

Part G - Special Requirements

Regulation 20 - Protection of Vehicle, Special Category and Ro-Ro Spaces

1. Purpose

The purpose of this regulation is to provide additional safety measures in order to address the fire safety objectives of this chapter for ships fitted with vehicle, special category and ro-ro spaces. For this purpose, the following functional requirements shall be met:

- 1.1 fire protection systems shall be provided to adequately protect the ship from the fire hazards associated with vehicle, special category and ro-ro spaces;
- 1.2 ignition sources shall be separated from vehicle, special category and ro-ro spaces;
and
- 1.3 vehicle, special category and ro-ro spaces shall be adequately ventilated.

2. General requirements

2.1 Application

In addition to complying with the requirements of regulations in parts B, C, D and E, as appropriate, vehicle, special category and ro-ro spaces shall comply with the requirements of this regulation.

2.2 Basic principles for passenger ships

- 2.2.1 The basic principle underlying the provisions of this regulation is that the main vertical zoning required by regulation 9.2 may not be practicable in vehicle spaces of passenger ships and, therefore, equivalent protection must be obtained in such spaces on the basis of a horizontal zone concept and by the provision of an efficient fixed fire-extinguishing system. Based on this concept, a horizontal zone for the purpose of this regulation may include special category spaces on more than one deck provided that the total overall clear height for vehicles does not exceed 10 m.
- 2.2.2 The basic principle underlying the provisions of paragraph 2.2.1 is also applicable to ro-ro spaces.
- 2.2.3 The requirements of ventilation systems, openings in "A" class divisions and penetrations in "A" class divisions for maintaining the integrity of vertical zones in this chapter shall be applied equally to decks and bulkheads forming the boundaries separating horizontal zones from each other and from the remainder of the ship.

3. Precaution against ignition of flammable vapours in closed vehicle spaces, closed ro-ro spaces and special category spaces

3.1 Ventilation systems

3.1.1 Capacity of ventilation systems

There shall be provided an effective power ventilation system sufficient to give at least the following air changes:

3.1.1.1 Passenger ships:

Special category spaces 10 air changes per hour

Closed ro-ro and vehicle spaces 10 air changes per hour other than special category spaces for ships carrying more than 36 passengers

Closed ro-ro and vehicle spaces 6 air changes per hour other than special category spaces for ships carrying not more than 36 passengers

3.1.1.2 Cargo ships: 6 air changes per hour

The Administration may require an increased number of air changes when vehicles are being loaded and unloaded.

3.1.2 Performance of ventilation systems

3.1.2.1 In passenger ships, the power ventilation system required in paragraph 3.1.1 shall be separate from other ventilation systems and shall be in operation at all times when vehicles are in such spaces. Ventilation ducts serving such cargo spaces capable of being effectively sealed shall be separated for each such space. The system shall be capable of being controlled from a position outside such spaces.

3.1.2.2 In cargo ships, ventilation fans shall normally be run continuously whenever vehicles are on board. Where this is impracticable, they shall be operated for a limited period daily as weather permits and in any case for a reasonable period prior to discharge, after which period the ro-ro or vehicle space shall be proved gas-free. One or more portable combustible gas detecting instruments shall be carried for this purpose. The system shall be entirely separate from other ventilating systems. Ventilation ducts serving ro-ro or vehicle spaces shall be capable of being effectively sealed for each cargo space. The system shall be capable of being controlled from a position outside such spaces.

3.1.2.3 The ventilation system shall be such as to prevent air stratification and the formation of air pockets.

3.1.3 Indication of ventilation systems

Means shall be provided on the navigation bridge to indicate any loss of the required ventilating capacity.

3.1.4 Closing appliances and ducts

3.1.4.1 Arrangements shall be provided to permit a rapid shutdown and effective closure of the ventilation system from outside of the space in case of fire, taking into account the weather and sea conditions.

3.1.4.2 Ventilation ducts, including dampers, within a common horizontal zone shall be made of steel. In passenger ships, ventilation ducts that pass through other horizontal zones or machinery spaces shall be "A-60" class steel ducts constructed in accordance with regulations 9.7.2.1.1.1 and 9.7.2.1.1.2.

3.1.5 Permanent openings

Permanent openings in the side plating, the ends or deckhead of the space shall be so situated that a fire in the cargo space does not endanger stowage areas and embarkation stations for survival craft and accommodation spaces, service spaces and control stations in superstructures and deckhouses above the cargo spaces.

3.2 Electrical equipment and wiring

3.2.1 Except as provided in paragraph 3.2.2, electrical equipment and wiring shall be of a type suitable for use in an explosive petrol and air mixture.*

* Refer to the recommendations of the International Electrotechnical Commission, in particular publication 60079.

3.2.2 In case of other than special category spaces below the bulkhead deck, notwithstanding the provisions in paragraph 3.2.1, above a height of 450 mm from the deck and from each platform for vehicles, if fitted, except platforms with openings of sufficient size permitting penetration of petrol gases downwards, electrical equipment of a type so enclosed and protected as to prevent the escape of sparks shall be permitted as an alternative on condition that the ventilation system is so designed and operated as to provide continuous ventilation of the cargo spaces at the rate of at least ten air changes per hour whenever vehicles are on board.

3.3 Electrical equipment and wiring in exhaust ventilation ducts

Electrical equipment and wiring, if installed in an exhaust ventilation duct, shall be of a type approved for use in explosive petrol and air mixtures and the outlet from any exhaust duct shall be sited in a safe position, having regard to other possible sources of ignition.

3.4 Other ignition sources

Other equipment which may constitute a source of ignition of flammable vapours shall not be permitted.

3.5 Scuppers and discharges

Scuppers shall not be led to machinery or other spaces where sources of ignition may be present.

4. Detection and alarm

4.1 Fixed fire detection and fire alarm systems

Except as provided in paragraph 4.3.1, there shall be provided a fixed fire detection and fire alarm system complying with the requirements of the Fire Safety Systems Code. The fixed fire detection system shall be capable of rapidly detecting the onset of fire. The type of detectors and their spacing and location shall be to the satisfaction of the Administration, taking into account the effects of ventilation and other relevant factors. After being installed, the system shall be tested under normal ventilation conditions and shall give an overall response time to the satisfaction of the Administration.

4.2 Sample extraction smoke detection systems

Except open ro-ro spaces, open vehicle spaces and special category spaces, a sample extraction smoke detection system complying with the requirements of the Fire Safety

Systems Code may be used as an alternative for the fixed fire detection and fire alarm system required in paragraph 4.1.

4.3 Special category spaces

4.3.1 An efficient fire patrol system shall be maintained in special category spaces. However, if an efficient fire patrol system is maintained by a continuous fire watch at all times during the voyage, a fixed fire detection and fire alarm system is not required.

4.3.2 Manually operated call points shall be spaced so that no part of the space is more than 20 m from a manually operated call point, and one shall be placed close to each exit from such spaces.

5. Structural protection

Notwithstanding the provisions of regulation 9.2.2, in passenger ships carrying more than 36 passengers, the boundary bulkheads and decks of special category spaces and ro-ro spaces shall be insulated to "A-60" class standard. However, where a category (5), (9) or (10) space, as defined in regulation 9.2.2.3, is on one side of the division, the standard may be reduced to "A-0". Where fuel oil tanks are below a special category space or a ro-ro space, the integrity of the deck between such spaces, may be reduced to "A-0" standard.

[Return to Contents](#)

6. Fire extinction

6.1 Fixed fire-extinguishing systems**

** Refer to the Guidelines when approving alternative fixed water-based fire-fighting systems for use in special category spaces (MSC/Circ.914).

6.1.1 Vehicle spaces and ro-ro spaces which are not special category spaces and are capable of being sealed from a location outside of the cargo spaces shall be fitted with a fixed gas fire-extinguishing system which shall comply with the provisions of the Fire Safety Systems Code, except that:

6.1.1.1 if a carbon dioxide fire-extinguishing system is fitted, the quantity of gas available shall be at least sufficient to give a minimum volume of free gas equal to 45% of the gross volume of the largest such cargo space which is capable of being sealed, and the arrangements shall be such as to ensure that at least two thirds of the gas required for the relevant space shall be introduced within 10 min;

6.1.1.2 any other fixed inert gas fire-extinguishing system or fixed high expansion foam fire-extinguishing system may be fitted provided the Administration is satisfied that an equivalent protection is achieved; and

6.1.1.3 as an alternative, a system meeting the requirements of paragraph 6.1.2 may be fitted.

6.1.2 Ro-ro and vehicle spaces not capable of being sealed and special category spaces shall be fitted with an approved fixed pressure water-spraying system† for manual operation which shall protect all parts of any deck and vehicle platform in such spaces. Such water spray systems shall have:

† Refer to the Recommendation on fixed fire-extinguishing systems for special cargo spaces adopted by the Organization by resolution A.123(V).

6.1.2.1 a pressure gauge on the valve manifold;

6.1.2.2 clear marking on each manifold valve indicating the spaces served;

6.1.2.3 instructions for maintenance and operation located in the valve room; and

6.1.2.4 a sufficient number of drainage valves.

6.1.3 The Administration may permit the use of any other fixed fire-extinguishing system*** that has been shown, by a full-scale test in conditions simulating a flowing petrol fire in a vehicle space or a ro-ro space to be not less effective in controlling fires likely to occur in such a space.

*** Refer to the Guidelines when approving alternative fixed water-based fire-fighting systems for use in special category spaces (MSC/Circ.914).

6.1.4 When fixed pressure water-spraying fire-extinguishing systems are provided, in view of the serious loss of stability which could arise due to large quantities of water accumulating on the deck or decks during the operation of the water spraying system, the following arrangements shall be provided:

6.1.4.1 in passenger ships:

6.1.4.1.1 in the spaces above the bulkhead deck, scuppers shall be fitted so as to ensure that such water is rapidly discharged directly overboard;

6.1.4.1.2 in ro-ro passenger ships, discharge valves for scuppers, fitted with positive means of closing operable from a position above the bulkhead deck in accordance with the requirements of the International Convention on Load Lines in force, shall be kept open while the ships are at sea;

6.1.4.1.2.1 any operation of valves referred to in paragraph 6.1.4.1.2.1 shall be recorded in the log book;

6.1.4.1.3 in the spaces below the bulkhead deck, the Administration may require pumping and drainage facilities to be provided additional to the requirements of regulation II-1/21. In such case, the drainage system shall be sized to remove no less than 125% of the combined capacity of both the water-spraying system pumps and the required number of fire hose nozzles. The drainage system valves shall be operable from outside the protected space at a position in the vicinity of the extinguishing system controls. Bilge wells shall be of sufficient holding capacity and shall be arranged at the side shell of the ship at a distance from each other of not more than 40 m in each watertight compartment;

6.1.4.2 in cargo ships, the drainage and pumping arrangements shall be such as to prevent the build up of free surfaces. In such case, the drainage system shall be sized to remove no less than 125% of the combined capacity of both the water-spraying system pumps and the required number of fire hose nozzles. The drainage system valves shall be operable from outside the protected space at a position in the vicinity of the extinguishing system controls. Bilge wells shall be of sufficient holding capacity and shall be arranged at the side shell of the ship at a distance from each other of not more than 40 m in each watertight compartment. If this is

not possible the adverse effect upon stability of the added weight and free surface of water shall be taken into account to the extent deemed necessary by the Administration in its approval of the stability information.**** Such information shall be included in the stability information supplied to the master as required by regulation II-1/22.

**** Refer to the Recommendation on fixed fire-extinguishing systems for special cargo spaces adopted by the Organization by resolution A.123(V).

6.2 Portable fire extinguishers

6.2.1 Portable fire extinguishers shall be provided at each deck level in each hold or compartment where vehicles are carried, spaced not more than 20 m apart on both sides of the space. At least one portable fire-extinguisher shall be located at each access to such a cargo space.

6.2.2 In addition to the provision of paragraph 6.2.1, the following fire-extinguishing appliances shall be provided in vehicle, ro-ro and special category spaces intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion:

6.2.2.1 at least three water-fog applicators; and

6.2.2.2 one portable foam applicator unit complying with the provisions of the Fire Safety Systems Code, provided that at least two such units are available in the ship for use in such spaces.

MCA Guidance

G1 Vehicle, special category and Ro-Ro spaces

G1.1 Ventilation fans serving special category, Ro-Ro or vehicle spaces, cargo spaces and machinery used for operating bow or stern doors, should be situated in spaces separated from the special category Ro-Ro or vehicle spaces by 'A' Class divisions as specified in regulation 9. Fans with motors of less than 2kW used for mixing the air within a special category space in order to prevent stratification may be situated within the space subject to; the fan motors complying with the Merchant Shipping (Passenger Ship Construction; Ships of Classes I, II and II(A)) Regulations 1998, Regulation 60(3); and the fan blades being of a non-sparking type.

G1.2 Air pipes to tanks or voids should not terminate within a special category, Ro-Ro or vehicle space because they impair the 'A' Class integrity of the deck which separates such spaces. The air pipes should be taken to open decks or looped over within the special category space and taken out through the ships side.

G2 Power ventilation system

G2.1 Reference is made to MSC/Cir.729 - Design Guidelines and Operational Recommendations for Ventilation Systems in Ro-Ro Cargo Spaces. The requirement to indicate any loss of ventilating capacity is considered complied with by an alarm on the bridge, initiated by the fall-out of a fan motor starter relay. Arrangements should be provided to permit rapid shutdown of the ventilation system. These operations should be possible without entering the special category space. Ventilation ducts of a special category space:

G2.1.1 which is not part of the same horizontal zone should be constructed of steel and should be fire insulated to A-60 standard or fitted with an automatic fire damper in the separating division.

G2.1.2 which is part of the same horizontal zone should be constructed of non-combustible material.

G2.2 Ventilation ducts should not pass through machinery spaces unless fire insulated to A-60 standard.

G2.3 Scupper arrangements, for the sizing of scuppers and drainage pumps the capacity of both the water spraying system pumps and the water discharge from the required number of fire hose nozzles should be taken into account. Additional requirements for special category spaces below the bulkhead deck, pumping and drainage arrangements should be such as to prevent the accumulation of water on such decks. In respect of scuppers and drainage pumps, the following should be complied with:

G2.4 Exhaust fans should be of non-sparking type in accordance with IACS Requirement F 29, as revised.

G2.5 Installation of electrical equipment in special category spaces - The degree of protection of electrical equipment required will be realised:

G2.5.1 above a height of 450mm above the deck;

G2.5.1.1 by an enclosure of at least IP 55 as defined in IEC Publication 529 - Classification of Degree of Protection Provided by Enclosures; or

G2.5.1.2 by apparatus for use in zone 2 areas as defined in IEC Publication 60079 - Electrical Ap for Explosive Gas Atmospheres (Temperature Class T3).

G2.5.2 at or below a height of 450mm above the deck;

G2.5.2.1 the electrical equipment should be of certified safe type and wiring, if fitted, and should be suitable for use in zone 1 areas as defined in IEC Publication 60079 - Electrical Apparatus for Explosive Gas Atmospheres - (Gas Group II(A) and Temperature Class T3).

G2.6 In addition to motor vehicles with petrol in their tanks, motor vehicles propelled by liquefied petroleum gas (LPG) may also be carried provided the cylinders of LPG are properly secured. Likewise gas cylinders in boats, caravans and in other vehicles, where the gas is used solely in connection with its operation or business, may also be carried.

G2.7 The alarm signal given at the bridge or fire control station by the manual fire alarm system should be distinct from any other signal which does not indicate fire. Any call point for the alarm system situated in well ventilated vehicle deck spaces above the bulkhead deck, or in similar spaces having a specific flammable vapour hazard, should be mounted more than 450mm above the deck and should be suitably enclosed, unless of a certified safe type.

G2.8 As a minimum, they should be audible where the fire patrol makes their rounds such as key box locations and the routes specified on the fire patrol checklist. If necessary, extra antennas should be fitted to obtain effective communication.

G3 Fire detection in Ro-Ro spaces

G3.1 Smoke detectors exclusively or a combination of smoke and flame detectors should be used in these spaces. The detector sections in these spaces may be provided with an arrangement, e.g. a timer, for disconnecting detector sections during loading and unloading. The central unit should indicate whether the detector sections are disconnected or not. The time of disconnection should be adapted to the time of loading/unloading. Manual release mechanisms should not be capable of being disconnected by the arrangement referred to above. A sample smoke detection system meeting the requirements of the Regulations should be accepted as an equivalent detection system.

G3.2 The fire detection system, excluding manual call points, may be switched off with a timer during loading/unloading of vehicles to avoid "false" alarms.

G4 Protection of special category spaces

G4.1 The control room or position where the valves are located should fulfil the requirements for control stations for the adjacent bulkheads and decks of the protected space.

G4.2 The fire extinguishers in special category spaces should be suitable for A and B Class fires. The extinguishers should have a capacity of 12 kg dry powder or equivalent.

G4.3 The bilge wells should be provided with high level alarms which give alarm in the control room for the water spraying system. The bilge well alarms should also be connected to the engine room alarm system.