

Cargo Care Checklist: DRI Cargoes

ACTION TO BE TAKEN WHEN DEALING WITH **DIRECT REDUCED IRON (DRI) CARGOES**

This checklist covers the carriage of DRI (A), DRI (B) and DRI (C). It should be used in conjunction with the ship operator's procedures and the IMSBC Code.

All DRI cargoes are hazardous. **Consider appointing a suitable local surveyor, particularly in assisting with checking cargo stockpiles.**

Warning

DRI cargo reacts with air, fresh water and seawater, producing heat and hydrogen - in our experience, this includes DRI (A)

Do not enter cargo holds without taking proper precautions for enclosed space entry

Beware of oxygen depletion in adjacent spaces

01 BEFORE LOADING

Check the cargo is listed on the vessel's *Document of Compliance for the Carriage of Dangerous Goods*

Vessel has a calibrated gas detector on board - it must be suitable for the measurement of oxygen and hydrogen in oxygen-depleted and potentially-explosive atmospheres.....

Hatch covers and other hold openings are tested for weathertightness.....

Confirm the operation of bilge non return valves

'NO SMOKING' signs posted as required and no hot work is permitted

Cargo holds are clean, dry and free from salt and any residues of previous cargo.....

Bilge wells are clean, dry and protected from ingress of cargo

Remove any wooden fixtures and combustible materials from the holds

Adjacent tanks (other than double bottom tanks) to be kept empty

Contain dust by covering accommodation vents, openings, aerials and radar scanners

Check the weather forecast for the expected period of loading

Crew are provided with the appropriate PPE, e.g. masks and eye protection

Shipper provides the following completed documents and are in good order:

• Shipper's declaration form with proper BCSN

• MSDS

• Certificate stating the cargo is at the time of loading suitable for shipment as per the IMSBC Code in terms of particle size, moisture content and temperature

• Comprehensive information on the cargo and safety procedures to be followed in the event of an emergency.....

A representative of the vessel (e.g. owner's appointed surveyor) has inspected the stockpiles nominated for loading.....

Cargo is confirmed to be less than 65°C and in accordance with the shipper's certificate on moisture content and temperature

All cargo hold vents are closed

Additional for DRI (A)

The moisture content is less than 1%

The cargo is mostly whole briquettes (fines content must be no more than 5% by weight).....

Shippers provide certification showing fines content.....

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Additional for DRI (B)

- The moisture content is less than 0.3%
- Shippers provide certification showing fines content
- Shippers' certificate states the date of manufacture for each lot of cargo
- Cargo is certified as having been aged for at least 3 days, or treated to achieve the same reduction in activity
- Confirm the terminal have cleared water from conveyor belt

Additional for DRI (C)

- The moisture content is less than 0.3%
- The average cargo particle size is observed to be within the expected range (6.35mm to 25mm although briquettes may be larger) , with fines no more than 5% by weight
- Cargo is certified as having been aged for at least 30 days, or treated to achieve the same reduction in activity
- Confirm the terminal have cleared water from conveyor belt

02 DURING LOADING

- Do not load or transfer cargo during rain or precipitation
- Cargo trimmed in accordance with sections 4 and 5 of the IMSBC Code
- Non-working hatches remain closed
- As each hold is completed and covers closed, cargo temperatures and hydrogen concentrations in hold atmospheres measured and recorded at regular intervals

Warning

If the hydrogen concentration exceeds 1% or the cargo temperature exceeds 65°C, seek expert advice

Any cargo that has already been loaded and which subsequently is exposed to additional fresh water or seawater over its natural moisture content and becomes wetted, or in which reactions have started and its temperature has exceeded 120°C, must be discharged without delay.

Additional for DRI (A)

- Ensure the terminal are monitoring the temperature during loading
- Monitor breakage of briquettes

Additional for DRI (B)

- Ensure the terminal are monitoring the temperature and moisture content during loading - confirm less than 0.3%
- Any cargo loaded that subsequently becomes wetted, or in which reactions have started, must be discharged without delay
- On completion of loading of each cargo hold, close immediately and add sufficient inert gas to achieve an oxygen concentration of less than 5% throughout the space
- Monitor breakage of briquettes

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Additional for DRI (C)

Ensure the terminal are monitoring the temperature during loading

On completion of loading of each cargo hold, close immediately and add sufficient inert gas to achieve an oxygen concentration of less than 5% throughout the space

03 AFTER LOADING

All cargo holds are closed

Post-loading certificate issued stating cargo temperature and moisture content

Additional for DRI (A)

Post-loading certificate issued stating particle size

Additional for DRI (B)

The master and a competent person recognised by the national administration of the port of loading are satisfied that:

- All loaded cargo spaces are correctly sealed and have been inserted
- The cargo temperatures have stabilised at all measuring points and are less than 65°C; and
- The concentration of hydrogen in the free space has stabilised and is less than 0.2% by volume (5% LEL)

Additional for DRI (C)

Post-loading certificate issued stating particle size

The master and a competent person recognised by the national administration of the port of loading are satisfied that:

- All loaded cargo spaces are correctly sealed and have been inerted
- The cargo temperatures have stabilised at all measuring points and are less than 65°C; and
- The concentration of hydrogen in the free space has stabilised and is less than 0.2% by volume (5% LEL)

04 DURING VOYAGE

Cargo temperatures, oxygen and hydrogen concentrations in hold atmospheres measured and recorded at regular intervals, this is recommended for all types of DRI

Bilge wells are frequently checked for water and pumped out as required - always keep accurate records

Warning

If the hydrogen concentration exceeds 1% or the cargo temperature exceeds 65°C, seek expert advice

Additional for DRI (A)

Surface ventilation conducted only as necessary - air must not be directed into the body

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of the cargo

Note:

When mechanical ventilation is used, the fans shall be certified as explosion-proof and shall prevent spark generation. Wire mesh guards shall be fitted over inlet and outlet ventilation openings, and the escaping gases prevented from entering accommodation

Additional for DRI (B) and DRI (C)

Oxygen concentrations must be less than 5% throughout

Maintain inert gas blanket - it is not permitted to use the vessel's fixed firefighting system to achieve oxygen reduction

05 DISCHARGE

Check weather forecast prior to discharge

Measure hydrogen content before opening hatches - the level should be less than 1%

Close hatch covers during rain or precipitation

If cargo operations are suspended, re-measure hydrogen levels before re-opening hatch covers

Note:

Retain all records of temperature, hydrogen and oxygen measurements, where appropriate, on board for 2 years

Additional for DRI (A)

A fine spray of fresh water is permitted only when the cargo is to be stored in an open area

Disclaimer

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