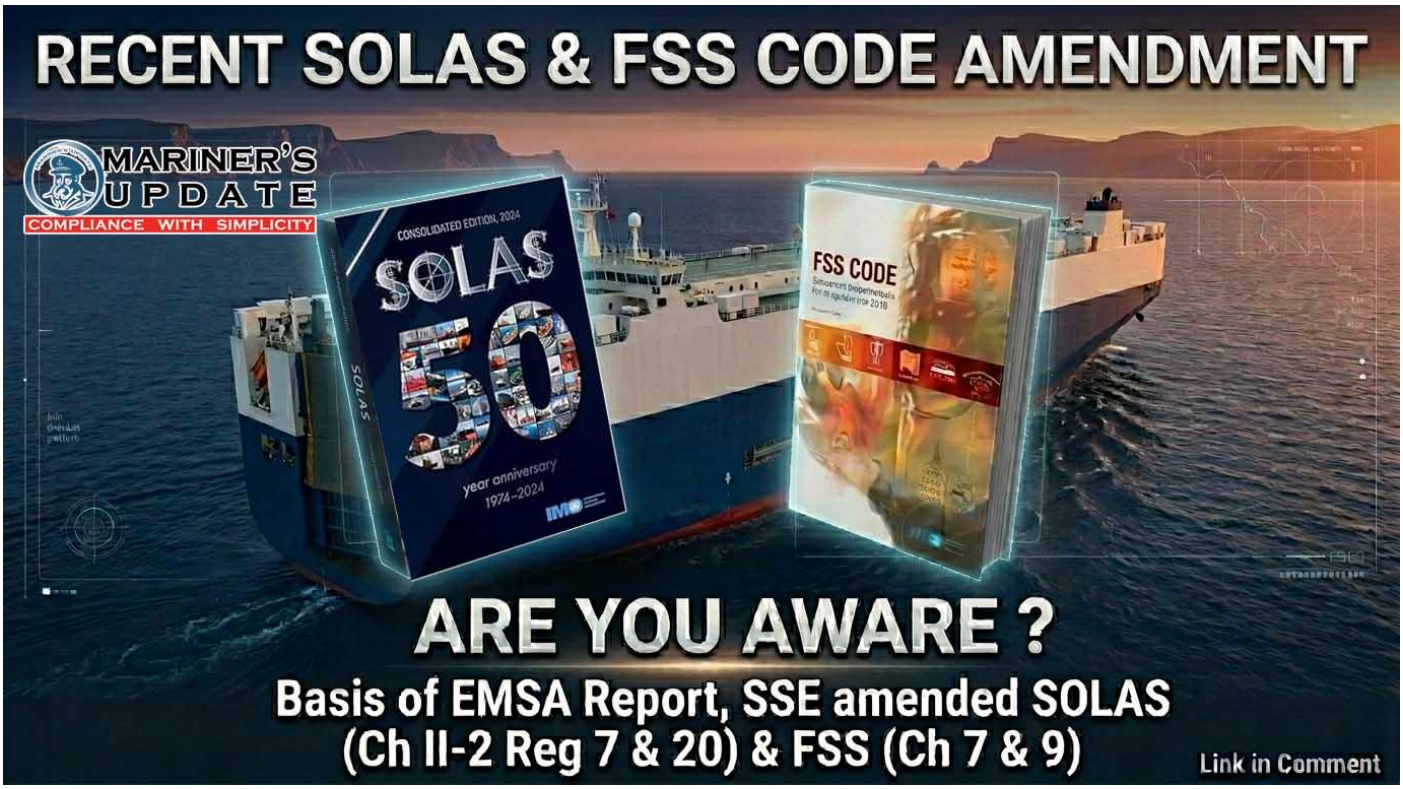

FIRE SAFETY REQUIREMENTS FOR RO-RO, PASSENGER & CARGO SHIPS

Regulatory Update – SOLAS & FSS Amendments

The IMO has introduced key amendments through **MSC.550(108)** and **MSC.555(108)**, updating **SOLAS Chapter II-2** and the **FSS Code** to strengthen fire safety requirements for Ro-Ro, passenger, and cargo ships. These changes came into force on **1 January 2026**.

Background:

Past fire incidents on Ro-Ro vessels highlighted gaps in early detection, fire suppression, and containment. Studies by EMSA (FIRESAFE I & II) further identified operational risks, leading to enhanced regulatory measures.

Key Focus:

- Improved fire detection & alarm systems
- Enhanced fire-extinguishing arrangements
- Better containment of fire spread

The amendments target safer operations in vehicle and Ro-Ro spaces, reflecting IMO's continued efforts to reduce fire risks across modern ship designs.

Amendments to Protection of Vehicle, Special Category, and Ro-Ro Spaces and Detection & Alarm Systems

(SOLAS Regulations II-2/20 & II-2/7)

The amendments to SOLAS Regulation II-2/20 and II-2/7 as adopted by MSC.550(108), introduce improved fire safety provisions for vehicle, special category, open and closed Ro-Ro spaces and weather-decks intended for the carriage of vehicles, focusing on early detection and quick response (fire detection and alarm systems), water-based suppression coverage, and strengthened boundary protection and ventilation requirements. The new requirements are applicable to Passenger ships and Cargo ships. The table below summarizes the requirements based on the ship type and date of construction.

Amendments to SOLAS Chapter II-2

Ship Type & Date of Construction	Domain	Amendments / Additional Requirements
Passenger Ships Constructed on or after 1 Jan 2026	Fire Detection & Alarm Systems	• Individually identifiable fixed fire detection & fire alarm system in vehicle, special category and ro-ro spaces (per FSS Code Ch. 9 - see below requirements). • Combined smoke and heat detectors must be installed in vehicle, special category and ro-ro spaces, capable of rapidly detecting the onset of fire. Linear heat detectors may be accepted by Administration. Detectors location shall be to the satisfaction of the Administration, considering the effects of ventilation and other relevant factors. After installation, the system shall be tested under normal ventilation conditions with overall response time subject to Administration approval. • For vehicle, special category and ro-ro spaces, fire detection system must align with deluge system sections where water-based deluge systems are fitted. • System interface shall provide logical, unambiguous information presentation for quick decision-making. • Weather decks intended for vehicle carriage require fixed fire detection & alarm systems with Administration-approved detector types, spacing, and locations, considering weather conditions and obstruction by cargo. Different sensitivity settings are permitted for loading/unloading and voyage operations to reduce false alarms.
	Video monitoring	• Effective video monitoring system shall be installed in vehicle, special category and ro-ro spaces for continuous monitoring. The system shall provide immediate playback capability for quick fire location identification. Cameras shall be positioned high enough to see over cargo and vehicles, covering the entire space. • Video recordings shall be available for replay at a continuously manned control station or safety center for at least 7 days. Camera-to-fire-extinguishing-system section correspondence shall be clearly displayed near the video monitor. Continuous crew monitoring is not required.
	Structural Fire Protection	• On passenger ships carrying more than 36 passengers, boundary bulkheads and decks of special category and ro-ro spaces shall be insulated to "A-60" standard. This may be reduced to "A-0" where category (5), (9) or (10) spaces (as per regulation 9.2.2.3) adjoin the division, or where fuel oil tanks are located below special category spaces. • Where special category or ro-ro spaces have internal deck subdivisions, deck fire ratings shall be determined by the fixed water-based fire-extinguishing system's capacity and arrangement. Decks shall be "A-30" standard if the

Ship Type & Date of Construction	Domain	Amendments / Additional Requirements
		system cannot simultaneously cover areas above and below. Ramps and doors between decks shall be steel and as tight as practical.
	Arrangement of openings in ro-ro spaced and special category spaces	• Openings in side plating, ends or deckhead of ro-ro spaces shall be positioned to prevent fire from endangering: survival craft stowage areas; embarkation and assembly stations (including access); and accommodation spaces, control stations and normally occupied service spaces in superstructures/deckhouses above. Openings are not permitted on decks directly below these spaces and within a safety distance of minimum 6.0 m measured horizontally. • Openings with closing arrangements (ramps/doors) are excluded. Ramps and doors shall be steel for decks below accommodation, control stations and service spaces, and minimum "A-0" for decks below survival craft and embarkation/assembly stations. • Openings are accepted in ro-ro spaces below accommodation spaces, control stations and normally occupied service spaces, when the fire integrity of the ship's side, including windows and doors, is "A-60" on boundaries in a rectangular area measured 6.0 m horizontally forward and aft of the openings and vertically minimum two deck levels above the deck level with the opening. "A-0" windows protected by a water-based system (water curtain) with an application rate of at least 5.0 L/min/m^2 may be accepted as equivalent to "A-60" windows. Ventilation inlets shall be designed to minimize the risk of contamination. • Mechanical ventilation openings for ro-ro and special category spaces are permitted below accommodation, service spaces and control stations if protected by steel or fire-resistant closing devices, operable from readily accessible positions and not vulnerable to be cut off by fire. Such openings are prohibited below survival craft, emergency generators and engine-room air intakes. • Air intakes for main propulsion, power generation and emergency power generation machinery shall be positioned to minimize contamination risk by fire in the ro-ro space or special category space.
	Arrangement of weather deck intended for the carriage of vehicles	• Appropriate arrangements shall prevent fully developed fires on weather decks from endangering survival craft stowage areas, embarkation and assembly stations (including access), accommodation spaces, control stations, and normally occupied service spaces in adjacent superstructures and deckhouses. • A horizontal safety distance of more than 6.0 m shall be maintained from designated vehicle lanes to accommodation spaces, control stations and normally occupied service spaces in adjacent superstructures and deckhouses. • The safety distance can be reduced to 3.0 m when boundaries, including windows and doors, within 6.0 m have "A-60" fire integrity. Alternatively, "A-0" boundaries protected by a water-based system (water curtain) with an application rate of at least 5.0 L/min/m^2 may be accepted as equivalent. • Survival craft and embarkation stations, including access to these, shall be protected with a horizontal safety distance of more than 12.0 m. • Air intakes for main propulsion, power generation and emergency power generation machinery shall be positioned to minimize fire contamination risk from weather deck fires.
	Fixed water-based fire-extinguishing system on weather	• Fixed water-based fire-extinguishing system(s) based on monitor(s) shall be installed to cover weather decks intended for vehicle carriage. Monitor(s) shall comply with FSS Code Ch. 7 (see below requirements). • Drainage shall be provided where a fixed water-based fire-extinguishing system is installed to cover weather decks intended for carriage of vehicles.

Ship Type & Date of Construction	Domain	Amendments / Additional Requirements
	decks intended for carriage of vehicles	The system shall be sized to remove no less than 125% of the combined capacity of both the monitor(s) and the required number of fire hose nozzles.
	Decision-making	• In vehicle, special category and ro-ro spaces with fixed pressure water-spraying systems, suitable signage and marking on deckheads, bulkheads and vertical boundaries for easy identification of fire-extinguishing system sections is to be provided. Signage shall be adapted to crew movement patterns, considering cargo or fixed installation obstructions. Section number signs shall be photoluminescent material (per FSS Code Ch.11) and consistent with section valve identification and at the safety center or continuously manned control station.

Passenger Ships Constructed before 1 Jan 2026 (incl. before 1 Jul 2012) To comply no later than the first survey on or after 1 Jan 2028	Fire Detection and Alarm Systems	• Fixed fire detection & fire alarm system shall be provided in vehicle, special category and ro-ro spaces (per FSS Code Ch. 9 - see below), capable of rapidly detecting the onset of fire.
		• Combined smoke and heat detectors must be installed throughout vehicle, special category and ro-ro spaces. Heat detectors shall comply with the spacing and coverage area requirements as applicable for smoke detectors. Heat detectors are only required where there is already a smoke detector.
		• The following requirements prior to the amendments adopted by MSC.550(108) remain applicable:
		  • Testing requirements after installation
		  • If an efficient patrol system is maintained by a continuous fire watch at all

	Video monitoring	• Same requirements as Passenger Ships constructed after 1 Jan 2026, except the replay capability • Replay capability for at least 24 hours.
	Structural fire protection and arrangement	• Requirements prior to the amendments adopted by MSC.550(108) remain applicable.
	Fixed water-based fire-extinguishing system on weather decks intended for carriage of vehicles	• Fixed water-based fire-extinguishing system(s) based on monitor(s) shall be installed to protect weather decks intended for vehicle carriage. Monitors shall be positioned to ensure unobstructed vehicle protection and be operable via safe access ways or remote control not impaired by fire in the protected area. Each monitor shall have minimum 1,250 L/min capacity. The Administration may permit lower flow rates when impractical due to ship size/arrangement, or alternative arrangements for ships with monitor systems installed prior to 1 January 2026 (complying with FSS Code Ch. 7 - see below).
Cargo Ships Constructed on or after 1 Jan 2026	Fire Detection and Alarm Systems	• Fixed fire detection & fire alarm system shall be provided in vehicle, special category and ro-ro spaces (complying with FSS Code Ch. 9 - see below), capable of rapidly detecting the onset of fire. • Detector type, spacing and location shall be subject to Administration approval, considering ventilation effects and other relevant factors. After installation, the system shall be tested under normal ventilation conditions with overall response time subject to Administration approval. • All corridors, stairways and escape routes within accommodation spaces, and all control stations and cargo control rooms shall be protected by fixed fire detection and fire alarm systems and/or automatic sprinkler, fire detection and

Ship Type & Date of Construction	Domain	Amendments / Additional Requirements
		fire alarm systems per the adopted protection method (Method IC, IIC or IIIC) in accordance with SOLAS regulation 9.2.3.1. Rooms containing sample smoke detection systems are considered control stations (ref. MSC.1/Circ.1456/Rev.1 and IACS UI SC160).
Cargo Ships Constructed before 1 Jan 2026	Fire Detection and Alarm Systems	• Requirements prior to the amendments adopted by MSC.550(108) remain applicable.

Amendments to FFS Code Chapter 7 - Fixed Water-Based Fire-Fighting Systems

MSC.555(108) amends the specification of fixed water-based fire-extinguishing system on Ro-Ro passenger ships having weather decks intended for the carriage of vehicles as required by SOLAS Chapter II-2. The performance standards and testing requirements shall apply to Ro-Ro passenger ships constructed on or after 1 January 2026:

- The protected area shall be the entire length and width of the weather deck intended for vehicle carriage. Fixed monitor(s) shall deliver water to weather deck vehicle carriage areas, and areas including superstructure boundaries up to 8.0 m horizontally from vehicle storage areas, or the next vertical boundaries, whichever is less.
- Combined capacity of all monitors shall be a minimum 2.0 L/min/m^2 of protected area, with individual monitor output no less than 1,250 L/min. Even water distribution shall be ensured.
- Distance from monitor to the farthest extent of the protected area forward shall not exceed 75% of monitor throw in still air conditions.
- Each monitor shall be located outside the area which it protects, in a safe position, with fire-safe access. Monitors shall provide unobstructed water coverage with vehicles stowed to maximum capacity of the weather deck. Areas not covered by monitors shall be protected by water nozzles, designed considering weather conditions and providing 5.0 L/min/m^2 with fire-accessible release controls.
- The system shall be immediately available and capable of continuous water supply. Water supply shall simultaneously cover the entire weather deck width and 40 m length (or full deck length if less), with capacity no less than required for the largest monitor.
- The system may be supplied by the fire main, the pump(s) serving other fixed water-based fire-fighting systems, or a dedicated pump providing a continuous supply of seawater.
- Where the ship's fire pumps feed monitor(s):
  - o A valve shall enable segregation to operate systems separately or simultaneously; and
  - o The pump capacity shall serve both systems simultaneously, including two fire main jets at required pressure (four jets if carrying dangerous goods on weather deck).
- Where another fixed water-based fire-fighting system feeds monitor(s):
  - o A valve shall enable segregation to operate systems separately or simultaneously; and
  - o For open ro-ro spaces, pump capacity shall serve both systems simultaneously (minimum two sections near weather deck openings plus one weather deck monitor). For closed ro-ro and special category spaces, simultaneous operation is not required.

Amendments to FSS Code Chapter 9 - Fixed Fire Detection and Fire Alarm Systems

As per MSC.555(108), the specifications of fixed fire detection and fire alarm systems have been amended to include requirements for linear heat detectors, positioning of detectors and system control requirements such as visual and audible fire signals, in accordance with the amendments of SOLAS Chapter II-2. These specifications shall apply to ships constructed on or after 1 January 2026.

• Linear heat detectors shall be tested according to standards EN 54-22:2015 and IEC 60092-504.

Alternative testing standards may be used as determined by the Administration.

• The maximum spacing of detectors shall be in accordance with the table below:

Type of detector	Max floor area per detector (m2)	Max distance apart between centers (m)	Max distance away from bulkhead(m)
Heat	37	9	4.5
Smoke	74	11	5.5
Combined smoke & heat	75	9	4.5

• The Administration may require or permit alternative spacing based on test data demonstrating detector characteristics. Detectors below movable ro-ro decks shall comply with the above spacing requirements.

• Linear heat detection system sensor cables shall be spaced maximum 9.0 m apart, with maximum 4.5 m distance from bulkheads.

• For Ro-Ro Passenger ships constructed on or after 1January 2026:

o Alarm notifications shall follow a consistent alarm presentation scheme (wording, vocabulary, color and position). Alarms shall be immediately recognizable on the navigation bridge and shall not be compromised by noise or poor placement.

o The interface shall provide alarm addressability, enable identification of alarm history and most recent alarms by the crew, and allow alarm suppression while ensuring alarms with ongoing trigger conditions remain clearly visible.

o Smoke detector function in special category and ro-ro spaces may be disconnected during vehicle loading/unloading. Disconnection time shall match loading/unloading duration and automatically reset. The central unit shall indicate disconnection status. Heat detection function and manual call point disconnection is not permitted.

EMSA FIRESAFE Studies:

The FIRESAFE projects were launched to reduce the frequency and impact of fires on Ro-Ro decks—one of the most challenging areas to manage at sea.

1. The "Cargo" Factor

- **90% of fires** in Ro-Ro spaces originate in the cargo itself (vehicles or cargo units), not the ship's systems.
- Fires are often caused by electrical faults, mechanical overheating, or reefers (refrigerated units).

2. Early Detection is Everything

- The study emphasizes that **"Early Detection"** must be fast enough to allow crew intervention before the fire becomes uncontrollable.
- **New Requirement:** Effective video monitoring and linear heat detectors are now becoming the standard to ensure 24/7 coverage over all cargo.

3. Life-Saving Appliance (LSA) Protection

- FIRESAFE II identified "exclusion zones." LSA (like lifeboats and liferafts) must be placed at a safe distance from Ro-Ro deck openings to ensure they aren't damaged by heat or smoke during an evacuation.

4. New Standards for 2026

- Many findings from these studies have been integrated into **SOLAS amendments** entering into force in 2026.
- Expect stricter rules on fixed water-based extinguishing systems for weather decks and enhanced fire suppression for vehicle spaces.