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## [<sup>F1</sup>ANNEX I

### **SAFETY REQUIREMENTS FOR NEW AND EXISTING PASSENGER SHIPS ENGAGED ON DOMESTIC VOYAGES**

#### **Textual Amendments**

- F1** Substituted by [Commission Directive 2010/36/EU of 1 June 2010 amending Directive 2009/45/EC of the European Parliament and of the Council on safety rules and standards for passenger ships \(Text with EEA relevance\)](#).

#### CHAPTER II-1

### **CONSTRUCTION — SUBDIVISION AND STABILITY, MACHINERY AND ELECTRICAL INSTALLATIONS**

#### *PART D*

#### **ELECTRICAL INSTALLATIONS**

##### **1 General (R 40)**

NEW CLASS B, C AND D AND EXISTING CLASS B SHIPS:

- .1 Electrical installations shall be such that:
  - .1 all electrical auxiliary services necessary for maintaining the ship in normal operational and habitable conditions will be ensured without recourse to the emergency source of electrical power;
  - .2 electrical services essential for safety will be ensured under various emergency conditions; and
  - .3 the safety of passengers, crew and ship from electrical hazards will be ensured.
- .2 The Administration of the flag State shall take appropriate steps to ensure uniformity of implementation and application of the provision of this part in respect of electrical installations<sup>(1)</sup>.

##### **2 Main source of electrical power and lighting (R 41)**

NEW CLASS B, C AND D AND EXISTING CLASS B SHIPS:

- .1 New ships of class C and D in which the electrical power is the only power for maintaining the auxiliary services essential for the safety of the ship, and new and existing ships of class B in which the electrical power is the only power for maintaining the auxiliary services essential for the safety and the propulsion of the ship, shall be provided with two or more main generating sets of such power that the aforesaid services can be operated when any one sets is out of service.

In new class C and D ships of less than 24 metres in length, one of the main generating sets may be main propulsion engine driven, provided it is of such power that the aforesaid services can be operated when any one other set is out of service.

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- .2.1 A main electric lighting system which shall provide illumination throughout those parts of the ship normally accessible to and used by passengers or crew shall be supplied from the main source of electrical power.
- .2.2 The arrangement of the main electric lighting system shall be such that a fire or other casualty in spaces containing the main source of electrical power, associated transforming equipment, if any, the main switchboard and the main lighting switchboard, will not render the emergency lighting system, required by Regulation 3, inoperative.
- .2.3 The arrangement of the emergency electric lighting system shall be such that a fire or other casualty in spaces containing the emergency source of electrical power, associated transforming equipment, if any, the emergency switchboard and the emergency lighting switchboard will not render the main electric lighting system required by this Regulation inoperative.
- .3 The main switchboard shall be so placed relative to one main generating station that, as far as is practicable, the integrity of the normal electrical supply may be affected only by a fire or other casualty in the space where the generating set and the switchboard are installed.

#### CLASS B, C AND D SHIPS CONSTRUCTED ON OR AFTER 1 JANUARY 2012

- .4 In class B, C and D ships constructed on or after 1 January 2012, supplementary lighting shall be provided in all cabins to clearly indicate the exit so that occupants will be able to find their way to the door. Such lighting, which may be connected to an emergency source of power or have a self-contained source of electrical power in each cabin, shall automatically illuminate when power to the normal cabin lighting is lost and remain on for a minimum of 30 min.

### 3 **Emergency source of electrical power (R 42)**

#### NEW CLASS B, C AND D AND EXISTING CLASS B SHIPS:

- .1 Every ship shall be provided with a self-contained emergency source of electrical power with emergency switchboard located above the bulkhead deck, in a readily accessible space which shall not be contiguous to the boundaries of machinery spaces of category A or of those spaces containing the main source of electrical power or main switchboard.
- .1 The requirement in the first paragraph is not required provided that ships are designed with two fully redundant machinery spaces, separated by at least one watertight and fire-safe compartment and two bulkheads or an alternative construction giving the same level of safety, and that there is at least one generator with an associated switchboard etc in each machinery space.
- .2 The emergency source of electric power may be either an accumulator battery capable of complying with the requirements of paragraph .5, without being recharged or suffering an excessive voltage drop, or a generator, capable of complying with the requirements of paragraph .5, driven by internal combustion type of machinery with an independent supply of fuel having a flashpoint of not less than 43 °C, with automatic starting arrangements for new ships and approved starting arrangements for existing ships, and provided with a transitional source of emergency electrical power according to paragraph .6, unless, in the case of new class C and D ships of less than 24 metres in length a suitably located independent battery arrangement is provided for that particular consumer for the period of time required for these Regulations.

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- .3 The emergency source of electric power shall be so arranged that it will operate efficiently when the ship is listed to 22,5 ° and when the trim of the ship is 10 ° from an even keel. Emergency generator set(s) shall be capable of being readily started in any cold condition likely to be encountered and, in new ships, capable of being started automatically.
- .4 The emergency switchboard shall be situated as near as practicable to the emergency source of power.
- .5 The emergency source of power required by paragraph .1 shall:
- .1 be capable of operating in general for a period of:
- 12 hours for class B ships (new and existing)
  - 6 hours for class C ships (new)
  - 3 hours for class D ships (new);
- .2 in particular, be capable to operate simultaneously the consumers as identified within the following services as required for the class of ships for the times indicated above:
- (a) one independent bilge power pump and one of the fire pumps;
  - (b) emergency lighting:
    - 1. at every assembly or embarkation station and over the sides as provided in Regulation III/5.3;
    - 2. in all alleyways, stairways and exits giving access to the assembly or embarkation stations;
    - 3. in the machinery spaces, and in the place where the emergency generator is situated;
    - 4. in the control stations where radio and main navigating equipment are situated;
    - 5. as required in Regulations II-2/B/16.1.3.7 and II-2/B/6.1.7;
    - 6. at all stowage positions for firefighter's outfits;
    - 7. at one independent bilge power pump and one of the fire pumps, referred to in subparagraph (a) and at the starting position of their motors;
  - (c) the ship's navigation lights;
  - (d)
    - 1. all communication equipment,
    - 2. the general alarm system,
    - 3. the fire detecting system, and
    - 4. all signals which may be required in an emergency, if they are electrically operated from the ship's main generating sets;
  - (e) the ship's sprinkler pump, if any and if it is electrically operated; and
  - (f) the ship's daylight signalling lamp, if it is operated by the ship's main source of electric power;

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- .3 be capable to operate, for a period of half an hour, the power-operated watertight doors together with the associated control, indication and alarm circuits.
- .6 The transitional source of emergency electrical power required by paragraph .2 shall consist of an accumulator battery suitably located for the use in an emergency which shall operate without recharging or suffering an excessive voltage drop for half an hour:
- (a) the lighting required by paragraph .2(b)1 of this Regulation;
  - (b) the watertight doors, as required by paragraphs .7.2 and .7.3 of Regulation II-1/B/13, but not necessarily all of them simultaneously, unless an independent temporary source of stored energy is provided; and
  - (c) the control, indication and alarm circuits as required by paragraph .7.2 of Regulation II-1/B/13.

.7 CLASS B, C AND D SHIPS CONSTRUCTED ON OR AFTER 1 JANUARY 2003:

Where electrical power is necessary to restore propulsion, the capacity shall be sufficient to restore propulsion to the ship in conjunction with other machinery, as appropriate, from a dead ship condition within 30 min. after blackout.

**4 Supplementary emergency lighting for ro-ro ships (R 42-1)**

NEW CLASS B, C AND D AND EXISTING CLASS B SHIPS:

In addition to the emergency lighting required in Regulation II-1/D/3.5.2(b), on every ship with ro-ro cargo spaces or special category spaces:

- .1 all passenger public spaces and alleyways shall be provided with supplementary electric lighting that can operate for at least three hours when all other sources of electrical power have failed and under any condition of heel. The illumination provided shall be such that the approach to the means of escape can be readily seen. The source of power for the supplementary lighting shall consist of accumulator batteries located within the lighting units that are continuously charged, where practicable, from the emergency switchboard. Alternatively, any other means of lighting which is at least as effective may be accepted by the Administration of the flag State. The supplementary lighting shall be such that any failure of the lamp will be immediately apparent. Any accumulator battery provided shall be replaced at intervals having regards to the specific service life in the ambient conditions that they are subject to in service; and
- .2 a portable rechargeable battery operated lamp shall be provided in every crew space alleyway, recreational space and every working space which is normally occupied unless supplementary emergency lighting, as required by paragraph .1 is provided.

**5 Precautions against shock, fire and other hazards of electrical origin (R 45)**

NEW CLASS B, C AND D AND EXISTING CLASS B SHIPS:

- .1 Exposed metal parts of electrical machines or equipment which are not intended to be live but which are liable under fault conditions to become live shall be earthed unless the machines or equipment are:
  - .1 supplied at a voltage not exceeding 50 V direct current or 50 V, root mean square, between conductors; auto-transformers shall not be used for the purpose of achieving this voltage; or

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- .2 supplied at a voltage not exceeding 250 V by safety isolating transformers supplying only one consuming device; or
- .3 constructed in accordance with the principle of double insulation.
- .2 All electrical apparatus shall be so constructed and so installed as not to cause injury when handled or touched in the normal manner.
- .3 The sides and the rear and, where necessary, the front of switchboards shall be suitably guarded. Exposed live parts having voltages to earth exceeding the voltage specified under 1.1 shall not be installed on the front of such switchboards. Where necessary, non-conducting mats or gratings shall be provided at the front and rear of the switchboard.
- .4 In distribution systems with no connection to earth, a device capable of monitoring the insulation level to earth and giving an audible or visual indication of abnormally low insulation values shall be provided.
- .5.1 All metal sheaths and armour of cables shall be electrically continuous and shall be earthed.
- .5.2 All electrical cables and wiring external to equipment shall be at least of a flame-retarding type and shall be so installed as not to impair their original flame-retarding properties. Where necessary for particular application the Administration of the flag State may permit the use of special type of cables such as radio frequency cables, which do not comply with the foregoing.

NEW CLASS B, C AND D SHIPS:

- .5.3 Cables and wiring serving essential or emergency power, lighting, internal communications or signals shall so far as practicable be routed clear of galleys, laundries, machinery spaces of category A and their casings and other high fire risk areas. In new and existing ro-ro passenger ships, cabling for emergency alarms and public address systems installed on or after 1 July 1998 shall be approved by the Administration of the flag State having regard to the recommendations developed by the IMO. Cables connecting fire pumps to the emergency switchboard shall be of a fire-resistant type where they pass through high fire risk areas. Where practicable all such cables should be run in such a manner as to preclude their being rendered unserviceable by heating of the bulkheads that may be caused by a fire in an adjacent space.
- .6 Cables and wiring shall be installed and supported in such a manner as to avoid chafing or other damage. Terminations and joints in all conductors shall be so made as to retain the original electrical, mechanical flame-retarding and, where necessary, fire resisting.

NEW CLASS B, C AND D AND EXISTING CLASS B SHIPS:

- .7.1 Each separate circuit shall be protected against short circuit and against overload, except as permitted in Regulations II-1/C/6 and II-1/C/7.

NEW CLASS B, C AND D SHIPS:

- .7.2 Lighting fittings shall be so arranged as to prevent temperature rises which could damage the cables and wiring, and to prevent surrounding material from becoming excessively hot.
- .8.1 Accumulator batteries shall be suitably housed, and compartments used primarily for their accommodation shall be properly constructed and efficiently ventilated.

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- .8.2 Electrical or other equipment which may constitute a source of ignition of flammable vapours shall not be permitted in these compartments.
- .9 Distribution systems shall be so arranged that fire in any main vertical zone, as is defined in Regulation II-2/A/2.9, will not interfere with services essential for safety in any other such zone. This requirement will be met if main and emergency feeders passing through any such zone are separated both vertically and horizontally as wide as is practicable.

NEW CLASS B, C AND D SHIPS, CONSTRUCTED ON OR AFTER 1 JANUARY 2012:

- .10 No electrical equipment shall be installed in any space where flammable mixtures are liable to collect, e.g. in compartments assigned principally to accumulator batteries, in paint lockers, acetylene stores or similar spaces, unless the Administration is satisfied that such equipment is:
- .1 essential for operational purposes;
  - .2 of a type which will not ignite the mixture concerned;
  - .3 appropriate to the space concerned; and
  - .4 appropriately certified for safe usage in the dusts, vapours or gases likely to be encountered.]

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- (1) [<sup>F1</sup>Reference is made to the recommendations published by the International Electrotechnical Commission and, in particular, 60092 series — Electrical Installations in Ships.]

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