QATAR STEEL COMPANY (QSC)
PO Box No 50090 MESAIEED,QATAR

MANUFACTURER'S MATERIAL SAFETY DATA SHEET

SECTION I – PRODUCT AND COMPANY IDENTIFICATION

Product identification

Product Name	:	Direct Reduced Iron (DRI)
Trade Name	:	DRI Pellets/Lump
Chemical Name	:	Iron
Product Use	:	Iron and Steel Production

Proper Shipping Name	:	Direct Reduced Iron (B), Pellets,
IMO Class	:	MHB
Group	:	B
BC (Bulk Cargo) No	:	015
MFAG table NO	:	None
EmS NO	:	BC 15
Approx. Stowage Factor	:	0.5 M^3 / T

Company Identification

Manufacturer's Name : Qatar Steel Company (QSC)

Address: PO Box 50090
Mesaieed Industrial City
Mesaieed
State of QATAR

Phone Numbers : + 974 44778778
FAX Numbers : + 974 44771424

SECTION II – HAZARD(s) IDENTIFICATION

Class	:	Not classified as Hazardous
Ingredients	:	No known hazardous ingredients
Poison schedule	:	Not scheduled.

HEALTH EFFECTS

Acute Ingestion	:	If swallowed, dust or small pieces may cause gastrointestinal disturbances. An overdose of iron may cause irritation to the mouth and stomach. Symptoms may include nauseas, vomiting and abdominal pain.
Eye Contact	:	Dust and small pieces may cause mechanical irritation, redness and pain in contact with the eyes.
Skin contact	:	Dust and small pieces may cause mechanical irritation in contact with the skin, which can result in slight redness.
Excessive Inhalation	:	Inhalation of dust may cause irritation to the respiratory tracks. Symptoms may include coughing, sneezing, soreness of throat and breathing difficulties.

SECTION III – Composition/ information on Ingredients

CHEMICAL DATA: (Percentages by weight)

Total Iron (TFe)	:	**91% Min**
Metallic Iron (MFe)	:	**85% Min**
Carbon (C)	:	**2.2% Min**
Sulfur (S)	:	**0.01% Max**
Phosphorous (P)	:	0.06 % Max
Total Gangue	:	4.8 % Max

SECTION IV - FIRST AID MEASURES

FIRST AID

If swallowed : Induce vomiting immediately. Seek medical attention.

Inhalation : Remove person to fresh air. Get medical attention in case of breathing difficulty.

Eyes : If contact with eye(s) occurs wash with copious amount of water for approximately 15 minutes. If eye irritation develops and persists seek medical attention.

Skin : Wash gently and thoroughly with water and soap. Ensure contaminated clothing is washed before re-use or discard. If irritation develops seek medical attention.

First Aid facilities : Eye wash and normal washroom

SECTION V – FIRE FIGHTING MEASURES

FIRE AND EXPLOSION HAZARD DATA

Material may slowly evolve hydrogen after contact with water and reacts more rapidly with sea/ salt water. Maximum allowable ship loading temperature is 65 ^{0} C. if temperature exceeds 65 ^{0} C, provide adequate ventilation to remove any hydrogen gas generation.

Firefighting procedures

Remove the hot material from the stack. Divide hot material into small piles and spread it out. The materials will cool below the ignition point. In case, if it is not practical to spread the material over a wide area such as in a hold of a ship, covering by a non oxidant material like sand / finely crushed slag could be used for smothering the fire and hindering the air supply.

Do not use seawater to cool and avoid fresh water also to cool down the hot material. In case if fresh water is used,

i) use large amount of water to flood the material and

ii) Provide adequate ventilation to let hydrogen gas generated escape to atmosphere.

Ignition temperature	: Above 125 ^{0} C.
Special firefighting procedures	: Divide into small piles and flood with water. Do not use CO_2 Extinguisher as CO may be formed.
Unusual Fire and explosion Hazards	: Product is porous iron which rusts in the presence of water and air. Rusting creates heat which may cause large piles to heat up and ignite. Hydrogen gas also is liberated from wet product. If piles become hot, separate into small piles and flood with water.

SECTION VI – ACCIDENT RELEASE MEASURES

Steps to be taken in case of spill	: DRI pellets roll. Care must be taken when walking on it. Practice good Housekeeping procedures.
Material in Bulk	: Broken pieces and dust generated during loading and unloading should be collected and disposed adequately.

SECTION VII - HANDLING AND STORAGE

Store in cool, dry area removed from oxidizing agents, flammable materials and other sources of heat.

Storage bins and silos must be inerted with seal gas or Nitrogen so that oxygen concentrations are below 4%. Avoid wet DRI storage in bins and silos.

Prior to shipment, DRI should be aged at least for 72 hours, or treated with some other equivalent passivation technique. The pile temperature has to be measured at frequent intervals by inserting thermocouple in each pile.

It should not be loaded if temp. is > 65^0 C. No wet material to be loaded, it should be under dry condition, although discharge under all weather conditions is acceptable.

The cargo should be evenly distributed & concentrations of fines minimized, cargo should be loaded in layers, each of nominal height of 2 meters, to assist fine distribution.

Boundaries of compartments where DRI is carried should be resistant to fine & passage of water, Hatch covers should be inspected & tested. They should remain sealed throughout the Voyage.

It is important that the Vessel's Ventilation system is fully operational.

All cargo space should be clean & dry, wooden fixtures should be removed.

SECTION VIII – EXPOSURE CONTROLS,PERSONAL PROTECTION

Respiratory Protection	:	During handling dust is generated and respiratory protection of EN 149:2001 may be used.
Eye Protection	:	During handling – loading and unloading, use Safety Spectacles as dust evolution and chips may be there.
Other Protection	:	Safety Helmet, Safety Shoes and Cotton hand gloves.

SECTION IX – PHYSICAL AND CHEMICAL PROPERTIES

Physical State	:	Solid
Appearance	:	Light grey
Odor	:	Odorless
Apparent Density g/cc	:	3.5 +/ --
Bulk Density MT/M^3	:	1.8 +/ --
Porosity- %	:	35 +/ --
Water Pick-up %	:	12 +/ --
Dimension	:	6 – 30 mm
Volume	:	2 cc
Weight	:	0.5 g
Solubility in water	:	Insoluble
Flash Point	:	Not Applicable
Flammability – LEL	:	Not Applicable
- UEL	:	Not Applicable

SECTION X - STABILITY AND REACTIVITY DATA

Stability	:	Stable under normal conditions. Unstable when wet, oxidizes with fresh water and more readily with sea water forming rust and generation of Hydrogen Gas.
Conditions to avoid	:	Temperature above 65 ^{O} C Contact with acid, open flame and water.

SECTION XI – TOXICOLOGICAL INFORMATION

No toxicity data available

SECTION XII – ECOLOGICAL INFORMATION

DRI is not considered to be a contaminant to the environment.
Proper dust treatment or collection system to be there for the DRI dust generated during handling, loading and unloading.
Avoid spillage in land or water.
Local environmental regulations shall be followed.

SECTION XIII – DISPOSAL CONSIDERATION

Waste Disposal	Recycle all the spillage possible. Dust shall be collected, treated, recycled / disposed off as per the prevailing environmental regulations.

SECTION XIV – TRANSPORT INFORMATION

Surface transportation (Road & rail)	Local transportation regulations shall be followed.

Maritime Transport

DRI is classified by International Maritime Organization in the BC code as "Material Hazardous in Bulk" (MHB).
As per IMO a "Competent Authority" is to certify that the Vessel is Safe enough for Carrying DRI Material.

"Competent Authority" is a person recognized by National Administration of the Country of Shipment who should certify to the Ship's Master that the DRI, at the time of loading, is suitable for shipment.

Before commence loading "Competent Authority" inspects the Vessel & his team (Supercargo & Loading Supervisor) to check any seepage from the bottom & dry conditions of holds.

Then all hatch covers are closed & water is sprayed for checking any leakage from top. Then "Competent Authority" will issue NOC for loading.

Supercargo is a person to do all critical parameters checking (temp, O2 & H2) every 8 hours & relays information to the master & shipper daily through Vessel's communication system during Voyage.

Throughout the Voyage, cargo spaces are to be maintained under an inert atmosphere containing < 5% O2. Inert gas should be N2 & not CO2 which under reaction with hot iron would generate dangerous CO.

H2 content of atmosphere should be maintained below 1%. Monitoring of O2 & H2 should be carried at regular interval.

In case H2 exceeds 1%, the hatch should be ventilated until it is reduced to below 1%.

The temp. of the Cargo should be monitored at regular intervals during voyage. Before loading the Cargo, the floor of each hatch should be wired with thermocouples at a specific places. Second layer of thermocouples should be placed after loading half of the Cargo.

In case Cargo temp. exceeds 200 ^{0} C, Ship must be headed to nearest port, if cannot reached swiftly, flooding of hatch could be the last solution with fastest rate of water input.

Cargo spaces carrying DRI may become Oxygen–depleted, caution should be exercised when entering such compartment.

Radar & RDF Scanners should be protected from dust during loading & discharging Operations.

SECTION XV – REGULATORY INFORMATION

OSHA/EPA	Not provided.

SECTION XVI – OTHER INFORMATION

Basic awareness training on the properties and safe handling of DRI shall be imparted to all handlers those involved in loading, unloading and other operations.