardous Waste (40 CFR 261).

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14. TRANSPORT INFORMATION

DOT (DEPARTMENT OF TRANSPORTATION):

Proper Shipping Name: Not Regulated

Hazard Class: Not Regulated

I.D. Number and Initials: Not Regulated

Packing Group: Not Regulated

Label(s): Not Regulated

15. REGULATORY INFORMATION

OSHA (Occupational Safety and Health Administration)

Hazardous by definition of hazardous communication standard (29 CFR 1910.1200)

TSCA (Toxic Substance Control Act):

Components of this product are listed on the TSCA Inventory.

CERCLA (Comprehensive Response Compensation, and Liability Act):

Ferromanganese alloy is not found in "List of Hazardous Substances and Reportable Quantities" (40 CFR 302.4). No RQ has been assigned for the generic or broad class of "Manganese and Compounds".

RCRA (Resource Conservation/Recovery Act):

Ferromanganese alloy is not a listed or characteristic hazardous waste.

SARA TITLE III (Superfund Amendments and Reauthorization Act);

EPCRA (Emergency Planning and Community Right to Know Act):

311/312 Hazard Categories:

Immediate Health, Delayed Health, Fire.

313 Reportable Ingredients:

Manganese (CAS No. 7439-96-5)

Chromium (CAS No. 7440-47-3)

Nickel (CAS No. 7440-02-0)

CALIFORNIA PROPOSITION 65:

This product contains chemical(s) known to the State of California to cause cancer:

Nickel

16. OTHER INFORMATION

Literature references are available upon request from the manufacturer.

The information presented in this Material Safety Data Sheet relates to this specific material. It may not be valid for this material if used in combination with any other materials or in any process. It is the user's responsibility to verify the suitability and completeness of this information for the particular use intended.



ArcelorMittal

Material Safety Data Sheet

Section 1 - Chemical Product and Company Identification

Product/Chemical Name: Blast Furnace Iron

MSDS ID Number: AM USA - 013

Synonyms: Molten Iron, Blast Furnace Hot Metal, Pig Iron, Cold Iron, Cast Iron

CAS Number: Mixture

Manufacturer: ArcelorMittal USA LLC

1 South Dearborn Street

Chicago, IL 60603-9888

General Information: 1-219-787-4901 or email at: msdssupport@arcelormittal.com

Original Issue Date: 12/06/2002

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

Revised: 01/01/2013

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

Section 2 - Composition / Information on Ingredients

Ingredient Name	CAS Number	Percentage by wt.	OSHA PEL ¹	ACGIH TLV ²
Iron	7439-89-6	93 – 94	10 mg/m ³ - Iron oxide fume	5.0 mg/m ³ - Iron oxide dust and fume
Carbon	7440-44-0	4 – 5.5	15 mg/m ³ (as total dust, PNOR ³) 5.0 mg/m ³ (as respirable fraction ⁶ , PNOR)	10 mg/m ³ (as inhalable fraction ⁴ , PNOS) ³ 3.0 mg/m ³ (as respirable fraction, PNOS)
Manganese	7439-96-5	0.2 – 1.0	“C” 5.0 mg/m ³ (as fume & Mn compounds)	0.2 mg/m ³
Phosphorus	7723-14-0	0.04 – 0.2	0.1 mg/m ³	0.1 mg/m ³
Silicon	7440-21-3	0.1 – 4.0	15 mg/m ³ (as total dust) 5.0 mg/m ³ (as respirable fraction)	10 mg/m ³
Sulfur	7704-34-9	0.02 – 0.3	15 mg/m ³ (as total dust, PNOR) 5.0 mg/m ³ (as respirable fraction, PNOR)	10 mg/m ³ (as inhalable fraction, PNOS) 3.0 mg/m ³ (as respirable fraction, PNOS)

Notes:

- All commercial steel products contain small amounts of various elements in addition to those specified. These small quantities frequently referred to as “trace” or “residual” elements generally originate in the raw materials used. Individual trace elements vary in concentration by weight, and may include antimony, arsenic, cadmium, chromium, cobalt, copper, lead, molybdenum, nickel, titanium, vanadium, 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.
- 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. A STEL (Short Term Exposure Limit) is defined as a 15-minute exposure, which should not be exceeded at any time during a workday.
 - 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 the PNOR limit which is the same as the inert or nuisance dust limit of 15 mg/m³ for total dust and 5.0 mg/m³ 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 2009 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/m³ for inhalable particulate and 3.0 mg/m³ 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 2009 TLVs® and BEIs® Appendix D, paragraph C.

Section 3 - Hazards Identification

☆☆☆☆☆ Emergency Overview ☆☆☆☆☆

This molten metal product poses a significant and immediate burn and fire hazard. Potentially hazardous quantities of airborne particulate and fume may be generated. These operations should be performed in well-ventilated areas. Avoid inhalation of metal dusts and fumes. Iron 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.

Potential Health Effects

Primary Entry Routes: Inhalation and skin. Iron in the molten state presents an inhalation and contact hazard and 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/fume 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. After excessive exposures, onset of symptoms present after a few hours 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 have been associated with causing metal fume fever. Sulfur compounds, present in generated fumes, may irritate the respiratory or gastrointestinal tract. Phosphorus oxide compounds are respiratory tract irritants.
- **Eye:** Contact with molten metal will cause severe burns and blindness. Particles of iron or iron compounds, which become imbedded in the eye, may cause irritation to the eyes. Sulfur compounds, present in generated fumes, may irritate the eyes.
- **Skin:** Skin contact with molten metal will cause severe burns. Sulfur compounds, present in generated fumes, may irritate the skin.
- **Ingestion:** Ingestion of harmful amounts of molten iron is unlikely, however it will cause severe burns. Ingestion of dust/fume 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).
- **CARBON:** Chronic inhalation of high concentrations to carbon may cause pulmonary disorders.
- **MANGANESE:** Chronic exposure to high concentrations of manganese fumes and dusts may adversely affect the central nervous system with symptoms including languor, sleepiness, weakness, emotional disturbances, spastic gait, mask-like facial expression and paralysis. Animal studies indicate that manganese exposure may increase susceptibility to bacterial and viral infections.
- **PHOSPHOROUS:** Inhalation of phosphorous oxides may cause respiratory irritation.
- **SILICON:** Silicon dusts are a low health risk by inhalation and should be treated as a nuisance dust. Eye contact with pure material can cause particulate irritation. Skin contact with silicon dusts may cause physical abrasion.
- **SULFUR:** Sulfur compounds, present in the fumes, may irritate the skin, eyes, lungs and gastrointestinal tract.

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

Carcinogenicity: IARC, NTP (The National Toxicology Program), and OSHA do not list blast furnace iron or any of its constituents as a 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. If thermal burn has occurred, flush area with cold water and seek medical attention.

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.

Ingestion: Not a probable route of industrial exposure; however, if ingested obtain medical advice.

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: Molten metal may react violently with water. Use extinguishers appropriate for surrounding materials.

Unusual Fire or Explosion Hazards: Avoid having molten iron run onto or trap water under molten iron. Sudden violent release of steam and gases can occur when water is trapped under molten iron.

Hazardous Combustion Products: Fumes containing metal oxides and other alloying elements may be liberated.

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

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

Section 6 – Accidental Release Measures

Spill/Leak Procedures: Not applicable to iron in solid state. For spills involving molten iron, personnel should be protected against contact with eyes and skin and avoid inhalation of dust/fume. Fine, dry material should be removed by vacuuming or wet sweeping methods to prevent spreading of dust. 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: Any excess product can be recycled for further use, disposed in an appropriately permitted waste landfill, or disposed by other methods, which are in accordance with local, state, and federal regulations.

Section 7 – Handling and Storage

Handling Precautions: Operations with the potential for generating high concentrations of airborne particulates should be evaluated and controlled as necessary. Practice good housekeeping. Avoid breathing metal fumes and/or dust. Avoid contact with molten iron.

Storage Requirements: Store away from incompatible materials.

Section 8 - Exposure Controls / Personal Protection

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

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

Administrative Controls: No Information found (NIF).

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 molten iron or the generation of airborne particulates, use protective clothing (flame retardant-molten), gloves (aluminized-molten) and safety glasses to prevent skin and eye contact as required. Contact lenses should not be worn where industrial exposures to this material are likely. Wash skin that has been exposed with soap and water or waterless hand cleaner.

Section 9 - Physical and Chemical Properties

Physical State: Molten >1537.8°C, (>2800 °F)

Appearance and Odor: Greyish as solid/Orange as molten

Odor Threshold: Not Applicable

Vapor Pressure: Not Applicable

Vapor Density (Air = 1): Not Applicable

Formula Weight: Not Applicable

Density: 7.85

Specific Gravity (H₂O = 1, at 4 °C): 7.0

pH: Not Applicable

Water Solubility: Insoluble

Other Solubilities: Not Applicable

Boiling Point: 2760°C, (5000 °F)

Viscosity: Not Applicable

Refractive Index: Not Applicable

Surface Tension: Not Applicable

% Volatile: Not Applicable

Evaporation Rate: Not Applicable

Freezing/Melting Point: Not Applicable

Section 10 - Stability and Reactivity

Stability: Molten iron is stable under normal storage and handling conditions.

Polymerization: Hazardous polymerization cannot occur.

Chemical Incompatibilities: Encapsulating water with molten iron may cause an explosion.

Conditions to Avoid: Water when iron is in molten state.

Hazardous Decomposition Products: Thermal oxidative decomposition can produce fumes containing oxides of iron and manganese as well as other elements.

Section 11- Toxicological Information

Toxicity Data: * No Information Found (NIF) for the product as a mixture.

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

Skin Effects: Skin contact with the individual components may cause burns, irritation, dermatitis, ulcerations and sensitizations.

Acute Inhalation Effects: Inhalation of the individual 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), Carbon LD50: NIF, Manganese LD50: 9 g/kg oral (rat), Phosphorous LD50: NIF, Silicon LD50: NIF, Sulfur LD50: NIF

Chronic Effects: Refer to Section 3

Carcinogenicity: NIF

Mutagenicity: NIF

Teratogenicity: NIF

* See NIOSH, *RTECS* (NO7400000), for additional toxicity data on iron oxide, (FF5250000) for carbon, (OO9275000) for manganese, (TH3500000) for phosphorous, (WM0400000) for silicon, (WS4250000) for sulfur.

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.

Disposal Regulatory Requirements: No Information Found (NIF).

Container Cleaning and Disposal: Follow applicable federal, state and local regulations. Observe safe handling pre-cautions.

Section 14 - Transport Information

DOT Transportation Data (49 CFR 172.101):

Molten Iron is **Not Listed** as a hazardous substance under 49 CFR 172.101.

Shipping Name: Cast Iron

Shipping Symbols: "HOT"

Hazard Class: Not Applicable

ID No.: Not Applicable

Packing Group: Not Applicable

Label: Not Applicable

Special Provisions (172.102): Not Applicable

Packaging Authorizations

a) **Exceptions:** Not Applicable

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 LLC 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): The product is not listed; however, individual components of the product are listed (Refer to Section 2).

EPA Regulations:

RCRA: The product and components are not regulated under this act.

CERCLA Hazardous Substance (40 CFR 302.4): The product is not listed; however, individual components of the product are listed: Manganese compounds and Phosphorous are listed under SARA 302.

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

SARA 313: Manganese 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: The product and components are not regulated under section 307, Priority Pollutants. However, Phosphorus is a Section 311 Hazardous Chemical.

Safe Drinking Water Act: The product and components are not regulated under this act.

State Regulations: The product 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 and Sulfur.
- Environmental Hazards: Manganese and Phosphorous.
- Special Hazard Substances: Not regulated.

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

- Environmental Hazardous Substance: Manganese and Phosphorous.
- Special Health Hazard Substances: Not regulated.

California Prop. 65: Does not Contain elements known to the State of California to cause cancer or reproductive toxicity.

Other Regulations: The product may not be listed in any state regulations. However, individual components of the product may be listed in various state regulations.

WHMIS (Canadian): D2B Product Classification

Section 16 – Other Information

Prepared By: ArcelorMittal USA LLC

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/m ³	microgram per cubic meter of air
mg/m ³	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

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LABEL

Blast Furnace Iron

GENERAL HAZARD STATEMENT: This molten metal product poses a significant and immediate burn and fire hazard. Potentially hazardous quantities of airborne particulate and fume may be generated. These operations should be performed in well-ventilated areas. Avoid inhalation of metal dusts and fumes. Iron 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.

CAUTION

IRON IN THE MOLTEN STATE PRESENTS AN INHALATION AND CONTACT HAZARD

CONTACT WITH MOLTEN METAL WILL CAUSE SEVERE BURNS AND BLINDNESS

Consult MSDS for more information

PRECAUTIONS: Operations with the potential for generating high concentrations of airborne particulates should be evaluated and controlled as necessary. Practice good housekeeping. Avoid breathing metal fumes and/or dust. Avoid contact with molten iron. 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. If thermal burn has occurred, flush area with cold water and seek medical attention.

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.

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://arcelormittal-environment.com/Default.aspx?tabid=103>

Product Name: Blast Furnace Iron

ArcelorMittal USA LLC

1 South Dearborn Street Chicago, IL 60603-9888

General Information:

msdssupport@arcelormittal.com or
1-219-787-4901

Original Issue Date: 01/01/2011

Revised: 01/01/2013



ArcelorMittal

Material Safety Data Sheet

Section 1 - Chemical Product and Company Identification

Product/Chemical Name: Blast Furnace Iron

MSDS ID Number: AM USA - 013

Synonyms: Molten Iron, Blast Furnace Hot Metal, Pig Iron, Cold Iron, Cast Iron

CAS Number: Mixture

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

General Information: 1-219-787-4901 or email at: msdssupport@arcelormittal.com

Original Issue Date: 12/06/2002

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

Revised: 01/01/2013

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

Section 2 - Composition / Information on Ingredients

Ingredient Name	CAS Number	Percentage by wt.	OSHA PEL ¹	ACGIH TLV ²
Iron	7439-89-6	93 – 94	10 mg/m ³ - Iron oxide fume	5.0 mg/m ³ - Iron oxide dust and fume
Carbon	7440-44-0	4 – 5.5	15 mg/m ³ (as total dust, PNOR ³) 5.0 mg/m ³ (as respirable fraction ⁶ , PNOR)	10 mg/m ³ (as inhalable fraction ⁴ , PNOS) ⁵ 3.0 mg/m ³ (as respirable fraction, PNOS)
Manganese	7439-96-5	0.2 – 1.0	“C” 5.0 mg/m ³ (as fume & Mn compounds)	0.2 mg/m ³
Phosphorus	7723-14-0	0.04 – 0.2	0.1 mg/m ³	0.1 mg/m ³
Silicon	7440-21-3	0.1 – 4.0	15 mg/m ³ (as total dust) 5.0 mg/m ³ (as respirable fraction)	10 mg/m ³
Sulfur	7704-34-9	0.02 – 0.3	15 mg/m ³ (as total dust, PNOR) 5.0 mg/m ³ (as respirable fraction, PNOR)	10 mg/m ³ (as inhalable fraction, PNOS) 3.0 mg/m ³ (as respirable fraction, PNOS)

Notes:

- All commercial steel products contain small amounts of various elements in addition to those specified. These small quantities frequently referred to as “trace” or “residual” elements generally originate in the raw materials used. Individual trace elements vary in concentration by weight, and may include antimony, arsenic, cadmium, chromium, cobalt, copper, lead, molybdenum, nickel, titanium, vanadium, 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.
- 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. A STEL (Short Term Exposure Limit) is defined as a 15-minute exposure, which should not be exceeded at any time during a workday.
 - 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 the PNOR limit which is the same as the inert or nuisance dust limit of 15 mg/m³ for total dust and 5.0 mg/m³ 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 2009 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/m³ for inhalable particulate and 3.0 mg/m³ 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 2009 TLVs® and BEIs® Appendix D, paragraph C.

Section 3 - Hazards Identification

☆☆☆☆☆ Emergency Overview ☆☆☆☆☆

This molten metal product poses a significant and immediate burn and fire hazard. Potentially hazardous quantities of airborne particulate and fume may be generated. These operations should be performed in well-ventilated areas. Avoid inhalation of metal dusts and fumes. Iron 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.

Potential Health Effects

Primary Entry Routes: Inhalation and skin. Iron in the molten state presents an inhalation and contact hazard and 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/fume 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. After excessive exposures, onset of symptoms present after a few hours 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 have been associated with causing metal fume fever. Sulfur compounds, present in generated fumes, may irritate the respiratory or gastrointestinal tract. Phosphorus oxide compounds are respiratory tract irritants.
- **Eye:** Contact with molten metal will cause severe burns and blindness. Particles of iron or iron compounds, which become imbedded in the eye, may cause irritation to the eyes. Sulfur compounds, present in generated fumes, may irritate the eyes.
- **Skin:** Skin contact with molten metal will cause severe burns. Sulfur compounds, present in generated fumes, may irritate the skin.
- **Ingestion:** Ingestion of harmful amounts of molten iron is unlikely, however it will cause severe burns. Ingestion of dust/fume 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).
- **CARBON:** Chronic inhalation of high concentrations to carbon may cause pulmonary disorders.
- **MANGANESE:** Chronic exposure to high concentrations of manganese fumes and dusts may adversely affect the central nervous system with symptoms including languor, sleepiness, weakness, emotional disturbances, spastic gait, mask-like facial expression and paralysis. Animal studies indicate that manganese exposure may increase susceptibility to bacterial and viral infections.
- **PHOSPHOROUS:** Inhalation of phosphorous oxides may cause respiratory irritation.
- **SILICON:** Silicon dusts are a low health risk by inhalation and should be treated as a nuisance dust. Eye contact with pure material can cause particulate irritation. Skin contact with silicon dusts may cause physical abrasion.
- **SULFUR:** Sulfur compounds, present in the fumes, may irritate the skin, eyes, lungs and gastrointestinal tract.

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

Carcinogenicity: IARC, NTP (The National Toxicology Program), and OSHA do not list blast furnace iron or any of its constituents as a 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. If thermal burn has occurred, flush area with cold water and seek medical attention.

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.

Ingestion: Not a probable route of industrial exposure; however, if ingested obtain medical advice.

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: Molten metal may react violently with water. Use extinguishers appropriate for surrounding materials.

Unusual Fire or Explosion Hazards: Avoid having molten iron run onto or trap water under molten iron. Sudden violent release of steam and gases can occur when water is trapped under molten iron.

Hazardous Combustion Products: Fumes containing metal oxides and other alloying elements may be liberated.

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

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

Section 6 – Accidental Release Measures

Spill/Leak Procedures: Not applicable to iron in solid state. For spills involving molten iron, personnel should be protected against contact with eyes and skin and avoid inhalation of dust/fume. Fine, dry material should be removed by vacuuming or wet sweeping methods to prevent spreading of dust. 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: Any excess product can be recycled for further use, disposed in an appropriately permitted waste landfill, or disposed by other methods, which are in accordance with local, state, and federal regulations.

Section 7 – Handling and Storage

Handling Precautions: Operations with the potential for generating high concentrations of airborne particulates should be evaluated and controlled as necessary. Practice good housekeeping. Avoid breathing metal fumes and/or dust. Avoid contact with molten iron.

Storage Requirements: Store away from incompatible materials.

Section 8 - Exposure Controls / Personal Protection

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

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

Administrative Controls: No Information found (NIF).

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 molten iron or the generation of airborne particulates, use protective clothing (flame retardant-molten), gloves (aluminized-molten) and safety glasses to prevent skin and eye contact as required. Contact lenses should not be worn where industrial exposures to this material are likely. Wash skin that has been exposed with soap and water or waterless hand cleaner.

Section 9 - Physical and Chemical Properties

Physical State: Molten >1537.8°C, (>2800 °F)

Appearance and Odor: Greyish as solid/Orange as molten

Odor Threshold: Not Applicable

Vapor Pressure: Not Applicable

Vapor Density (Air = 1): Not Applicable

Formula Weight: Not Applicable

Density: 7.85

Specific Gravity (H₂O = 1, at 4 °C): 7.0

pH: Not Applicable

Water Solubility: Insoluble

Other Solubilities: Not Applicable

Boiling Point: 2760°C, (5000 °F)

Viscosity: Not Applicable

Refractive Index: Not Applicable

Surface Tension: Not Applicable

% Volatile: Not Applicable

Evaporation Rate: Not Applicable

Freezing/Melting Point: Not Applicable

Section 10 - Stability and Reactivity

Stability: Molten iron is stable under normal storage and handling conditions.

Polymerization: Hazardous polymerization cannot occur.

Chemical Incompatibilities: Encapsulating water with molten iron may cause an explosion.

Conditions to Avoid: Water when iron is in molten state.

Hazardous Decomposition Products: Thermal oxidative decomposition can produce fumes containing oxides of iron and manganese as well as other elements.

Section 11- Toxicological Information

Toxicity Data: * No Information Found (NIF) for the product as a mixture.

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

Skin Effects: Skin contact with the individual components may cause burns, irritation, dermatitis, ulcerations and sensitizations.

Acute Inhalation Effects: Inhalation of the individual 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), Carbon LD50: NIF, Manganese LD50: 9 g/kg oral (rat), Phosphorous LD50: NIF, Silicon LD50: NIF, Sulfur LD50: NIF

Chronic Effects: Refer to Section 3

Carcinogenicity: NIF

Mutagenicity: NIF

Teratogenicity: NIF

* See NIOSH, *RTECS* (NO7400000), for additional toxicity data on iron oxide, (FF5250000) for carbon, (OO9275000) for manganese, (TH3500000) for phosphorous, (WM0400000) for silicon, (WS4250000) for sulfur.

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.

Disposal Regulatory Requirements: No Information Found (NIF).

Container Cleaning and Disposal: Follow applicable federal, state and local regulations. Observe safe handling pre-cautions.

Section 14 - Transport Information

DOT Transportation Data (49 CFR 172.101):

Molten Iron is **Not Listed** as a hazardous substance under 49 CFR 172.101.

Shipping Name: Cast Iron

Shipping Symbols: "HOT"

Hazard Class: Not Applicable

ID No.: Not Applicable

Packing Group: Not Applicable

Label: Not Applicable

Special Provisions (172.102): Not Applicable

Packaging Authorizations

a) **Exceptions:** Not Applicable

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 LLC 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): The product is not listed; however, individual components of the product are listed (Refer to Section 2).

EPA Regulations:

RCRA: The product and components are not regulated under this act.

CERCLA Hazardous Substance (40 CFR 302.4): The product is not listed; however, individual components of the product are listed: Manganese compounds and Phosphorous are listed under SARA 302.

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

SARA 313: Manganese 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: The product and components are not regulated under section 307, Priority Pollutants. However, Phosphorus is a Section 311 Hazardous Chemical.

Safe Drinking Water Act: The product and components are not regulated under this act.

State Regulations: The product 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 and Sulfur.
- Environmental Hazards: Manganese and Phosphorous.
- Special Hazard Substances: Not regulated.

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

- Environmental Hazardous Substance: Manganese and Phosphorous.
- Special Health Hazard Substances: Not regulated.

California Prop. 65: Does not Contain elements known to the State of California to cause cancer or reproductive toxicity.

Other Regulations: The product may not be listed in any state regulations. However, individual components of the product may be listed in various state regulations.

WHMIS (Canadian): D2B Product Classification

Section 16 – Other Information

Prepared By: ArcelorMittal USA LLC

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/m ³	microgram per cubic meter of air
mg/m ³	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

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