Draft Regulations on ships using battery systems with lithium-ion cells with a total capacity of 20 kWh or more

Legal basis: Laid down by the Norwegian Maritime Authority on dd.mm.yyyy under the Act of 16 February 2007 No. 9 relating to ship safety and security (Ship Safety and Security Act) sections 2, 6, 7, 9, 11, 15, 16, 21, 28a, 29, 30 and 45, cf. Formal Delegation of 16 February 2007 No. 171, Formal Delegation of 31 May 2007 No. 590 and Formal Delegation of 19 August 2013 No. 1002.

1. Chapter
General provisions

Section 1. *Scope of application*

(1) These Regulations apply to Norwegian ships using battery systems with lithium-ion cells, where the total capacity in a single compartment is 20 kWh or more, when such ships are required to have:

a. vessel instructions
b. a trading certificate
c. a Cargo Ship Safety Construction Certificate
d. a Passenger Certificate
e. a Passenger Ship Safety Certificate for passenger ships engaged on domestic voyages
f. a Passenger Ship Safety Certificate
g. a High-Speed Craft Safety Certificate.

(2) The term "ship" includes barges, fishing vessels and high-speed craft.

Section 2. *Alternative requirements for ships of less than 24 metres in length (L) and less than 500 gross tonnage*

Ships of less than 24 metres in length (L) and less than 500 gross tonnage may comply with the requirements of a recognised classification society for battery rooms, battery systems, support systems and components as an alternative to the requirements of sections 5 and 6 and chapters 3 and 4 of these Regulations.

Section 3. *Requirements for ships with battery systems installed before dd.mm.2025*

A ship fitted with battery systems before dd.mm.2025 shall comply with the requirements of these Regulations in the event of a change in the use of a battery system or the replacement of a battery system. All ships with battery systems shall comply with the requirements of these Regulations no later than dd.mm.2035.

Section 4. Definitions

(1) Battery system: An energy storage system consisting of cells or cell groups, battery packs, electrical circuits and electronics.

(2) Battery Management System (BMS): A system that monitors and regulates battery performance to ensure safe and efficient operation. Cell monitoring, balancing, state of charge (SoC) estimation, state-of-health (SoH) estimation, temperature regulation, communication, fault detection, diagnostics and charge control are examples of functions carried out by a BMS.

(3) Hazardous area: An area classified in accordance with IEC 60079.

(4) FSS Code: The International Code for Fire Safety Systems, as adopted by the IMO's Maritime Safety Committee (MSC).

(5) Rating of ingress protection (IP): A numerical classification of equipment enclosures as defined in IEC 60529.

(6) Charging system: A system consisting of a DC charger, cables and equipment integrated into the battery system, necessary for performing the charging function, including digital communication for charge control.

(7) SCH 160: Refers to Schedule 160, a standardised designation for pipe thickness in accordance with ASME B36.10M and ASME B36.19M.

(8) Thermal runaway: A rapidly accelerating, self-sustaining increase in temperature.

Section 5. *Battery selection and configuration*

(1) Battery systems shall:

a. be made of fire-retardant materials resistant to corrosion caused by seawater and humidity;
b. be shielded against electromagnetic interference;
c. be accessible for inspection, maintenance, repair, operation and testing without risk to the person performing the work;
d. be designed to prevent internal cell failure from causing the spread of flames or gases to the battery room.

(2) Battery systems and connection points shall have a minimum enclosure rating of IP 44.

(3) Battery systems shall be equipped with an integrated off-gas duct that directs gas produced by internal cell failure directly to fresh air and is designed to prevent water ingress.

(4) Battery systems shall be type-approved by a recognised classification society. A report from a recognised classification society verifying the design and containing the tests required by the type approval programme for maritime battery systems may replace the type approval requirement.

(5) For ships of less than 24 metres in length (L) and less than 500 gross tonnage, the battery system shall be designed to ensure that any thermal runaway is confined to the originating cell and does not spread to other cells.

Section 6. *Charging system*

(1) The battery system shall have a dedicated charging system that communicates with the BMS.

(2) The charging system shall be equipped with overcurrent protection, including short-circuit protection.

(3) Connections from the charging system's protection to the battery system shall be inherently short-circuit and earth fault proof.

Section 7. *Shore power supply*

(1) Ships using battery systems shall be capable of:

a. connecting to a shore power supply;
b. replacing onboard diesel auxiliary engines with electricity supplied via the shore power supply.

(2) The ship's shore power connection shall comply with:

a. recognised international standards (IEC); or
b. relevant port facilities if the ship operates between regular ports.

2. Chapter
Ships of 24 metres in length (L) and upwards and ships of 500 gross tonnage and upwards

Section 8. *Scope of application for chapter 2*

Sections 9 to 21 shall apply to ships of 24 metres in length (L) and upwards and ships of 500 gross tonnage and upwards.

Section 9. *Requirements for battery systems*

In addition to complying with the requirements of this chapter, battery systems, support systems and components shall meet the requirements set out by a recognised classification society.

Section 10. *Risk analysis*

(1) The safety level of a ship with battery systems installed on board shall be documented through a risk analysis. The analysis shall be available as early as possible in the design phase.

(2) The risk analysis shall account for both technical and human failures and be conducted in accordance with recognised procedures and methods, such as "Requirements for Risk Analyses" (NS-5814), "Risk Management - Risk Assessment Techniques" (IEC 31010), or guidelines from a recognised classification society for developing a safety philosophy.

(3) The risk analysis shall be performed by an entity with documented expertise and experience in conducting risk analyses.

(4) The risk analysis shall be updated if changes are made during the design phase or after the ship has entered into operation.

Section 11. *Protection of the battery system*

(1) The battery system shall be designed to withstand a collision load with an inertial force corresponding to "a" in the table below in the forward direction and "a/2" in the aft direction, where "g" is the gravitational acceleration.

Ship's length (L)	Design acceleration (a)
L > 100 m	$0{,}5\,g$

60 < L ≤ 100 m	$\left(2-\frac{3(L-60)}{80}\right)g$
L ≤ 60 m	$2g$

(2) For ships with a High-Speed Craft Safety Certificate, the battery system shall be designed to withstand accelerations as described in chapter 4 of the International Code of Safety for High-Speed Craft, adopted by Resolution MSC.97(73) (2000 HSC Code), as amended.

(3) The battery room shall be located behind the collision bulkhead. For ships with a High-Speed Craft Safety Certificate, the battery room shall not be located within the (A_{BOW} area designated for energy-absorbing structures in front of the transverse plane.

(4) Battery rooms located below the damage waterline, or below the bulkhead deck if the ship is not subject to damage stability requirements, shall maintain watertight integrity from the outside and shall not be adjacent to the ship's outer shell within the buoyant volume. Doors shall be capable of withstanding a design pressure of at least 1 metre of water column and may be hinged.

(5) As an alternative to the fourth paragraph, the battery system, support system and components may have additional protection that meets the requirements of enclosure rating IP67.

Section 12. *Safety equipment*

Safety equipment and light sources in the battery room shall be certified for use in hazardous area Zone 2. The following equipment in the battery room is defined as safety equipment:

Equipment	Reference
Camera surveillance	Section 14
Temperature sensor	Section 14
Fire detection	Section 18
Gas detection	Section 19
Visual and audible alarms	Section 19

Section 13. *Monitoring and alarms*

The bridge or other continuously manned control station shall have monitoring and alarms arranged independently of the battery system. The minimum requirements are as follows:

Battery room	Monitoring	Alarm

Ambient temperature	X	X
Gas concentration	X	X
Entrance door, open position		X

Section 14. *Battery room*

(1) Bulkheads and decks in the battery room shall have the strength of watertight bulkheads, with a minimum static design pressure of 20 kN/m².

(2) The battery room shall be gastight against adjacent spaces. Gastight doors shall not have a leakage rate exceeding 0.5 m³/m²·h at 50 Pa differential pressure. The door, locking mechanism and hinges shall be designed to ensure they do not compromise the integrity of the bulkhead.

(3) The battery room shall have a structural design that prevents local accumulation of gas.

(4) Doors to the battery room shall either be normally closed with an alarm or self-closing.

(5) There shall be no direct access to the battery room from control stations, accommodation spaces or service spaces.

(6) The battery room shall have a separate bilge system.

(7) No piping systems unrelated to the battery system shall be installed in the battery room. Drainage from spaces directly above the battery room is permitted if the drainage and associated pipes are fully welded, corrosion-protected, self-draining and comply with the thickness requirements of SCH160.

(8) The battery room shall contain only the battery system, climate control, light sources and safety equipment. Other systems that form part of the battery system, such as the charging system and water cooling system, shall be located outside the battery room.

(9) The battery room shall be equipped with a camera surveillance system (CCTV) covering the entire room. The CCTV system shall be monitored from a continuously manned control station. In the event of fire or gas detection, the CCTV system shall automatically display images from the battery room. Camera surveillance shall be clearly indicated by signage outside the battery room.

(10) The ambient temperature in the battery room shall be monitored.

Section 15. *Ventilation system*

(1) The ventilation system shall be designed to prevent the spread of gases into accommodation spaces and to direct smoke and gases to areas where they pose no danger.

(2) Battery rooms shall be equipped with a dedicated ventilation system, independent of other ventilation systems.

(3) A ventilation system in continuous operation shall be designed to prevent temperature, salt content, humidity and dust in the room from causing damage to the battery system.

(4) Where the ventilation system does not operate continuously, the room shall be classified as a confined space, with associated risks of hazardous gases or reduced oxygen levels, and shall be clearly signposted accordingly.

(5) Ventilation inlets and outlets shall be regarded as ventilation from a hazardous area Zone 2 (extending to a radius of 1.5 metres). Ventilation inlets to battery rooms shall be positioned in areas that, in the absence of the considered inlet, would be non-hazardous.

(6) The ventilation system shall:

a. consist of ventilation ducts constructed to the "A-0" standard, leading to and from the battery room;
b. direct exhaust air to areas where personnel cannot be exposed to toxic gases, ensuring a minimum distance of 3.0 metres from ventilation openings, openings to enclosed spaces, muster or embarkation stations or life-saving equipment;
c. not pass through accommodation spaces, service spaces or control stations;
d. be safeguarded against water ingress, with ventilation inlets and outlets positioned above the threshold requiring watertight closures;
e. be arranged to prevent condensation or water ingress caused by duct damage from reaching the battery system;
f. be fitted with grilles on ventilation inlets and outlets, with openings limited to a maximum of 13 mm.

Section 16. *Integrated off-gas duct*

(1) The outlet of the integrated off-gas duct shall be classified as ventilation from hazardous area Zone 2 (extending to a radius of 1.5 metres).

(2) The integrated off-gas duct shall:

a. be constructed to the "A-0" standard to and from the battery room;
b. not contain fire dampers;
c. incorporate a non-return valve or non-return flap if intake ducts are present;
d. direct exhaust gases to areas where personnel cannot be exposed to toxic gases, ensuring a minimum distance of 3.0 metres from ventilation openings, openings to enclosed spaces, muster or embarkation stations or life-saving equipment;
e. not pass through accommodation spaces, service spaces or control stations;
f. be safeguarded against water ingress, with any inlets and outlets positioned above the threshold requiring watertight closures;
g. be fitted with grilles on inlets and outlets, with openings limited to a maximum of 13 mm.

Section 17. *Structural fire protection*

Battery rooms shall be fire-insulated to a fire class of "A-60" in bulkheads and decks. Where battery rooms adjoin void spaces, cofferdams, water tanks that are part of the ship's structure or open decks, the fire insulation may be reduced to fire class "A-0".

Section 18. *Fire detection*

(1) Fire detectors shall be connected to the ship's fire detection and fire alarm system.

(2) A minimum of two fire detectors shall be installed in each battery room. Fire detectors shall be either:

a. combined smoke and heat detectors; or
b. a combination of smoke detectors and heat detectors.

Section 19. *Gas detection system*

(1) The gas detection system shall be connected to the ship's alarm system.

(2) Each battery room shall be fitted with a minimum of two gas detectors.

(3) Gas detectors shall be capable of detecting CO, H_2 or other gases emitted by the battery system at an early stage.

(4) The gas detection system shall be powered by two circuits, one of which shall be supplied by an emergency power source. Automatic switching between power sources shall be provided.

(5) Electrical equipment in the battery room that is not explosion-proof shall automatically be deactivated upon gas detection in the battery room.

(6) Visual and audible alarms shall be installed in the battery room and in adjacent rooms providing access to the battery room. These alarms shall be automatically activated upon gas detection.

Section 20. *Fixed fire-extinguishing system and cooling system*

(1) Battery rooms shall be equipped with a combination of an inert gas fire-extinguishing system and a water-based cooling system.

(2) The inert gas fire-extinguishing system shall:

a. comply with chapter 5 of the FSS Code;
b. be designed to discharge two shots at 100% capacity, each from independent cylinders;
c. be capable of automatically releasing the first shot upon detection by at least two detectors;
d. be protected against the accumulation of static electricity within the nozzles during discharge.

(3) The automatic release function shall be capable of being deactivated, with a warning light clearly displayed at a continuously manned control station to indicate when the system is deactivated.

(4) The secondary release shall be manually activated upon confirmed detection of gas or smoke, as soon as the room has been verified as evacuated.

(5) The ventilation system and associated closure devices shall automatically shut down upon detection of gas or smoke within the battery room.

(6) Any pressure build-up shall be vented via off-gas ducts, which may be the ventilation ducts, leading to the open deck through pressure relief dampers. Pressure relief dampers shall ensure that overpressure within the battery room does not exceed 50 Pa. Openings from pressure relief dampers shall be classified as ventilation from a hazardous area Zone 2, extending to a radius of 1.5 metres.

(7) In addition to the inert gas fire-extinguishing system, the battery room shall be equipped with a fixed water-spray system. The system shall deliver 5 litres of fresh water per minute per square metre or an equivalent output with water mist nozzles and shall operate continuously for 60 minutes after activation.

(8) A procedure for the safe ventilation of the battery room following any incident involving the battery system shall be established.

Section 21. *Deck-mounted battery system*

(1) Sections 12 to 20 shall not apply to deck-mounted battery systems that comply with the requirements of this section.

(2) Deck-mounted battery systems shall be sufficiently exposed to outdoor air to prevent the accumulation of explosive gases in the event of an incident. At least 30% of each side surface and any associated superstructure forming part of the external arrangement of the deck-mounted battery system shall be open to outdoor air. Where the external arrangement has less than 30% openings, it shall be demonstrated through modelling that the arrangement provides sufficient ventilation to prevent explosion hazards.

(3) Deck-mounted battery systems shall:

a. be protected against mechanical damage;
b. be designed to withstand the most adverse combination of maximum local environmental loads and operational loads that may occur simultaneously;
c. be positioned in a location with minimal risk of mechanical damage and at least 4.0 metres from deck cargo, life-saving appliances, door openings or ventilation openings;
d. be designed and secured to withstand the ship heeling to 22.5 degrees combined with a trim of 10 degrees, or any combination of angles within these limits;
e. have a minimum ingress protection rating of IP 67.

(4) Fire detection for deck-mounted battery systems shall be independent of the systems for control, alarm and monitoring (including the BMS). The system shall be capable of detecting smoke, heat or flames at an early stage.

(5) Fire detection monitoring for deck-mounted battery systems shall be connected to the ship's fire detection and fire alarm system.

(6) On ships constructed of materials other than steel, the deck where the battery system is installed shall be insulated to provide fire resistance equivalent to steel or protected by a dedicated water-based system with an application rate of 10 litres per minute per square metre.

(7) On steel ships, bulkheads to accommodation spaces, workspaces and control stations located within 4.0 metres of the deck-mounted battery system shall be of "A-60" class construction.

(8) On ships constructed of materials other than steel, bulkheads within 4.0 metres of the deck-mounted battery system shall be of class "A-60" or "FRD60".

3. Chapter
Ships of less than 24 metres length (L) and less than 500 gross tonnage

Section 22. *Scope of application for chapter 3*

Sections 23 to 33 shall apply to ships of less than 24 metres in length (L) and less than 500 gross tonnage.

Section 23. *Safety philosophy*

(1) The safety philosophy of the battery room shall be documented and address all hazards associated with the specific type of battery system. As a minimum, the following shall be included:

a. risk associated with the development of toxic, flammable, and corrosive gases;
b. fire hazards;
c. explosion hazards;
d. necessary detection, monitoring and alarm systems;
e. ventilation management in the event of gas leakage or fire, including safe ventilation after an incident;
f. external hazards.

(2) The safety philosophy shall be based on the specific ship and battery system in use.

Section 24. *Protection of the battery system*

(1) The battery system shall be installed behind the collision bulkhead. Ships not required to have a collision bulkhead shall not position the battery system further forward than 0.05 L (m) from the forward perpendicular.

(2) The battery room shall be protected against water ingress through openings, including ventilation inlets and outlets.

(3) The battery system shall be mechanically secured to withstand the ship's movements and potential collisions.

(4) Bulkheads and decks in the battery room shall either be part of the ship's structure or provide equivalent structural integrity.

Section 25. *Safety system*

(1) A battery system shall have a safety system designed to ensure safe shutdown, emergency disconnection and to limit the consequences of foreseeable events and accidents.

(2) A single failure in the safety system shall not cause the simultaneous failure of the safety and alarm functions of the battery system.

(3) The safety system and the indication, control and alarm system within the battery system shall be independent of each other. Mutual independence is achieved when a single system failure does not affect the continued operation of the other system.

(4) The safety system shall comply with the requirements of a recognised classification society.

(5) Emergency disconnection shall prevent power from flowing to or from the battery system.

(6) The activation point for emergency disconnection shall be easily accessible outside the battery room, clearly visible and operable without risk.

Section 26. *Monitoring and alarms*

(1) A continuously manned control room shall be equipped with monitoring and alarms that are independent of the battery system:

Battery room	Monitoring	Alarm
Ambient temperature	X	X
Ventilation in dedicated off-gas duct, if installed		X
Entrance door, open position		X
Charging system	X	X
Fault		X

(2) Indication control and alarm systems shall comply with the requirements of a recognised classification society.

Section 27. *Battery room*

(1) For vessels of 15 metres in overall length and upwards, the battery room shall contain only equipment associated with the battery system.

(2) On vessels of less than 15 metres, no objects with a high fire risk that are not part of the battery system shall be placed in the battery room. The battery room shall not be part of the vessel's accommodation.

(3) Liquid-filled pipes that are not part of the battery system or the fire-extinguishing system shall not have flanged or screwed connections in the battery room.

(4) There shall be no fire hydrants in the battery room.

(5) The ambient temperature in the battery room shall be monitored.

Section 28. *Ventilation system*

(1) Battery rooms shall be equipped with a dedicated ventilation system, independent of other ventilation systems.

(2) The ventilation system shall be designed to prevent the spread of gases into accommodation spaces and ensure that smoke and gases are directed to areas where they present no danger.

(3) A continuously operating ventilation system shall be designed to ensure that temperature, salt content, humidity and dust do not damage the battery system.

(4) If the ventilation system does not operate continuously, the room shall be classified as a confined space, with associated risks of hazardous gases or reduced oxygen levels and shall be clearly signposted.

(5) Ventilation inlets and outlets shall be classified as ventilation from a hazardous area Zone 2 (extending to a radius of 1.5 metres). Ventilation inlets to battery rooms shall be positioned in areas that, without the inlet, would be classified as non-hazardous areas.

(6) The ventilation system shall:

a. consist of ventilation ducts constructed to the "A-0" standard, leading to and from the battery room;
b. direct exhaust air to areas where personnel cannot be exposed to toxic gases and as far away as possible from ventilation openings, openings to enclosed spaces, muster or embarkation stations or life-saving equipment;
c. not pass through accommodation spaces, service spaces or control stations;
d. be protected against water ingress, with ventilation inlets and outlets positioned above the threshold at which watertight closures are required;
e. be designed to prevent condensation or water ingress due to duct damage from reaching the battery system;
f. have grilles on ventilation inlets and outlets, with openings not exceeding 13 mm.

Section 29. *Integrated off-gas duct*

(1) The outlet of the integrated off-gas duct shall be classified as ventilation from hazardous area Zone 2 (extending to a radius of 1.5 metres).

(2) The integrated off-gas duct shall:

a. be constructed to the "A-0" - standard to and from the battery room;
b. not contain fire dampers;
c. incorporate a non-return valve or non-return flap if intake ducts are present;.
d. direct exhaust gases to areas where personnel cannot be exposed to toxic gases and as far away as possible from ventilation openings, openings to enclosed spaces, muster or embarkation stations or life-saving equipment;
e. not pass through accommodation spaces, service spaces or control stations;
f. be protected against water ingress, with any inlets and outlets positioned above the threshold at which watertight closures are required;
g. have grilles on inlets and outlets, with openings not exceeding 13 mm.

(3) The battery room shall be equipped with mechanical intake that maintains overpressure relative to the battery system’s integrated off-gas duct.

(4) If the battery system is the sole main power source, ventilation dampers and entrances to the battery room shall be closed to preserve the existing overpressure in the battery room.

Section 30. *Structural fire protection*

(1) The fire resistance of battery rooms in fishing and cargo vessels of less than 15 metres in overall length shall be at least "A-0" or "FRD-60", with insulation applied on the inside of the battery room.

(2) For fishing and cargo vessels of 15 metres in overall length and upwards, as well as passenger ships, the following fire resistance requirements shall apply:

a. The minimum requirement is "A-0".
b. "A-30" is required for:
    i. areas containing objects with a high fire risk, combustion machinery or flammable liquids; if the structure is made of aluminium, insulation shall be applied on both sides;
    ii. control rooms, accommodation spaces, muster and embarkation stations; if the structure is made of aluminium, insulation shall be applied on the inside of the battery room.
c. For structures made of fibre-reinforced plastic, fire resistance in the battery room shall be "FRD-60", with insulation applied on the inside of the battery room and on both sides where adjacent to objects with a high fire risk.

(3) Doors providing access to the battery room shall be either normally closed doors with an alarm or self-closing doors.

(4) Normally locked access hatches do not require an alarm.

Section 31. *Fire detection*

(1) A fixed fire detection system shall be installed in the battery room.

(2) Combined smoke and heat detectors or a combination of smoke and heat detectors shall be installed.

(3) The vessel's fixed fire detection system can be used for fire detection in the battery room.

Section 32. *Fixed fire-extinguishing system in the battery room*

(1) Fishing and cargo vessels of 8 to 15 metres in overall length shall have a fixed fire-extinguishing system, approved for use in engine rooms use on such vessels, installed in the battery room.

(2) Fishing and vessels of 15 metres in overall length, as well as passenger ships, shall have a fixed fire-extinguishing system in the battery room that meets one of the following requirements:

a. a water-based system compliant with IMO MSC/Circ.1165, as amended by MSC.1/Circ.1269 and MSC.1/Circ.1386;
b. an inert gas extinguishing system compliant with the FSS Code Chapter 5, cf. IMO MSC/Circ.848, as amended by IMO MSC/Circ.1267;
c. A CO_2 system compliant with the FSS Code Chapter 5.

(3) A water-based system as per second paragraph (a) does not need to switch to seawater when the freshwater tank is empty and:

a. is designed to deliver freshwater for 30 minutes;
b. is supplied from dedicated freshwater tanks or service tanks with a low-level alarm;

c. has measures to drain discharge water when the system is activated.

(4) Gas systems as per second paragraph (b) or (c) shall have two complete, independent charges. The secondary release may have a release time exceeding 120 seconds.

(5) If the extinguishing strategy involves closing the ventilation, a plan shall be in place for the safe ventilation of the battery room after the incident due to the risk of explosion and toxic gases. The plan shall be included in the safety philosophy, see section 23.

Section 33. *Complete battery system*

(1) A complete battery system is a battery system designed to be a self-contained, fire-insulated, closed system.

(2) The internal area of a complete battery system shall meet the requirements for battery rooms in this chapter, with the following changes:

a. The complete battery system shall be designed to ventilate exhaust gases to an integrated ventilation duct that protects the exhaust gases from ignition sources. Section 28 and section 29 third and fourth paragraphs shall not apply.
b. The requirement for a fixed fire-extinguishing system is met if the complete battery system is installed in an area protected by a water-based fixed fire-extinguishing system, or if it is installed on open deck.

(3) A complete battery system placed on open deck shall be designed to withstand foreseeable external influences and forces, including external cooling, such as seawater during thermal runaway.

(4) A complete battery system shall have a third-party evaluation by an ISO 9001-certified company. The evaluation shall confirm compliance with this regulation and verify that no single failure will result in:

a. a condition more severe than what the battery system is type-approved for;
b. loss of functions necessary to maintain the safety of the battery system.

4. Chapter
Battery system as the main source of electrical power

Section 34. *Main source of electrical power*

(1) A battery system may serve as the main electrical power source when it meets the requirements for the main power source set out in the applicable construction regulations for the ship.

(2) Each battery system shall be operable locally. Local operation shall be independent of remote control systems, such as the Power Management System (PMS), Integrated Automation System (IAS) or other battery system control systems.

Section 35. *Main electrical power source on ships of 15 metres in overall length and upwards*

(1) Ships of 15 metres in overall length and upwards that utilise a battery system as the main electrical power source shall, in addition to section 34, comply with the requirements of this section.

(2) The main electrical power source shall consist of at least two battery systems or one battery system and one generating set.

(3) A battery room shall not be located adjacent to another battery room or machinery spaces of category A.

(4) Each battery system or generating set shall be entirely independent and include complete systems for supplying electrical power, including power electronics and control systems.

(5) A fire or other accident in a battery room or an engine room housing generating sets shall not compromise the power supply, control or distribution from other generating sets or battery systems, including their support systems.

(6) Cables for battery systems or generating sets, including their support systems, shall be routed via two or more cable routes. These shall, as far as possible, be laid separately from each other and away from areas protected by fixed local application fire-fighting systems.

(7) Electrical services necessary for maintaining the ship’s normal operation and habitable conditions shall be ensured without reliance on the emergency electrical power source, even in the event of the loss of one battery system or generating set.

(8) If a battery system or generating set becomes unavailable, the remaining generating set or battery system shall be capable of supplying power to the electrical functions necessary to start the main propulsion system from a "dead ship" condition. An emergency electrical power source may be used to start a battery system from a "dead ship" condition, provided it has sufficient capacity to simultaneously provide the functions required in an emergency. In this context, "dead ship" means the condition where the battery system is electrically isolated, and the associated transition source for supplying the battery system's control system and control voltage is discharged.

(9) When the main electrical power source is necessary for the ship's propulsion and steering,

a. the system shall be arranged to ensure that power supply to equipment essential for propulsion, steering and overall ship safety is maintained or immediately restored in the event of the loss of the battery system or generating set in operation.
b. Load shedding or other equivalent arrangements shall be in place to protect the battery system or generating set from persistent overload or excessive temperature.
c. The main busbar shall be divided into at least two sections, which shall normally be interconnected with circuit breakers or other approved device. The interconnection of battery systems, generating sets and any other redundant equipment shall, as far as possible, be evenly distributed between the sections.

(10) A Failure Mode and Effects Analysis (FMEA) shall be conducted to document that the essential functions required for normal operation and safety are maintained in the event of a fire or other incidents in spaces containing battery systems, generating sets, or associated

support systems, components or cables. The FMEA shall include vessel description, analysis and test procedures.

Section 36. *Energy management system*

(1) When the battery system serves as the main electrical power source, it shall have its own Energy Management System (EMS) that complies with the requirements of a recognised classification society.

(2) The following monitoring and alarms shall be provided on the bridge:

Battery system	Monitoring	Alarm
SoC	X	
SoH	X	
Available battery energy (kWh)	X	X
Available battery power (kW)	X	X
Remaining range/time the batteries can supply energy for planned operation	X	X
Remaining range/time the battery system can supply energy for planned operation after the loss of the highest-capacity battery system. This shall apply only when the main power source consists of two or more battery systems.	X	X
Request for manual load reduction		X
Battery system fault		X
EMS fault		X

5. Chapter
Testing and control, operation, maintenance and training

Section 37. *Testing and control*

(1) Before a battery system is put into operation, the battery room, battery system and associated support systems shall be tested. The tests performed shall be documented in a test report.

(2) Before a battery system is commissioned or deemed operational, dynamic tests shall be carried out during sea trials to confirm the functionality of the battery system under normal operating conditions and in the event of loss of parallel-connected power sources.

Section 38. *Maintenance and testing*

(1) A maintenance manual for the battery system shall be available on board.

(2) The maintenance manual shall include maintenance procedures for the entire installation. The manual shall follow the recommendations from the equipment suppliers of the battery system and battery room and shall specify intervals for verifying the battery system's capacity.

(3) When battery systems are the sole main electrical power source on the ship, an annual verification of the battery system’s capacity shall be carried out.

(4) The maintenance procedure shall specify the required competence for performing maintenance.

(5) A maintenance manual for electrical equipment installed in hazardous rooms and areas shall be available on board.

(6) Personnel carrying out inspections and maintenance of electrical installations in hazardous spaces shall have documented training in accordance with IEC 60079-17.

(7) Emergency isolation of the battery system and other safety functions shall be tested regularly in line with supplier recommendations.

(8) The gas detection system shall undergo functional testing and calibration according to supplier recommendations, at least once a year.

Section 39. *Instructions, on-board training and drills*

(1) Crew members responsible for the operation, watchkeeping and maintenance of the battery system shall have documented training to handle battery-related emergency situation.

(2) The crew shall receive instructions on their assigned duties in the event of a battery-related emergency.

(3) Fire in the battery room shall be included in the ship’s fire drills.

6. Chapter
Concluding provisions

Section 40. *Equivalents and exemptions*

(1) The Norwegian Maritime Authority may, upon a written application from the company, approve alternative solutions to those required by these Regulations, provided it is documented that such solutions are equivalent to the regulatory requirements.

(2) The Norwegian Maritime Authority may grant exemptions from one or more requirements of these Regulations when the company submits a written application and one of the following conditions is met:

a. It is established that the requirement is not essential for the specific ship and that granting the exemption is justifiable in terms of safety.
b. It is established that compensatory measures will maintain the same level of safety as required by these Regulations.

(3) Equivalents or exemptions under this section may be granted for a limited series of sister ships.

Section 41. *Entry into force*

The Regulations enter into force on dd.mm.2025.