

DRI (A) SCHEDULE
As to be published in the new International Maritime Solid Bulk Cargoes
Code (IMSBC Code)

DIRECT REDUCED IRON (A)

- 11 The existing schedule **DIRECT REDUCED IRON (A)** is replaced by:

“DIRECT REDUCED IRON (A)
Briquettes, hot-moulded

DESCRIPTION

Direct reduced Iron (A) is a metallic grey material, moulded in a briquette form, emanating from a densification process whereby the direct reduced iron (DRI) feed material is moulded at a temperature greater than 650°C and has a density greater than 5,000 kg/m³. Fines and small particles (under 6.35 mm) shall not exceed 5% by weight.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m ³)	STOWAGE FACTOR (m ³ /t)
Not applicable	2,500 to 3,300	0.3 to 0.4 To be verified by the shipper
SIZE	CLASS	GROUP
Approximate size: Length 50 mm to 140 mm Width 40 mm to 100 mm Thickness 20 mm to 50 mm Briquette weight 0.2 to 3.0 kg Fines and small particles: under 6.35 mm	MHB	B

HAZARD

Temporary increase in temperature of about 30°C due to self-heating may be expected after material handling in bulk. The material may slowly evolve hydrogen after contact with water (notably saline water). Hydrogen is a flammable gas that can form an explosive mixture when mixed with air in concentration above 4% by volume. It is liable to cause oxygen depletion in cargo spaces. This cargo is non-combustible or has a low fire-risk.

STOWAGE AND SEGREGATION

“Separate from” goods of class 1 (Division 1.4S), 2, 3, 4 and 5 and class 8 acids in packaged form (see IMDG Code).

“Separate from” solid bulk materials of classes 4 and 5.

“Separate longitudinally by an intervening complete compartment or hold from” goods of class 1 other than Division 1.4S.

Boundaries of compartments where this cargo is carried shall be resistant to fire and passage of liquid.

HOLD CLEANLINESS

The cargo spaces shall be clean, dry and free from salt and residues of previous cargoes. Prior to loading, wooden fixtures such as battens, loose dunnage, debris and combustible materials shall be removed.

WEATHER PRECAUTIONS

This cargo shall be kept as dry as practicable during loading and the voyage. Open storage is acceptable prior to loading. This cargo shall not be loaded onto ships or transferred between ships or barges during precipitation. During loading of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be kept closed. Only when weather permits may non-working hatch covers be left open for a minimum of 1 hour after completion of each pour to allow cooling after cargo handling in bulk.

LOADING

Prior to loading this cargo, the shipper shall provide the master with a certificate issued by a competent person recognized by the National Administration of the port of loading stating that the cargo, at the time of loading, is suitable for shipment and that it conforms with the requirements of this Code; that the quantity of fines and small particles (up to 6.35 mm in size) is no more than 5% by weight; the moisture content is less than 1.0% and the temperature does not exceed 65°C.

This cargo shall not be loaded when the temperature is in excess of 65°C, if its moisture content is in excess of 1.0% or if the quantity of fines and small particles (up to 6.35 mm in size) exceeds 5% by weight.

Appropriate precautions shall be taken during loading in order to have a cargo composed of essentially whole briquettes. The cargo shall be loaded in such a way so as to minimize breakage of briquettes and the additional generation of fines and small particles and concentration of fines in any area of the cargo. The addition of fines and particles less than 6.35 mm or dust in homogenous cargoes of briquettes shall be prohibited.

Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code. Due consideration shall be given to evenly spreading the cargo across the tanktop to minimize the concentration of fines.

The cargo temperature shall be monitored during loading and recorded in a log detailing the temperature for each lot of cargo loaded, a copy of which shall be provided to the master. After loading, a certificate, confirming that throughout the whole consignment the fines and small particles (under 6.35 mm in size) are less than 5% by weight, shall be issued by a competent person recognized by the National Administration of the port of loading.

PRECAUTIONS

The carrier's nominated technical persons or other representatives shall have reasonable access to stockpiles and loading installations for inspection.

Shippers shall provide comprehensive information on the cargo and safety procedures to be followed in the event of emergency. The shipper may also provide advice in amplification of this Code but the advice shall not be contrary thereto in respect of safety.

Where practicable, ballast tanks adjacent to the cargo spaces containing this cargo, other than double-bottom tanks, shall be kept empty. Weather deck closures and hatch covers shall be inspected and tested to ensure integrity and weather tightness which shall be maintained throughout the voyage.

Appropriate precautions shall be taken to protect machinery, equipment and accommodation spaces from the dust of the cargo. Radars and exposed radio communication equipment of the ship shall be protected from the dust of this cargo. Bilge wells of the cargo spaces shall be clean, dry and protected from ingress of the cargo using non-combustible material. Persons, who may be exposed to the dust of the cargo, shall wear protective clothing, goggles or other equivalent dust eye-protection and dust filter masks, as necessary.

During handling of this cargo "NO SMOKING" signs shall be posted on decks and in areas adjacent to cargo spaces, and no naked lights shall be permitted in these areas.

Cargo spaces containing this cargo and adjacent spaces may become oxygen-depleted. Flammable gas may also build up in these spaces. All precautions shall be taken upon entering the cargo and adjacent spaces.

VENTILATION

Surface ventilation only, either natural or mechanical, shall be conducted, as necessary, during the voyage for this cargo. On no account shall air be directed into the body of the cargo. When mechanical ventilation is used, the fans shall be certified as explosion-proof and shall prevent any spark generation thereby avoiding the possibility of ignition of hydrogen air mixture. Suitable wire mesh guards shall be fitted over inlet and outlet ventilation openings. Ventilation shall be such that escaping gases cannot enter living quarters in hazardous concentrations.

CARRIAGE

For quantitative measurements of hydrogen, a suitable detector shall be on board while this cargo is carried. The detector shall be suitable for use in an oxygen depleted atmosphere and of a type certified safe for use in an explosive atmosphere. The concentrations of hydrogen in the cargo spaces carrying this cargo shall be measured regularly during the voyage, and the results of the measurements shall be recorded and kept on board for a minimum of two years. When the monitored hydrogen concentration is higher than 1% (> 25% LEL) by volume, appropriate safety precautions shall be taken in accordance with those procedures provided by the shipper in case of emergency. If in doubt, expert advice shall be sought.

Bilge wells shall be checked regularly for the presence of water. If water is found, it shall be removed by pumping or draining the bilge wells.

Temperature of the cargo shall be taken regularly during the voyage and a record kept on board for a minimum of two years. If the temperature in the cargo space exceeds 65°C, appropriate safety precautions shall be taken in accordance with the procedures provided by the shipper in case of emergency. If in doubt, expert advice shall be sought.

DISCHARGE

The hydrogen concentration in the cargo space shall be measured immediately before any opening action of the hatch covers. If the hydrogen concentration is greater than 1% (> 25% LEL) by volume, all appropriate safety precautions in conformity with the procedures provided by the shipper or the recommendations of the competent authority shall be taken. If in doubt, expert advice shall be sought.

During discharge, a fine spray of fresh water may be applied to this cargo for dust control only when the cargo will be stored in an open area. It is not recommended to apply a fine spray of fresh water to this cargo when it will be stored in an enclosed space or is to be transhipped.

CLEAN UP

Accumulations of dust from this cargo on deck or in proximity to cargo spaces shall be removed as quickly as possible. Consideration shall be given to carefully cleaning exposed radio communications equipment to which dust from the cargo might adhere, such as radar, radio aerials, VHF installations, AIS and GPS. Hosing with sea water should be avoided.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED

Nil

EMERGENCY PROCEDURES

Nil

EMERGENCY ACTION IN THE EVENT OF FIRE

Do not use water. Do not use steam. Do not use CO₂.

Batten down.

The specific procedures in the event of emergency provided by the shipper should be consulted and followed, as appropriate. If in doubt, expert advice should be sought as quickly as possible.

Preparations should be made for grab discharge if serious heating occurs.

MEDICAL FIRST AID

Refer to the Medical First Aid Guide (MFAG), as amended.

55