



# JMS FLEET CIRCULAR

**FC Number : 07-2022**

**SUBJECT : Lithium Battery Hazards**

**ISSUE DATE : 21 September 2022**

Dear Captain, Officers and Crew,

Following the succession in recent time of accidents ascribable to Lithium batteries failures or improper storage and the consequent reporting and attention brought from the Administrators on this subject, JMS issue this Fleet Circular in order to:

- raise the Crew awareness on the risks related to the Lithium batteries;
- provide an overview of the fire suppression and fire retardant systems currently available;
- assist Captains and Officers in implementing a Standard Operation Procedure

Reports from the Administrators (i.e. MSIU – Malta Safety Investigation Unit) and supporting documents from Underwriters and Contractors are available in the Fleet Circular Folder.

## **Risks Associated to Lithium Batteries**

All Crew shall be aware of the listed risks:

- 1) **Fire due to short-circuiting**. Possible causes are: overcharging/over-discharging the batteries; latent defects from the manufacturer;
- 2) **Explosion** due to release of ignitable gases in a confined space;
- 3) **Thermal Runaway** due to overcharging/over-discharging, mechanical shock, exposure to excessive temperature, external short circuit due to faulty wiring, internal short circuit (damaged cell). This is the most catastrophic failure of a Li-Ion battery.

## **Preventing Actions**

- Latent Defect, Defect, Mechanical Shock
  - I. When receiving a Li-Ion battery device/toy, check it rigorously for any defect or anomalies during the charging procedure. In case of any doubt, contact the manufacturer
  - II. In case of mechanical shock, contact immediately the manufacturer and follow his instructions;



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III. If a battery needs to be replaced, this shall be disembark and disposed as soon as possible. DO NOT KEEP FAULTY BATTERIES ON THE VESSEL

## ■ Storage and recharge

MALTA CYC 2020 and its amendments is – at the moment of writing – the only Code providing statements on the storage of Lithium battery operated water Sports' equipment and toys. The Code states that:

### 11.2.1.4 Storage of battery operated Water Sports' Equipment/Toys

Battery operated water sports' equipment/toys shall be stored on an open deck OR else in an enclosed space/garage which shall:

- a. have a forced ventilation system which exhausts directly outside;
- b. have the ventilation system capable of being isolated and closed remotely;
- c. have all ventilation air intakes and exhausts fitted with permanently attached closing/shutdown flaps/shutters which shall be capable of being easily closed remotely;
- d. be fitted with an automatic gas, smoke and heat detection system and an automatic fixed fire extinguishing system. When activated the detectors shall initiate appropriate alarms and shall also automatically isolate electrical systems, shut down the ventilation system, close the ventilation flaps shutters and activate the fixed fire extinguishing system;
- e. be fitted with an automatic visual indication/warning light that shall be visible on-site and on the bridge, indicating that water sports' equipment/toys batteries are charging;
- f. be equipped with battery boundary cooling appliances/equipment in order to cool down the boundaries of lithium ion batteries in cases of battery runaway and/or fires. Operational instructions and necessary bilge pumping arrangements shall also be put in place;
- g. be fitted with a means of closing the garage door remotely from a space outside of the garage itself;
- h. have No-Smoking signage.

Those Vessels that cannot meet CYC criteria (independently from the Flag they fly) and cannot store the equipment/toys on an open deck, shall take into consideration the following to evaluate the location for the charging/storage :

- Recharging shall be monitored by the Crew. The procedure shall be posted in the assigned technical space, on the Bridge/ER and part of the Crew familiarisation Checklist

### DO NOT LEAVE EQUIPMENT AND TOYS UNDER UNMANNED CHARGE DURING THE NIGHT

- Toys shall not be exposed/stored in high temperature space; consider as well that direct solar exposure during summer period can damage the accumulator.
- If the electrical toys will not be in use for more than 2 days, batteries should be left at the ideal SOC – State of Charge – of 20/30% of the total capacity.



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DO NOT LEAVE THE ACCUMULATOR FULLY CHARGED OR FULLY DISCHARGE IF THE EQUIPMENT WILL NOT BE USED FOR MORE THAN 2 DAYS.

- Early action fire suppression/ fire retardant means shall be available and Crew trained accordingly. Current available means are:

## 1. Li-Ion Fire Extinguishers

There are currently two types of Li-Ion FE, one water based with an additive known as P Foam. Due to its low viscosity, the liquid can penetrate electrical devices to reach the source of the fire. LB6 FEs absorb and disperse heat; the other one is a mineral-based firefighting agent. It is also water based, with vermiculite platelets which surround the burning battery cells and create a barrier to stop the fire spreading to other cells.

## 2. Specific Fire Blankets

Designed for the automotive sector, the EV Fire Blankets can stand a peak temperature of 1600°C and withstand 1200°C for 50hrs. They represent a valuable mean to isolate the fire and contain the smoke.

## 3. Sand

A readily available and effective fire retardant is sand kept in a fire-proof box/bucked allowing for the battery/equipment to be in a fire proof box. In case of fire, the flaming battery can be covered with sand to allow a controlled burn-out.

## 4. Silicon oxide extinguishing granules

Extinguishing granules thermally insulate the battery. The extinguishing or insulation effect is immediately active and functions completely autonomously. A prerequisite, however, is that the batteries are surrounded by a sufficient quantity of granules.

Granules consist mainly of silicon oxide with an average grain size of 0.5 to 5 mm. At a temperature of approx. 1050°C they begin to melt and form an enclosed, thermally insulating layer around the seat of the fire.

## 5. Recharging boxes

There are different manufacturers supplying fire-proof/explosion-proof boxes with built-in recharging arrangements.

Captains are encouraged to carefully evaluate the positioning of the Li-Ion FFE when carrying out the risk assessment and implementing the SOP: storing the suppression equipment close to the recharging or storage station is not necessarily the right choice.



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Laptops, tablets, mobile phones and similar shall be considered as equipment powered by a Lithium battery. Same criteria, where applicable, shall be applied in terms of damages, storage and recharging as per water sport equipment.

A mobile phone or a tablet lithium battery fire ignition can lead to the same dangerous situation as a water toy.

All crew have a responsibility to:

- Familiarise with and understand the risks associated with Lithium battery equipment and water toys (including devices such as tablets, mobile phones).

The Captain has the responsibility to:

- Carried out a risk assessment associated to the storage/recharging of Lithium battery equipment, water toys and devices;
- Equip the vessel with the suitable and dedicated fire suppression means;
- Implement a Standard Operating Procedure based on the risk assessment;
- Carry out Lithium battery firefighting drills.

Kind regards,

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