

A large red bulk carrier ship is docked at a pier. The ship has a white superstructure with multiple decks and windows. Yellow cranes are visible on the pier, and the ship is surrounded by water. The image is framed by a white, curved border.

Circular

# Liquefying Bulk Cargoes

Mineral cargoes transported in bulk can liquefy if they are too wet, gravely affecting a vessel's stability. In this circular, MS Amlin Marine promotes further awareness of the dangers associated with the loading and carriage of bulk cargoes subject to liquefaction.

### ***IMSBC code and a well-known danger***

The dangers of liquefying cargoes are known throughout the marine industry. Nevertheless, serious incidents continue to occur, and it is essential that Masters, Owners, Charterers and Shippers are familiar with the International Maritime Solid Bulk Cargoes (IMSBC) Code.

Cargoes that can potentially liquefy are listed in the IMSBC Code as “Group A” cargoes, and require special handling. The cargoes most frequently affected include iron ore, nickel ore and fluorspar. However the official list of Group A cargoes is not exhaustive and some cargoes not recorded may still pose a risk. Please be aware that all heavy bulk cargoes containing fine particles with sufficient moisture can, in fact, liquefy. Loading of bulk cargo should therefore always be conducted in strict accordance with the rules and guidelines of the IMSBC Code.

For coal cargoes, the IMSBC requirements were recently updated. In December 2018 MS Amlin issued a separate circular “The revised IMSBC requirements for liquefaction of coal cargoes”, which can be found [here](#).

### ***Measuring Moisture***

Shippers of Group A cargoes are required to provide the Master with written cargo information and particulars prior to loading. This information must include a certificate declaring the actual Average Moisture Content (AMC) of the entire cargo in all the holds at the time of loading. Little reliance must be placed on the test result of the mine laboratories and same should be inspected by an independent surveyor.

It should also include a document declaring the Transportable Moisture Limit (TML) of the cargo being loaded, together with its Flow Moisture Point (FMP). The FMP of a bulk cargo can only be officially determined by a competent independent laboratory. The TML is 90% of the FMP, and cargoes with an average moisture content level higher than 90% FMP should never be loaded.

The IMSBC Code stipulates that the test results determining a cargo's FMP may not be older than 6 months, and that the test results determining a cargo's average moisture content may not be older than 7 days at the time of loading. In case of heavy rains between the time of testing and loading the tests must be conducted again. The official name of the laboratory must be identified on the certificates as if in doubt, results can be verified.

### ***Examples of IMSBC Code Group A cargoes (not exhaustive):***

- Aluminum fluoride
- Bauxite fines
- Cement
- Chemical gypsum
- Coal
- Coal slurry
- Coke breeze
- Copper concentrate
- Copper slag
- Fish in bulk
- Fly ash
- Ilmenite (Upgraded)
- Ilmenite clay
- Ilmenite sand
- Iron and steel slag and it's mixture
- Iron concentrate (sinter feed)
- Iron ore concentrates
- Iron ore fines
- Iron oxide technical
- Lead concentrate
- Manganese ore fines
- Mineral concentrates
- Nickel ore
- Sand
- Scale generated from the iron and steel making process
- Spodumene (upgraded)
- Synthetic calcium fluoride
- Synthetic silicon dioxide
- Titanomagnetite sand
- Zinc slag
- Zircon kyanite concentrate

### **Charter Party Clause**

In many cases, and sometimes under extreme pressure or intimidation, shipowners and their representatives have been denied the opportunity to sample cargoes for moisture content prior to loading. Therefore MS Amlin recommends the incorporation of the standard “BIMCO Solid Bulk Cargoes that Can Liquefy Clause for Charter Parties” into time charter parties that allow for the carriage of solid bulk cargoes that may liquefy and in voyage charter parties fixed for such cargoes.



#### ***BIMCO Solid Bulk Cargoes that Can Liquefy Clause for Charter Parties***

- (a) The Charterers shall ensure that all solid bulk cargoes to be carried under this Charter Party are presented for carriage and loaded always in compliance with applicable international regulations, including the International Maritime Solid Bulk Cargoes (IMSBC) Code 2009 (as may be amended from time to time and including any recommendations approved and agreed by the IMO).
- (b) If the cargo is a solid bulk cargo that may liquefy, the Charterers shall prior to the commencement of loading provide the ship's Master, or his representative, with all information and documentation in accordance with the IMSBC Code, including but not limited to a certificate of the Transportable Moisture Limit (TML), and a certificate or declaration of the moisture content, both signed by the shipper.
- (c) The Owners shall have the right to take samples of cargo prior to loading and, at Charterers' request, samples to be taken jointly, testing of such cargo samples shall be conducted jointly between Charterers and Owners by an independent laboratory that is to be nominated by Owners. Sampling and testing shall be at the Charterers' risk, cost, expense and time. The Master or Owners' representative shall at all times be permitted unrestricted and unimpeded access to cargo for sampling and testing purposes. If the Master, in his sole discretion using reasonable judgement, considers there is a risk arising out of or in connection with the cargo (including but not limited to the risk of liquefaction) which could jeopardise the safety of the crew, the Vessel or the cargo on the voyage, he shall have the right to refuse to accept the cargo or, if already loaded, refuse to sail from the loading port or place. The Master shall have the right to require the Charterers to make safe the cargo prior to loading or, if already loaded, to offload the cargo and replace it with a cargo acceptable to the Master, all at the Charterers' risk, cost, expense and time. The exercise by the Master of the aforesaid rights shall not be a breach of this Charter Party.
- (d) Notwithstanding anything else contained in this Charter Party, all loss, damage, delay, expenses, costs and liabilities whatsoever arising out of or related to complying with, or resulting from failure to comply with, such regulations or with Charterers' obligations hereunder shall be for the Charterers' account. The Charterers shall indemnify the Owners against any and all claims whatsoever against the Owners arising out of the Owners complying with the Charterers' instructions to load the agreed cargo.
- (e) This Clause shall be without prejudice to the Charterers' obligations under this Charter Party to provide a safe cargo. In relation to loading, anything done or not done by the Master or the Owners in compliance with this Clause shall not amount to a waiver of any rights of the Owners.

## Recommendations

Mineral concentrates may liquefy if shipped moisture content in excess of their TML and present self-heating properties through oxidation especially if they are carried in bulk. Therefore, the IMSBC Code must be followed in full.

Bilge wells must be clean and dry and covered appropriately to prevent cargo ingress. The bilge system of cargo space to which cargo is to be loaded must be tested to ensure that it is in good working order.

Hatchcovers should be in a weathertight condition to prevent water ingress into the cargo hold. Should water leakage occurs during carriage, the normal moisture content of the cargo could seriously increase and extra caution should be taken. Under such circumstances, the vibration of the vessel may cause moisture to saturate, turning the concentrate into a slurry which could lead to a serious listing of the vessel.

As the density of such cargo tends to be extremely high, hence care should be taken to ensure that cargo is evenly spread across tank top in order to equalise weight distribution. Piling of cargo in the centre of the hatch during loading is strongly discouraged.

The cargo shall be trimmed so that the difference in height between the peaks and troughs of the cargo does not exceed 5% of the ship's breadth and that the cargo slopes uniformly from hatch boundaries to bulk heads and no shearing faces remain to allow for collapsing during the voyage. This applies in particular on smaller ships, i.e., 100 m long or less.

To protect the interest of the shipowner, MS Amlin recommends the incorporation of the standard "BIMCO Solid Bulk Cargoes that Can Liquefy Clause for Charter Parties" into time charter parties that allow for the carriage of solid bulk cargoes that may liquefy and in voyage charter parties fixed for such cargoes.

*"MS Amlin recommends appointing professional services of a qualified cargo surveying company to assist the Master prior and during loading"*



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This information is meant for guidance only. Should you require more information or assistance, please feel free to contact our Loss Prevention Service  
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