

# CARRIAGE OF ENERGY STORAGE UNITS ON BULK CARRIERS

LITHIUM-ION BATTERIES HAVE GAINED SIGNIFICANT ATTENTION IN RECENT YEARS DUE TO THEIR PIVOTAL ROLE IN THE GLOBAL SHIFT TOWARDS SUSTAINABILITY, AS WELL AS THEIR ASSOCIATION WITH CERTAIN FIRE RISKS RELATING TO THERMAL RUNAWAY, SELF-IGNITION, AND THE RISK OF AN EXPLOSIVE AND TOXIC ATMOSPHERE. WHILST THESE FIRE RISKS HAVE PREDOMINATELY BEEN DISCUSSED IN CONNECTION WITH THE TRANSPORT OF ELECTRICAL VEHICLES, THE CLUB HAS RECENTLY SEEN SEVERAL ENQUIRES RELATING TO ENERGY STORAGE UNITS CONTAINING LITHIUM-ION BATTERIES AS BREAK BULK ON BOARD BULK CARRIERS.



## DECLARATION

The energy storage unit typically comprises a box or container of varying sizes, within which the Lithium-ion batteries designed for energy storage are subsequently installed.

As the cargo is packaged, it will be governed by the provisions of the International Maritime Dangerous Goods (IMDG) code. Lithium-Ion batteries are listed by the IMDG code as class 9 which covers miscellaneous dangerous substances and articles. However, the IMDG code lists a number of various UN numbers all related to the transport of lithium-Ion batteries as detailed below:

## THE INTERNATIONAL MARITIME DANGEROUS GOODS (IMDG) CODE

ENTRY	CLASS	UN No.
<b>LITHIUM BATTERIES INSTALLED IN CARGO TRANSPORT UNIT</b> Lithium-ion batteries or lithium-metal batteries	9	3536
<b>LITHIUM-ION BATTERIES</b> (Including lithium-ion polymer batteries)	9	3480
<b>LITHIUM-ION BATTERIES CONTAINED IN EQUIPMENT</b> (Including lithium-ion polymer batteries)	9	3481
<b>LITHIUM-ION BATTERIES PACKED WITH EQUIPMENT</b> (Including lithium-ion polymer batteries)	9	3481
<b>LITHIUM-METAL BATTERIES</b> (Including lithium-alloy batteries)	9	3090
<b>LITHIUM-METAL BATTERIES CONTAINED IN EQUIPMENT</b> (Including lithium-alloy batteries)	9	3091
<b>LITHIUM-METAL BATTERIES PACKED WITH EQUIPMENT</b> (Including lithium-alloy batteries)	9	3091
<b>BATTERY POWERED VEHICLE</b>	9	3171

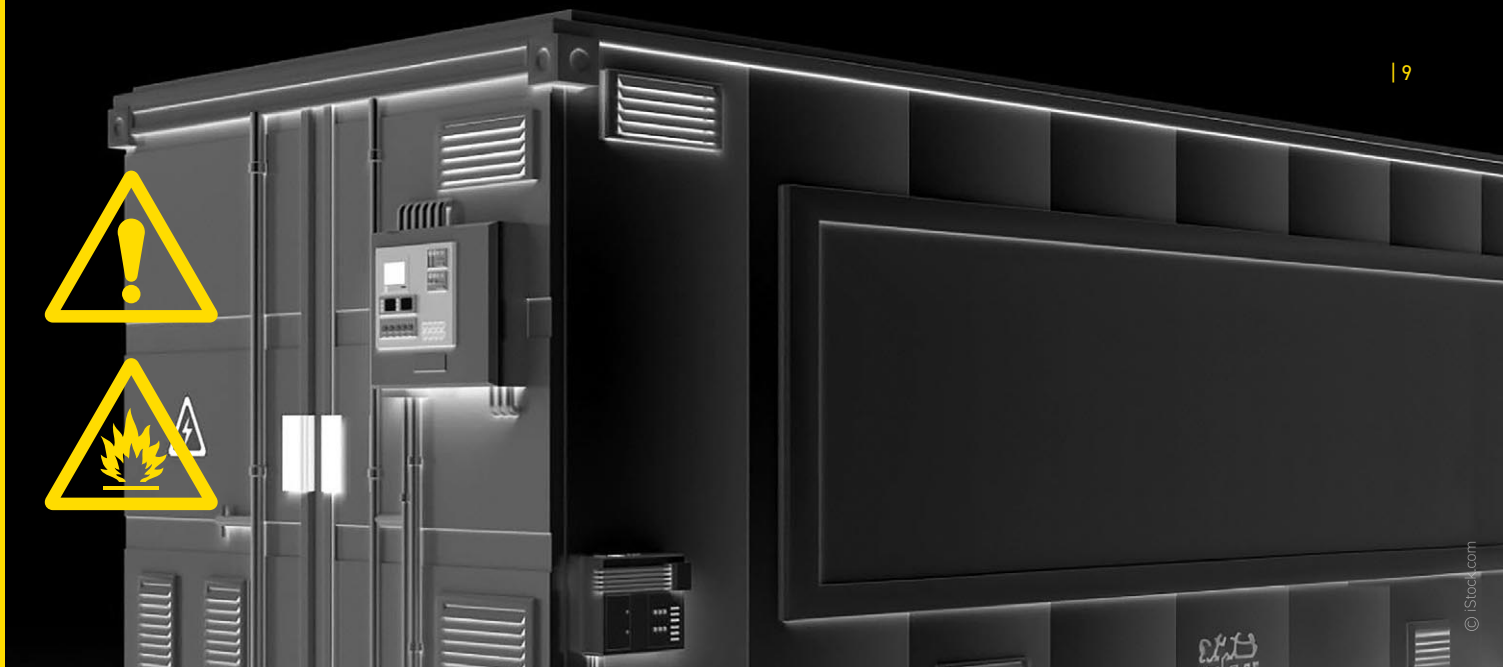
## RISK ASSESSMENT

Given both the potential risks associated with lithium-ion batteries and the high value of the energy storage units, the loading and securing process requires careful attention and planning. The shipper should provide the shipowner with detailed transport guidelines which should contain all the procedures required for the safe carriage of the entire shipment, including handling/lifting plan, lashing and securing requirements (including the gear, lashing points etc.) and emergency protocols. In addition, shipowners should undertake a structured risk assessment to assess the carriage considerations, cargo care, stowage, lashing requirements and any limitations, based on the information provided by the shipper and any statutory requirements as highlighted above.

## LOADING AND SECURING

It is advisable to appoint a competent surveyor or supercargo during the loading operations to assist the master and to ensure the stowage, loading, and securing procedures are executed properly. The following loading and securing advice should be considered, though the list should not be seen as exhaustive:

- Lifting may be a critical stage of the operation with elevated risk of damage to the cargo. It is essential to ensure the inspection and maintenance of the cranes and lifting gear is fully up to date, the records are in order, and that the manufacturer's recommended operational practices are followed. The limiting conditions of the lifting plan, such as wind, ship motions, slewing speed etc. must be complied with. The crane operator(s) must be duly qualified for the intended lifting operation.
- The cargo should be secured in accordance with the ship's Cargo Securing Manual (CSM), taking into account the applicable recommendations of the Code of Safe Practice for Cargo Stowage and Securing (the CSS Code) – Annex 13.
- The CSM must detail all lashing and securing arrangements and devices provided on board the ship, including their correct application and recommended methods for securing of cargo which the ship is approved for.
- If the ship's CSM does not specifically cover the carriage of the intended project cargo, shipowners should consult the Classification



Society in order to obtain approval and the CSM should be amended accordingly. This may also require an alteration of the physical lashing arrangement and/or for additional lashing equipment to be provided.

- The stowage plan should duly consider the availability of securing points. The securing lugs/pad-eyes should be aligned with the lashings so they are not subject to forces acting out of the nominal direction.

- The securing points fitted to the ship must be strong enough to withstand the dynamic loads. Where welding is required to install additional securing points, it should be performed by qualified welders and the welds should be inspected and tested as appropriate. The relevant safety procedures for hot work must also be followed.

- Verify that the weight of the cargo does not exceed the maximum permitted weight load on the tank top. These considerations should take into account the adequate distribution of the point load. Additional load spreading may be required so that the maximum point load is not exceeded.

- Consideration should be given to the securement of cargoes to ensure they do not shift or impair the project cargo.

- Ensure the cargoes do not possess any chemical risk of contaminating the project cargo during the voyage.

- Hatch cover testing should be conducted prior to loading the project cargo to ensure the weathertight integrity of the hatch covers.

- The onboard loading and stability software should be able to accommodate the loading of project cargo to ensure accurate stability calculations prior to departure.

### VOYAGE CONSIDERATIONS

The ship must always comply with intact stability requirements. The ship's metacentric height (GM) should also be considered during the planning phase for all phases of the voyage so that it remains within acceptable limits. Therefore, it is important to take into account weather routing to minimise the impact of the ship's motion on the cargo. As weather permits, the crew should frequently inspect the condition of the cargo and its lashings – entry into cargo holds should be governed by the shipowners entry into enclosed space procedures. The retightening of lashings should be documented as well as images of the cargo.

### EMERGENCY TRAINING

The guidance provided by the IMDG code's Emergency Schedule (EmS) and Medical First Aid Guide (MFAG) should be followed. The crew should be trained and familiarised with the specific characteristics and risks associated with a lithium-ion battery fire, as these may not be covered by the crew's traditional STCW firefighting training. This may include the increased risk of an explosive and toxic atmosphere developing. Therefore it is important for the crew to consider the early and effective deployment of the ship's fixed firefighting system.

### DISCHARGE

If the master has any concerns about the condition of the cargo, the master should inform the Club. This will enable a surveyor to attend the discharge port, verify the condition, and protect the shipowners' best interests. The surveyor may also assist the crew with monitoring the discharge operation to ensure the cargo is handled correctly and any damages caused by the stevedores are promptly recorded and documented.

In case of a claim the following evidence should be preserved:

- Weather forecasts and weather routing covering the voyage
- Surveyor/supercargo's loading report
- Stability calculations
- Route planning
- Cargo ventilation logs
- Latest hatch cover test report
- Documentation of the crew's inspection and retightening of lashing etc.

For further information, please do not hesitate to contact the loss prevention department at: [lossprevention@tindallriley.com](mailto:lossprevention@tindallriley.com)



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