



Fully Online
Lithium-ion Battery Safety
On Ships



VIRSEC
Online Maritime Training



MARINER HOUSE

MARITIME / SUPERYACHT
COMPLIANCE / TRAINING





About

Lithium-ion batteries are becoming increasingly common on ships, powering everything from smartphones and laptops to electric vehicles and cargo.

While they offer many benefits, these batteries can also present significant dangers if handled improperly.

Target Audience

The "Lithium-Ion Battery Hazards on Ships" course empowers maritime professionals with the knowledge and skills to mitigate risks and ensure safe operations.

This essential course is tailored for ship crew, captains, safety officers, emergency response teams, and shoreside managers interacting with lithium-ion batteries in the maritime environment.

Whether you use battery-powered equipment, oversee charging operations, or need to provide confident leadership in implementing safety procedures, this course is for you.

This course is created in partnership with Mariner House, a consultancy run by established maritime author Captain Gerard Pollock, a master mariner with over 25+ years of experience in shipping, Port State Control and maritime operations.

Course Duration

The course lasts for approximately 3 to 4 hours depending on the learner's abilities and reading speed, and whether you use the voiceover facility. You can enter and exit this course as often as you require within the licence duration of this course.

Course Learning Outcomes

Upon completing this course, you will be able to:

- Identify at least 5 common locations where lithium-ion batteries are found on ships
- Explain the basic functional processes of lithium-ion batteries
- Recognise battery abuse conditions and at least 3 types of hazardous battery defects
- Describe the characteristics of toxic and explosive gases emitted from lithium-ion batteries
- Understand the hazards of thermal runaway and appropriate responses to battery fires
- Evaluate the suitability of water-based fire suppression systems for lithium-ion battery fires
- Identify at least 2 types of specialist equipment for containing and suppressing lithium-ion battery fires



+44 (0)161 763 4427



www.virsec.org



training@virsec.org

Compliance & Regulatory Alignment

This course aligns with key maritime regulations and requirements, including:

1. Compliance with ISM Code

ISM Code 6.3 mandates ship managers to establish procedures for personnel, especially those in safety and environmental roles, ensuring proper familiarisation with their duties.

Our course supports this by offering comprehensive lithium-ion battery safety training, showcasing a commitment to fulfilling ISM Code obligations and keeping personnel updated on safety protocols.

2. Meeting ISM Code 6.5 Requirements

ISM Code 6.5 stresses the importance of identifying and providing necessary training to support safety management systems. The “Lithium-ion Battery Safety on Ships” course aligns with this mandate, offering in-depth insights into lithium-ion battery safety to ensure all personnel have essential training for safe marine operations.

3. STCW Convention Regulation I/14 – 5

STCW Convention Regulation I/14 – 5 highlights the need for companies to familiarise seafarers with their duties, ship arrangements, equipment, and relevant procedures.

- Our course surpasses theoretical frameworks by providing essential knowledge crucial for routine and emergency situations involving lithium-ion batteries, empowering ship managers to enhance crew competency in line with the STCW Convention.

Course Features

The main course features are as follows:

- ✓ Tailored specifically for a shipping audience
- ✓ Delivered entirely online for convenience and flexibility
- ✓ Five comprehensive lessons that can be completed at your own pace
- ✓ Incorporates real-world maritime examples and case studies
- ✓ Follows a detailed course outline developed by industry experts
- ✓ Supports regulatory compliance with ISM Code and STCW Convention requirements
- ✓ Focuses on prevention and promoting a strong safety culture
- ✓ Includes knowledge checks and a final assessment to reinforce learning



+44 (0)161 763 4427



www.virsec.org



training@virsec.org

Course Subjects

- The development of Li-ion battery technology
- How Li-ion batteries function
- Where Li-ion batteries can be found on ships
- Recognising and preventing Li-ion battery abuse
- The statutory need for hazard identification for Li-ion batteries
- Toxic and explosive gas hazards
- Fire and thermal runaway
- Advanced equipment and solutions for tackling Li-ion fires
- Safe battery storage handling and disposal

Pre-Requisites

There are no pre-requisites for taking this online Lithium-ion Battery Safety on Ships Course.



Course Bulk Purchase Offer

If you wish to place more than one crew member or staff member on this course, we offer bulk discount packages. Email us at training@virsec.org to learn more about the amazing discounts available.



+44 (0)161 763 4427



www.virsec.org



training@virsec.org



VIRSEC®



MARINER HOUSE
MARITIME / SUPERYACHT
COMPLIANCE / TRAINING



Sample Course Slides

Lithium-ion Battery Safety on Ships

Copyright VIRSEC® | All Rights Reserved | 10/03/2024

Lithium-ion Battery Safety on Ships
Fully Online Maritime Training Courses

Lithium Metal

With the symbol **Li** and atomic number **3**, Lithium is a particularly unique element. It's fascinating characteristics and fiery nature make it a subject of scientific curiosity and industrial importance.

Click the buttons below to learn about the properties of Lithium.

Alkali Metal
Metallic Brilliance
Flammable

Periodic Table of the Elements

Copyright VIRSEC® | All Rights Reserved | 10/03/2024

Lithium-ion Battery Safety on Ships
Fully Online Maritime Training Courses

Mobile Adoption	Wearable & Smart Devices	Digital Cameras
Almost all modern smartphones and tablets use lithium-ion batteries. They are the standard for portable computers because they can power them for hours on a single charge, freeing users so they can work and stay connected when on the move.	Smartwatches and fitness trackers are commonly equipped with lithium-ion batteries due to their rechargeability, compact size and long-lasting power. Even though small, the lifespan of these batteries in a low-draw watch can last up to 10 years.	Wireless cameras and DSLRs rely on lithium-ion batteries because of their exceptional energy density and small size. They enable photographers to capture more photos and record lengthy videos on a single charge.

Copyright VIRSEC® | All Rights Reserved | 10/03/2024

Lithium-ion Battery Safety on Ships
Fully Online Maritime Training Courses

Function of the Cathode

- The cathode is the positive electrode within a battery cell.
- Lithium ions migrate from the anode via the electrolyte to the cathode during discharge.
- At the same time, this creates a flow of electrons in the external circuit which powers electrical devices.
- When fully discharged, all the available Li-ion ions have moved back to the cathode, and at this point, the battery will show a 0% state of charge.
- The reverse process occurs during charging.

Importance of Cathode Materials - Click Here

Cathode

Copyright VIRSEC® | All Rights Reserved | 10/03/2024

Lithium-ion Battery Safety on Ships
Fully Online Maritime Training Courses

Transport's CO₂ Contribution

- Accounting for approximately 20% (7.64 gigatonnes) of global emissions, the transport sector contributes significantly to global CO₂ emissions.
- CO₂ emissions result primarily from burning fossil fuels in various modes of transportation, including cars, trucks, ships, planes, and trains.
- The transportation sector's high level of emissions is a concern because CO₂ is a greenhouse gas contributing to climate change.

Copyright VIRSEC® | All Rights Reserved | 10/03/2024

Lithium-ion Battery Safety on Ships
Fully Online Maritime Training Courses

Explosive Off-Gassing

- Lithium-ion batteries also emit a range of explosive gases when they fail or during a fire, in addition to toxic gases.
- Explosions release a significant amount of energy and rapidly expanding gases.
- They can be extremely dangerous when they occur in enclosed, sealed spaces.
- The forces generated by an explosion can cause structural damage to a ship and compromise its structural integrity.
- In the next slide, you will see a video illustrating explosion's destructive power.
- The video below shows that a small battery-powered device, like a vape pen, accidentally ended up inside a washing machine. Due to the heat and water, the battery failed and caused an explosion.

Copyright VIRSEC® | All Rights Reserved | 10/03/2024





MARINER HOUSE
MARITIME / SUPERYACHT
COMPLIANCE / TRAINING



Contact Us

VIRSEC Ltd.
Units 2a(i) & 2a(ii)
Beehive Mill
Jersey Street
Manchester
M4 6JG
United Kingdom

T: +44 (0)161 763 4427

E: training@virsec.org

W: www.virsec.org



MCA accredited course provider

