

# MATERIAL SAFETY DATA SHEET

## I General

## IRON

MANUFACTURER/SUPPLIER:

# ArcelorMittal

3210 Watling Street East Chicago Indiana 46312

DATE: 11/2005 (revised 12/05)

## II Hazardous Ingredient / Identity Information

<i>INGREDIENT</i>	<i>CAS NUMBER</i>	<i>TYPICAL % BY WEIGHT</i>
IRON	7439 - 89 - 6	>95
CARBON	7440 - 44 - 0	<5
SILICON	7440 - 21 - 3	<1
MANGANESE	7439 - 96 - 5	<0.5
SULFUR	7704 - 34 - 9	<0.5

None of the substances qualify for the TSCA Inventory as of 2005.

## III Physical Data

BOILING POINT: 5400 F/ 3000 C

MELTING POINT: >1850 F/ 1000 C

VAPOR DENSITY: NA

VAPOR PRESSURE: NA

EVAPORATION RATE: NA

SPECIFIC GRAVITY: 7.8

SOLUBILITY IN WATER: Not readily soluble

APPEARANCE AND ODOR: There is no consistent shape or form to solidified iron. Its shape or form is dependent upon the processing involved and its original form. Fresh iron surfaces will be silver and upon weathering (oxidation) will become reddish-brown (rust). Molten iron is a yellowish to red hot viscous liquid. There is no characteristic aroma associated solely with iron.

## IV Fire and Explosive Hazard Data

FLASH POINT: NA

FLAMABLE LIMITS IN AIR: NA

EXTINGUISHING MEDIA: Iron is not considered flammable, does not present an explosion hazard, and does not contribute to the combustion of other materials. Use fire fighting techniques and agents appropriate to the surrounding materials.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Molten metal may react violently with water. Fine particulate, dust or fume, particularly if unoxidized may be flammable or explosive.

## V Reactivity and Physical Hazard Data

STABILITY: Considered Stable

HAZARDOUS POLYMERIZATION: NA

INCOMPATIBILITY: CHLORINE – hot iron wire burns in chlorine gas.

CHLORINE TRIFLUORIDE – reacts with iron with incandescence.

FLUORINE – powdered iron reacts with incandescence.

### V (continued)

HYDROGEN PEROXIDE – violent decomposition of hydrogen peroxide may occur upon contact with iron.

NITROGEN DIOXIDE – reduced iron decomposes nitrogen dioxide at ordinary temperatures producing incandescence.

CONDITIONS TO AVOID: Solid material – be alert to unsecured loads, sharp edges, pointed ends, slippery surfaces, and hot surfaces.

Molten material is not compatible with liquids, for example, water or ice. See IV

## VI Spill or Leak Procedure

### STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:

Solidified iron is stable and should not present a hazard but it is massive and can easily destroy objects in its path. If it is spilled, it should be determined if any utilities (power, water, gas), persons, or vehicles are involved. Assist the injured, control traffic, and control sources that may cause injury. Notify the nearest fire fighting facility.

Molten Material – keep personnel away, isolate area, deny entry, stay upwind out of low areas. Stop the spill and contain material, if possible. Molten material can react explosively upon contact with water or ice. Do not put water into a container of molten metal.

### WASTE DISPOSAL METHOD:

Iron is not considered a hazardous waste under the Resource Conservation and Recovery Act (RCRA). The material may be claimed for reuse and/or recycle purposes. If the material is not recycled, then dispose of the material in accordance with the requirements of 40 CFR subtitle C and other applicable state and federal regulations.

## VII Health Hazard and Information Data:

Solidified iron under normal circumstances does not present an inhalation, skin contact, or ingestion hazard. Processes such as burning, cutting, welding, brazing, grinding, melting, etc. that elevate the temperature of the material or produce particulate may create elevated concentrations of contaminants. See the listing of applicable statutory or recommended occupational exposure limits for contaminants that may be generated during the processing of iron. American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values and OSHA Permissible Exposure Limits (PEL) are listed in the table in this section.

### EFFECTS OF OVEREXPOSURE:

ACUTE: Dust, fume, and/or vapor may cause irritation to the eyes, nose or throat and may impart a metallic taste to the mouth. Inhalation of the oxides (fresh and typically the result of welding or torch cutting activities) may be manifested as flu-like symptoms (24-48 hours characterized by chills, fever, aching muscles, dryness of the mouth and throat, and/or headache) commonly known as "metal fume fever".

## VII (continued)

### CHRONIC:

**IRON:** Inhalation of iron oxide fume or dust may result in a deposit in the lung tissue that causes a condition known as siderosis. This condition is benign and no physical impairment is indicated. Not listed as carcinogenic.

**MANGANESE:** Inhalation may result in symptoms such as headache, restless sleep patterns, restlessness, personality changes, neurological dysfunction, or muscular weakness. Not listed as carcinogenic.

**SULFUR DIOXIDE:** Sulfur dioxide may be created during the melting of iron. Inhalation may cause eye, nose, and/or throat irritation, watering eyes, runny nose, cough, choking, sneezing, with pulmonary resistance. Pulmonary paralysis and pulmonary edema are indicated. Effects from chronic exposure are unclear but inflammation of nasal tissue, nose bleeds, cough, conjunctivitis, gingivitis, and obstructive lung disease are suggested. Not listed as carcinogenic.

### EXPOSURE INFORMATION:

CONTAMINANT	Exposure Limits (1) (Milligram per Cubic Meter)		
	OSHA PKL	ACGIH TLV	
IRON (oxide fume as Fe <sub>2</sub> O <sub>3</sub> )	10	not listed	
(oxide fume as Fe)	not listed	5	
MANGANESE			
(dust and compounds as Mn)	5 ceiling	5	
(fume as Mn)	5 ceiling	1	3 STEL
SULFUR DIOXIDE	13	5.2	13 STEL

*LEGEND: (1) Exposure limits are for 8 hour time weighted averages unless indicated otherwise.*

### EMERGENCY AND FIRST AID PROCEDURES:

**INHALATION:** Immediately remove the victim to fresh air in the event of excessive exposure to dust, fume or vapor. If breathing is difficult, administer artificial respiration or oxygen. Obtain immediate medical assistance.

**EYE CONTACT:** Depending on the type and nature of exposure, relief may be obtained by fresh air or irrigating the eye(s) with clean water. Foreign bodies may need to be removed by qualified persons. Obtain medical assistance.

**SKIN:** Abrasions and cuts should be washed and closed by a clean compress and be immediately medically treated. Burns must have the ignited material removed from the burn area to stop the burning process. Apply cool, wet compresses, or immerse in cool, fresh (preferably sterile) water. Burns must be immediately medically treated. Should skin irritation occur, wash affected area with mild soap and rinse with clean, warm water.

## VII (continued)

**INGESTION:** Treat symptomatically and supportively. Obtain medical assistance.

### MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:

Persons with a predisposition to respiratory disorders, (i.e. asthma, emphysema, etc.), may be adversely affected by particulates or respiratory irritants generated by processing.

## VIII Precautions or Safe Handling and Use

**PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:** This material oxidizes in air to form rust and can deplete the oxygen concentration in a confined space resulting in an oxygen deficient atmosphere. Avoid dust accumulation that may be flammable or explosive. Be alert to unsecured loads, sharp edges, pointed ends, slippery surfaces, and/or hot surfaces.

**WASTE DISPOSAL METHOD:** See SECTION VI – SPILL OR LEAK PROCEDURES

### D.O.T. TRANSPORTATION REGULATIONS:

Certain forms of this material, (i.e. powders, borings, shavings, turnings, cuttings, dross, etc.), may be subject to DOT hazardous material shipping requirements. Consult 49CFR Parts 100 – 177 shipping specifications for the specific forms of this material.

### EPCRA REGULATIONS:

This material may contain substances that may be reportable under the Emergency Planning and Community Right-to-Know Act. Refer to 40 CFR Parts, 355, 370, and 372 For guidance and specific information.

## IX Special Protection Information and Control Measures

Consult your regional codes or Code of Federal Regulations, Title 29, Part 1910; Subpart G-Occupational Health and Environmental Control; Subpart I- Personal Protective Equipment; Subpart Q-Welding, Cutting and Brazing; and Subpart S-Toxic and Hazardous Substances. Certain welding type activities may produce hazardous substances such as carbon monoxide, ozone, or phosgene in the presence of chlorinated chemicals, or produce inert suffocating atmosphere in addition to the production of ultraviolet radiation and/or noise.

**VENTILATION:** Local exhaust or ventilation systems sufficient to maintain exposure levels to contaminants below prescribed limits may be required.

### **PERSONAL PROTECTION:**

**INHALATION:** When controls are not sufficient to reduce the exposure below the applicable exposure limit then use MSHA/NOISE approved respiratory protection within the use limitations of the respirator.

**EYES:** Use safety glasses, goggles, helmet, face shield as appropriate to the operation.

### **IX (continued)**

**CONTACT:** Appropriate protective gloves or clothing should be used to protect against sharp edges, pointed ends, or oily surface. Appropriate heat shielding garments should be used for activities generating heat. Replace damaged equipment.

THE INFORMATION BASED HEREIN IS BASED ON THE VENDOR'S MSDS WITH ADDITIONS AS NECESSARY TO COMPLY WITH CURRENT REGULATIONS. THE INFORMATION IS BELIEVED TO BE ACCURATE BUT NO REPRESENTATIONS, GUARANTEES OR WARRANTIES OF ANY KIND ARE MADE AS TO ITS ACCURACY, SUITABILITY FOR PARTICULAR APPLICATIONS, HAZARDS CONNECTED WITH USE OF THIS MATERIAL OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF. USER ASSUMES ALL RISK AND LIABILITY OF ANY USE OR HANDLING OF ANY MATERIALS BEYOND SUPPLIER'S CONTROL. VARIATIONS IN METHODS, CONDITIONS, EQUIPMENT USED TO STORE, HANDLE OR PROCESS THE MATERIAL AND HAZARDS CONNECTED WITH USE OF THE MATERIAL ARE SOLELY THE RESPONSIBILITY OF THE USER AND REMAIN AT ITS SOLE DISCRETION.