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RULES FOR THE CONSTRUCTION AND CLASSIFICATION OF COAST GUARD SHIPS 2022

AMENDMENT

July 2023



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The following	Parts	have	been	amended	and	the
effective dates as	re:					
Part			F	Effective da	ate	
Ι			1 July, 2023			
II				1 July, 202	23	
III			1 July, 2023			
IV			1 July, 2023			

The Rules for the Construction and Classification of Coast Guard Ships 2022 and this Amendment are to be consolidated and published as July 2023 Edition.

AMENDMENT TO "THE RULES FOR THE CONSTRUCTION AND CLASSIFICATION OF COAST GUARD SHIPS 2022"

PART I CLASSIFICATION AND SURVEY

- 2 -[PART I]

List of major changes in Part I from 2022 edition

1.1.1(b)	Revised
1.1.1(c)	Revised
1.6.2(f)(iii)	Revised
Table I 1-3	Revised

Rules for the Construction and Classification of Coast Guard Ships 2022 have been partly amended as follows:

Chapter 1 Classification of Coast Guard Ships

1.1 General

Paragraph 1.1.1(b)(ii) has been amended as follows:

1.1.1 Coast Guard Ships built and surveyed in accordance with the Rules for the Construction and Classification of Coast Guard Ships (hereinafter referred to as the Rules) published by the CR Classification Society (hereinafter referred to as the Society) or alternatives found to represent an overall safety standard equivalent to that of the Rules (See 1.1.6 of this Part) will be assigned a class in the Register of Ships (hereinafter referred to as the Register) and will continue to be classed so long as they are found, upon examination at the prescribed surveys, to be maintained in a fit and efficient condition and in accordance with the requirements of the Rules.

(a) For the ships constructed of steel, aluminum, or FRP and having V/\sqrt{L} not less than 2.36 where L is as defined in 1.1.2 of Part III and V is as defined in 1.1.18 of Part III, the requirements for hull construction specified in Part III of the Rules are to be applied. Applicable ship types and length are as follows:

Application Limits:		
Ship Type	Applicable Length	
Mono-hull	< 130 m	
Multi-hull	< 100 m	
Surface Effects Ship (SES)	< 90 m	
Hydrofoil	< 60 m	

Ships which have lengths that are in excess of the above table may be classed using the requirements in the Rules for HSC, as applicable, providing that requirements in 2.1 and 2.2.1(a)(iii) of Part III of the Rules for HSC are verified by theoretical prediction, first principles analysis, and model testing.

Where direct analyses are required, the requirements specified in 1.1.19 of Part I of the Rules for HSC are applicable.

- (b) For the ships having V/\sqrt{L} less than 2.36,
 - (i) the requirements of Hull Construction and Equipment specified in Part II of the Rules are to be applied,
 - (ii) the requirements of Fire Protection, Detection and Extinction as specified in Part IX of the Rules for Steel Ships to be applied.
- (c) The requirements of Material and Welding are as specified in Part XI and XII of the Rules for Steel Ships are to be applied.

1.6 Surveys of Ships

Paragraph 1.6.2(f)(iii) has been amended as follows:

- 1.6.2 Classification Initial Survey during construction
 - (f) Hull Survey for New Construction
 - (iii) Newbuilding survey planning

Prior to commencement of surveys for any newbuilding project, a kick off meeting shall be carried out.

A record of the meeting is to be made. The records are to take note of specific published Administration requirements and interpretations of statutory requirements. The shipyard shall be requested to advise of any changes to the activities agreed at the kick off meeting and these are to be documented. Shipbuilding quality standards for the hull structure during new construction are to be reviewed and agreed during the kick-off meeting. Structural fabrication is to be carried out in accordance with IACS Recommendation 47, "Shipbuilding and Repair Quality Standard", or a recognized fabrication standard which has been accepted by the Society prior to the commencement of fabrication/construction. The work is to be carried out in accordance with the Rules and under survey of the Society. In the event of series ship production^{*} consideration may be given to waiving the requirement for a kick off meeting for the second and subsequent ships provided that no changes to the specific activities agreed in the kick off meeting for the first ship are introduced. If any changes are introduced, these are to be agreed in a new dedicated meeting and documented in a record of such meeting.

*Series Ship Production: ships in the series subsequent to the first one (prototype), i.e. sister ships built in the same shipyard.

Table I 1-3 has been amended as follows:

Notation	Description	Reference
Coastal Service	Service along a coast, the geographical limits of which will be indicated in the Register, and for a distance out to sea generally not exceeding 30 nautical miles, unless some other distance is specified for 'Coastal Service' by the Administration with which the ship is registered, or by the Administration of the coast off which it is operating, as applicable. The operation/service limitations, such as significant wave height, or maximum voyage, etc., may be indicated in the bracket affixed after this notation.	
Greater Coastal Service	Service along a coast in restricted area within 200 nautical miles from the safe harbor or place of refuge, the geographical limits of which will be indicated in the Register, and for a distance out to sea generally farther than the area of Coastal Service in domestic voyage or for the geographical limits of the intended service accepted to the Society. The operation/service limitations, such as significant wave height, or maximum voyage, etc., may be indicated in the bracket affixed after this notation.	
Protected Waters Service	Service in sheltered water adjacent to sand banks, reefs, breakwaters or other coastal features, and in sheltered waters between islands.	
Specified Operating Area Service	Service within one or more geographical area(s) which will be indicated in the Register.	
Specified Route Service	Service between two or more ports or other geographical features which will be indicated in the Register.	

Table I 1-3List of Service Restriction Notation

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AMENDMENT TO "THE RULES FOR THE CONSTRUCTION AND CLASSIFICATION OF COAST GUARD SHIPS 2022"

PART II HULL CONSTRUCTION AND EQUIPMENT

- 8 -[**PART II**]

List of major changes in Part II from 2022 edition

11.1.3(b)	Revised
22.1.5	Revised
25.2	Revised
Fig. II 25-1~ 25-3	New
25.8.2(b)	Revised
Fig. II 25-4	Renumbered
25.8.3(b)	Revised

Rules for the Construction and Classification of Coast Guard Ships 2022 have been partly amended as follows:

Paragraph 11.1.3(b) has been amended as follows:

Chapter 11 Decks

11.1	General	

- 11.1.3 Passability through decks by frames
 - (a) The frame is not to extend through the weather deck, tank top, or watertight flat, unless efficient means for watertightness is provided.
 - (b) Where the frame passes through other tight deck below the weather deck or the freeboard deck within superstructure which is not fully and permanently enclosed, or the bulkhead deck in a passenger ship, efficient means for watertightness is to be provided.

Paragraph 22.1.5(a)~(b) have been amended as follows:

Chapter 22 Scuppers and Sanitary Discharges

22.1 Scuppers and Sanitary Discharges

22.1.5 Scupper pipes from enclosed cargo spaces on the freeboard deck of a ship are to be in accordance with the following requirements.

- (a) Where the freeboard to the freeboard deck is such that the deck edge is immersed when the ship heels more than 5°, the drainage shall be by means of a sufficient number of scuppers of suitable size discharging directly overboard, fitted in accordance with the requirements for scuppers, inlets and discharges of the International Convention on Load Lines in force discharging directly overboard.
- (b) Where the freeboard is such that the edge of the freeboard deck, respectively, is immersed when the ship heels 5° or less, the drainage of the enclosed cargo spaces on the bulkhead deck or on the freeboard deck, respectively, shall be led to a suitable space, or spaces, of adequate capacity, having a high water level alarm and provided with suitable arrangements for discharge overboard. In addition, it is to be ensured that:
 - (i) the number, size and disposition of the scuppers are such as to prevent unreasonable accumulation of free water;
 - (ii) the pumping arrangements required for ships, as applicable, take account of the requirements for any fixed pressure water-spraying fire-extinguishing system;
 - (iii) water contaminated with petrol or other dangerous substances is not drained to machinery spaces or other spaces where sources of ignition may be present; and
 - (iv) where the enclosed cargo space is protected by a carbon dioxide fire-extinguishing system, the deck scuppers are to be fitted with means to prevent the escape of the smothering gas.

Chapter 25 Equipment

Section 25.2 has been amended as follows:

Fig. II 25-1~ 25-3 have been added as follows:

25.2 Equipment Number

25.2.1 The equipment given in Table II 25-1 is based on the "Equipment Number", EN, which is to be calculated as follows:

$$EN = \Delta^{\frac{2}{3}} + 2(hBH + S_{fun}) + 0.1A$$

Where:

Δ	=	Molded displacement to the summer load waterline, in ton.
В	=	Breadth of ship, in m, as specified in 1.2.2.
<mark>₩h</mark>	=	Effective height, in m, from the summer load waterline to the top of the uppermost house, in m. h= $a + \Sigma h_i$,
а	=	Vertical distance amidships from the summer load water line to the top of uppermost continuous deck beam at side, in m.
∑ h <mark>i</mark>	=	Sum of the Hheights, in m, at centerline of superstructure and each tier of deck-houses having a breadth greater than 0.25B. For the lowest tier h_1 is to be measured at centerline from the upper deck or from a notional deck line where there is local discontinuity in the upper deck, see Fig. II 25-1 below for an example.
S _{fun}	-	Effective front projected area of the funnel, in m ² , defined as:
		$S_{fun} = A_{FS} - S_{shield}$
A _{FS}	-	Front projected area of the funnel, in m ² , calculated between the upper deck at centerline, or notional
		deck line where there is local discontinuity in the upper deck, and the effective height $h_{\rm F}$.
		A _{FS} is taken equal to 0 if the funnel breadth is less than or equal to 0.25B at all elevations along the
		funnel height.
h _F		Effective height of the funnel, in m, measured from the upper deck at centerline, or notional deck line where there is local discontinuity in the upper deck, and the top of the funnel. The top of the funnel may be taken at the level where the funnel breadth reaches 0.25B.
S _{shield}	-	The section of front projected area A _{FS} , in m ² , which is shielded by all deck houses having breadth
		greater than 0.25B. If there are more than one shielded section, the individual shielded sections i.e
		S _{shield1} , S _{shield2} etc as shown in Fig. II 25-2 to be added together. To determine S _{shield} , the deckhouse
		breadth is assumed B for all deck houses having breadth greater than 0.25B as shown for S _{shield1} ,
		S _{shield2} in Fig. II 25-2.
А	=	Sum of the profile area, in m ² , of the hull above summer load waterline, superstructures and
		deekhouses having a breadth greater than 0.25B, which are within the length of ship L.
		Side projected area, in m ² , of the hull, superstructures, houses and funnels above the summer load
		waterline which are within the equipment length of the ship and also have a breadth greater than 0.25B.
		The side projected area of the funnel is considered in A when A_{FS} is greater than 0. In this case, the side projected area of the funnel should be calculated between the upper deck, or notional deck line
		where there is local discontinuity in the upper deck, and the effective height $h_{\rm F}$.

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Fig. II 25-1 Effective Height



Front Projected Area of Funnel

Notes:

- (a1) When calculating In calculation of H h, sheer, camber and trim may are to be neglected. i.e. h is the sum of freeboard amidships plus the height (at centerline) of each tier of houses having a breadth greater than 0.25B.
- (2) Where If a deckhouse having a breadth greater than 0.25B is located above a deckhouse with a breadth of 0.25B or less, then the wide deckhouse is to be included, but the narrow deckhouse ignored.
- (b3) Screens and or bulwarks more than 1.5 m or more in height are to be regarded as parts of superstructure or deckhouse when calculating H h and A. Where a screen or bulwark is of varying height, the portion exceeding 1.5 m in height is to be included. The height of the hatch coamings and that of any deck cargo, such as containers, may be disregarded when determining h and A. With regard to determining A, when a bulwark is

more than 1.5 m high, the area shown in Fig. II 25-3 as A₂ is to be included in A.



Fig. II 25-3 Effective Areas for Screens, Bulwarks, etc.

- (4) The equipment length of the ship is the length between perpendiculars but is not to be less than 96% nor greater than 97% of the extreme length on the summer load waterline (measured from the forward end of the waterline).
- (5) When several funnels are fitted on the ship, the above parameters are taken as follows:
 - $h_F = Effective height of the funnel, in m, measured from the upper deck, or notional deck line where there is local discontinuity in the upper deck, and the top of the highest funnel. The top of the highest funnel may be taken at the level where the sum of each funnel breadth reaches 0.25B.$
 - $A_{FS} =$ Sum of the front projected area of each funnel, in m², calculated between the upper deck, or notional deck line where there is local discontinuity in the upper deck, and the effective height h_F . A_{FS} is to be taken equal to 0 if the sum of each funnel breadth is less than or equal to 0.25B at all elevations along the funnels height.
 - A = Side projected area, in m^2 , of the hull, superstructures, houses and funnels above the summer load waterline which are within the equipment length of the ship. The total side projected area of the funnels is to be considered in the side projected area of the ship, A, when A_{FS} is greater than 0. The shielding effect of funnels in transverse direction may be considered in the total side projected area, i.e., when the side projected areas of two or more funnels fully or partially overlap, the overlapped area needs only to be counted once.

25.2.2 Equipment for tugs

For tugs, the term 2hBH specified in 25.2.1 for calculating "Equipment Number", EN, is to be substituted by the following formula:

 $2 (a B + \sum h_i b_i)$

Where:

- a = As specified 25.2.1 of this Chapter.
- B = As specified 25.2.1 of this Chapter.
- $h_i = As$ specified 25.2.1 of this Chapter.
- $b_i =$ The breadth, in m, of the widest superstructure or deckhouse of each tier having a breadth greater than 0.25B.

25.8 Towing and Mooring Fittings

Paragraph 25.8.2(b) has been amended as follows:

25.8.2 Towing Fittings

(b) Design Load

Design load, see Fig. II 25- $\frac{14}{14}$, for towing fittings and their supporting structures are to be as specified in (i) to (vi) below:

(i) For normal towing operations (e.g. harbour / manoeuvring), the design load on the line (see Fig. II 25-14) is to be 1.25 times the intended maximum towing load.

Fig. II 25-4 has been renumbered as follows:



Paragraph 25.8.3(b) has been amended as follows:

- 25.8.3 Mooring Fittings
 - (b) Design Load

Design load, see Fig. II 25- $\frac{14}{4}$, for mooring fittings and their supporting structures are to be as specified in (i) to (vii) below:

- (i) The design load on the line (see Fig. II 25-44) is to be 1.25 times the breaking strength of the mooring line specified in Table II 25-1 according to the equipment number determined in 25.2.
- (iv) The design load on fittings is to take into account the total design load on the line specified in (i) (see Fig. II 25-14), but need not exceed twice the design load on the line.

- 15 -[PART III]

AMENDMENT TO "THE RULES FOR THE CONSTRUCTION AND CLASSIFICATION OF COAST GUARD SHIPS 2022"

PART III HULL CONSTRUCTION AND EQUIPMENT FOR HIGH-SPEED CRAFT

- 16 -[**PART III]**

List of major changes in Part III from 2022 edition

5.1.3(a)(iii)	Revised
5.1.3(a)(iv)	New
Fig. III 5-2	New

Rules for the Construction and Classification of Coast Guard Ships 2022 have been partly amended as follows:

Chapter 5 Equipment

Paragraph 5.1.3(a)(iii) & (iv) have been amended as follows:

5.1	Equipment	

5.1.3 Equipment number

- (a) General
 - (i) The equipment is in general to be in accordance with the requirements given in Table III 5-1, and may be reduced as per Table III 5-2 in accordance with the ship's Service Restriction Notation.
 - (ii) When two bow anchors are fitted, the mass of each anchor, the diameter and the length of each chain cable are to comply with the requirements given in Table III 5-1.
 - (iii) The equipment number EN for monohull craft is to be calculated as follows:

$$\underline{\text{EN}} = \underline{\Delta^2} + 2BH + 0.1A$$

$$EN = \Delta^{\frac{2}{3}} + 2 \cdot \left[\mathbf{a} \cdot \mathbf{B} + \sum_{i} (\mathbf{b}_{i} \cdot \mathbf{h}_{i} \cdot \sin \theta_{i}) \right] + 0.1A$$

where

nere			
Δ	=	the maximum displacement	t
H	-	effective height from the summer load waterline to the top of the uppermost	
		deckhouse, to be measured as follows:	Ħ
		$H = a + \sum h_t \sin \theta_t$	
a	=	the distance from summer load water line amidships to the upper deck at side	m
bi	-	breadth in m of each tier of superstructure and deckhouses having an actural	
		breadth of 0.25B	
hi	=	the height on the centerline of each tier of deck houses having an actual breadth	
		greater than $\frac{B/4}{0.25B}$, where B is the breadth as defined in 1.1.4 of this Part	m
θ_i	=	the angle of inclination aft of each front bulkhead as shown on Fig. III 5-1	
A	=	the area in profile view of the hull superstructures and deck houses above the	
		summer load waterline which is within the rule length of the craft defined in	
		1.1.2 of this Part and with a breadth greater than $\frac{B/4}{0.25B}$.	m^2

In the measurement of Σh_i and A, sheer and trim are to be ignored.

If a deck house broader than $\frac{B}{40.25B}$ is placed on top of another deck house equal to or less than $\frac{B}{40.25B}$ in breadth, only the widest is to be considered and the narrowest may be ignored.

Windscreens or bulwarks and hatch coamings more than 1.5 m in height above the deck at side are to be regarded as parts of superstructures and houses when determining H and A.

In the calculation of A, when a bulwark is more than 1.5 m in height, the crosshatched area of Fig. III 5-1 is to be considered.

For catamarans, the cross-sectional area of the tunnel above the waterline may be deducted from BH in the formula.

(iv) The equipment number for multi-hull craft is to be calculated as follows:

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$$EN = K_{m}\Delta^{\frac{2}{3}} + 2 \cdot \left[a \cdot B + \sum_{i} (b_{i} \cdot h_{i} \cdot \sin \theta_{i}) - S_{t}\right] + 0.1A$$

where

for craft with N identical hulls: $K_m = N^{\frac{1}{3}}$

i.e.:

for catamarans: $K_m = 1.26$ for trimarans: $K_m = 1.44$

for quadrimarans: $K_m = 1.59$

for craft with one mid hull and $2 \cdot n$ non-identical lateral hulls (N = $2 \cdot n + 1$): (N odd)

$$K_{m} = \frac{(B_{0} \cdot T_{0})^{\frac{2}{3}} + 2 \cdot \sum_{i=1}^{n} (B_{i} \cdot T_{i})^{\frac{2}{3}}}{(B_{0} \cdot T_{0} + 2\sum_{i=1}^{n} B_{i} \cdot T_{i})}$$

for craft with non-identical hulls, but of an even number $(N = 2 \cdot n)$: (N even)

$$K_{m} = 2^{\frac{1}{3}} \cdot \frac{\sum_{i=1}^{n} (B_{i} \cdot T_{i})^{\frac{2}{3}}}{(\sum_{i=1}^{n} B_{i} \cdot T_{i})^{\frac{2}{3}}}$$

St	=	transverse area, amidships, of the tunnel(s) existing between the hulls and the	m^2
		waterline	_
B_0, T_0	-	breadth and draught of the mid full hull (if any), measured amidship	m
		(see Fig. III 5-2)	
B _i , T _i	_	breadth and draught of the lateral hulls, measured amidship (see Fig. III 5-2)	m
Ν	-	total number of craft hulls	
n	_	number of lateral hulls on one side of the longitudinal symmetry plane of the	
		craft	
Δ	_	total displacement of the craft	t
Other s	with the second	re defined in 5.1.3(a)(iii)	-





Fig. III 5-2 has been added as follows:



In the example N = 3 and n = 1. In cases where N is even : $B_0 = T_0 = 0$

Fig. III 5-2 Multihull with Tunnel Area

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AMENDMENT TO "THE RULES FOR THE CONSTRUCTION AND CLASSIFICATION OF COAST GUARD SHIPS 2022"

PART IV MACHINERY AND SYSTEMS

- 22 -[PART IV]

List of major changes in Part IV from 2022 edition

2.1.3(e)(iii)	Revised
2.4.1(e)(i)	Revised
2.4.8	Revised
2.4.9(b)(iv)	Revised
4.1.1(a) & (e)	Revised
4.2.5(g)(i)	Revised
4.2.5(k)(iv)	Revised
4.11.2(a)(iv)	Revised
4.11.2(d)(iii)	Revised
4.11.3	Deleted
4.11.4(e)	Renumbered and Revised
4.11.4(f)(vi)	Renumbered and Revised
4.11.4(g),(h),(k)	Renumbered and Revised
4.11.5	Renumbered and Revised
4.11.6	Renumbered
4.11.7	Renumbered and Revised
4.18.1	Revised

Rules for the Construction and Classification of Coast Guard Ships 2022 have been partly amended as follows:

Chapter 2 Machinery Installations, Boilers and Pressure Vessels

2.1 Diesel Engines Including Couplings and Reduction Gears

Paragraph 2.1.3(e)(iii) has been amended as follows:

- 2.1.3 Starting arrangements
 - (e) Electrical starting
 - (iii) Other requirements

The starting batteries (or set of batteries) are to be used for starting and for engine's own control and monitoring purpose only. When the starting batteries are used for engine's own control and monitoring purpose, the aggregate capacity of the batteries is to be sufficient for continued operation of such system in addition to the required number of starting capacity. Provisions are to be made to continuously maintain the stored energy at all times. See also 4.6 and 4.11.74.11.6 of this Part.

2.4 Steering Gear

Paragraph 2.4.1(e)(i) has been amended as follows:

2.4.1 General

(e) Auxiliary steering gear

The auxiliary steering gear is to be capable of putting the rudder from 15° on one side to 15° on the other side in not more than 60 seconds with the craft running ahead at half speed, or 7 knots, whichever is greater.

Regarding the propulsion and steering systems other than traditional arrangements for a vessel's directional control, the auxiliary steering arrangements are to be capable of changing direction of the vessel's directional control system from one side to the other at declared steering angle limits at an average rotational speed of not less than 0.5°/s with the vessel running ahead at one half of the maximum ahead service speed or 7 knots, whichever is the greater.

The auxiliary steering gear is to be so arranged that the failure of the main steering gear will not render it inoperative. Likewise, failure of the auxiliary steering gear is not to affect the main steering gear.

An auxiliary steering gear is not required under the following conditions.

- (i) When the main steering gear comprises two or more power units, and is so arranged that after a single failure in its piping system or in one of the power units, the defect can be isolated so that the steering capability can be maintained or regained; and provided that the main steering gear is to be capable of operating the rudder, as required by 2.4.1(d), while all the power units are in operation.
 - (1) For passenger craft, the main steering gear is capable of operating the rudder, as required in 2.4.1(d), while any one of the power units is out of operation; and
 - (2) For cargo craft, the main steering gear is to be capable of operating the rudder, as required by 2.4.1(d), while all the power units are in operation.

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Paragraph 2.4.8 has been amended as follows:

2.4.8 Electrical power supply

Electrical power circuits are to meet the requirements of 4.2.3 and 4.11.44.11.3 (f)(v) of this Part.

Paragraph 2.4.9(b)(iv) has been amended as follows:

2.4.9 Testing and trials

(b) Trials

The steering gear is to be tried out on the trial trip in order to demonstrate to the Surveyor's satisfaction that the requirements of the Rules have been met. The trial is to include the operation of the following:

(iv) The emergency power supply required by 4.11.44.11.3(f)(v) of Part IV of the Rules.

Chapter 4 Electrical Installation

Paragraph 4.1.1(a) & (e) have been amended as follows:

4.1 General

- 4.1.1 General
 - (a) The requirements of the present Part are applicable to the electrical installation intended for craft without special service limitations or restrictions. The Society may, however, modify the requirements in certain particular cases for their application to small craft, fishing vessels and craft with service limitations or restrictions.
 - (e) Passenger eraft The craft intended for classification are to be constructed in accordance with the requirements of the Society as well as those of Governmental and International Convention Regulations.

Paragraph 4.2.5(g)(i) & (k)(iv) have been amended as follows:

4.2 System Design of Distribution and Circuit Protection

- 4.2.5 Internal Communication
 - (g) A general emergency alarm system complying with the requirement of following is to be provided to summon passenger and crew to muster stations and initiate the actions included in the muster list. The system is to be supplemented by either a public address system in accordance with 4.2.5 (k) or other suitable means of communication. Any entertainment sound system is to be automatically turned off when the general emergency alarm is activated.
 - (i) The general emergency alarm system is to be capable of sounding the general emergency alarm signal consisting of seven or more short blasts followed by one long blast on the craft's whistle or siren and additionally on an electrically operated bell or klaxon or other equivalent warning system, which is to be powered from the craft's main supply and the emergency source of electrical power required by 4.11.3-or 4.11.4. The supply is to be provided by separate feeders reserved soley for that purpose. The system is to be capable of operation from the navigation bridge and, except for the craft's whistle, also from other strategic points. The system is to be audible throughout all the accommodation and normal crew working spaces. The alarm is to continue to function after it has been triggered until it is manually turned off or is temporarily interrupted by a message on the public address system.
 - (k) A public address system is to be provided to supplement the general emergency alarm required by 4.2.5 (g), unless other suitable means of communication is provided. The public address system is to comply with the following:
 - (iv) Where a single system for both public address and general emergency alarm functions, the system is to be arranged so that single failure is not to cause the loss of both systems and is to minimize the effect of a single failure. The major system components, such as power supply unit, amplifier, alarm tone generator, etc., are to be duplicated. Power supply is to comply with 4.2.5 (g)(i).
 For eargo craft, tThe coverage provided by the arrangement of the system loops and speakers is to be such that after a single failure, the announcements and alarms are still audible in all spaces. Duplication of system loops and speakers in each room or space is not required provided the announcements and alarms are still audible in all spaces.

For passenger craft, a single system serving for both public address and general emergency alarm functions would still be required to have at least two loops sufficiently separated throughout their length with two separate and independent amplifiers.

4.11 Main Source and Emergency Source of Electrical Power

Paragraph 4.11.2(a)(iv) & (d)(iii) have been amended as follows:

- 4.11.2 Main Source of Electrical Power and Lighting Systems
 - (a) Main source of electrical power
 - (iv) The generating sets are to be such as to ensure that with any one generator or its primary source of power out of operation, the remaining generating sets are to be capable of providing the electrical services necessary to start the main propulsion plant from a dead craft condition. The emergency source of electrical power may be used for the purpose of starting from a dead craft condition if its capability either alone or combined with that of any other source of electrical power is sufficient to provide at the same time those services required to be supplied by the requirements in $\frac{4.11.3(f)(i)(1)}{10}$ to $\frac{(3)}{10}, \frac{4.11.3(f)(i)(1)}{10}$ to $\frac{(4)}{10}$ or $\frac{4.11.4}{10}$ (f)(i) to (iv).
 - (d) Lighting systems
 - (i) A main electric lighting system supplied from the main source of electrical power is to be provided in spaces or compartments where crew and personnel use and normally work on duty.
 - (ii) The main electric lighting system is to be so arranged as not to be impaired in the event of a fire or other casualty in spaces containing the emergency source of electrical power, associated transforming equipment, the emergency switchboard and the emergency lighting switchboard.
 - (iii) Emergency lighting is to provide sufficient illumination necessary for the safety as the requirements in 4.11.3 (f) (i) (1), 4.11.3 (f) (ii) (1), or 4.11.4 4.11.3 (f) (i).
 - (iv) The emergency electric lighting system is to be so arranged as not to be impaired in the event of a fire or other casualty in spaces containing the main source of electrical power, associated transforming equipment, the main switchboard and the main lighting switchboard.

Paragraph 4.11.3 has been deleted as follows:

4.11.3 Emergency Source of Electrical Power in Passenger Craft

(a) A self-contained emergency source of electrical power is to be provided.

(b) The emergency sources of electrical power, associated transforming equipment, if any, transitional source of emergency power, emergency switchboard and emergency lighting switchboard are to be located above the uppermost continuous deck and are to be readily accessible from the open deck. They are not to be located forward of the collision bulkhead.

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- (c) The location of the emergency source of electrical power and associated transforming equipment, if any, the transitional source of emergency power, the emergency switchboard and the emergency electric lighting switchboards in relation to the main source of electrical power, associated transforming equipment, if any, and the main switchboard are to be such as to ensure to the satisfaction of the Society that a fire or other casualty in spaces containing the main source of electrical power, associated transforming equipment, if any, and the main switchboard or in any machinery space of category A is not to interfere with the supply, control and distribution of emergency electrical power. As far as practicable, the spaces containing the emergency source of electrical power and the transitional source of emergency switchboard are not to be contiguous to the boundaries of machinery spaces of category A or those spaces containing the main source of electrical power, associated transforming equipment, if any, spaces of category A or the main switchboard. Where this is not practicable, the contiguous boundaries are to be Class A60.
- (d) Provided that suitable measures are taken for safeguarding independent emergency operation under all circumstances, the emergency generator may be used exceptionally, and for short periods, to supply non-emergency circuits.

(c) Alternative to Emergency Source of Power

Where the main source of electrical power is located in two or more compartments which are not contiguous, each of which has its own self contained systems, including power distribution and control systems, completely independent of each other and such that a fire or other casualty in any one of the spaces will not affect the power distribution from the others, or to the services required by 4.11.3(f)(i) or 4.11.3(f)(ii), the requirements of 4.11.3(a), 4.11.3(b) and 4.11.3(d) may be considered satisfied without an additional emergency source of electrical power, provided that:

- (i) There is at least one generating set, meeting the requirements of 4.11.3(n) and of sufficient capacity to meet the requirements of 4.11.3(f)(i) or 4.11.3(f)(ii) in each of at least two noncontiguous spaces;
- (ii) The arrangements required by 4.11.3(e) in each such space are equivalent to those required by 4.11.3(g)(i), 4.11.3(i), (j), (k), (l), (m), and 4.11.5 so that a source of electrical power is available at all times to the services required by 4.11.3(f)(i) or 4.11.3(f)(ii); and
- (iii) The generator sets referred to in 4.11.3(e)(i) and their self-contained systems are installed such that one of them remains operable after damage or flooding in any one compartment
- (f) The electrical power available is to be sufficient to supply all those services that are essential for safety in an emergency, due regard being paid to such services as may have to be operated simultaneously. The emergency source of electrical power is to be capable, having regard to starting currents and the transitory nature of certain loads, of supplying simultaneously at least the following services for the periods specified hereinafter, if they depend upon an electrical source for their operation:
 - (i) Category A Craft
 - (1) For a period of 5 hours, emergency lighting:
 - a) At the stowage positions of life-saving appliances;
 - b) At all escape routes such as alleyways, stairways, exits from accommodation and service spaces, embarkation points, etc;
 - e) In the public spaces;
 - In the machinery spaces and main emergency generating spaces, including their control positions;
 - c) In control stations;
 - f) At the stowage positions for fireman's outfits; and
 - g) At the steering gear.
 - (2) For a period of 5 hours
 - a) Main navigation lights, except for "not under command" lights;

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- b) Electrical internal communication equipment for announcements for passengers and crew required during evacuation;
- e) Fire detection and general alarm system and manual fire alarms; and
- d) Remote control devices of fire extinguishing systems, if electrical.
- (3) For a period of 4 hours of intermittent operation:
 - a) The daylight signaling lamps, if they have no independent supply from their own accumulator battery; and
 - b) The craft's whistle, if electrically driven; spaces, embarkation points, etc.
- (4) For a period of 5 hours:
 - a) Craft radio facilities and other loads as set out in 14.13.2 of the IMO's International Code of Safety for High speed Craft; and
 - b) Emergency control monitoring systems-
- (5) For a period of 10 hours:
 - a) The "not under command" lights.
- (6) For a period of 10 minutes continuous operations:

Steering gear to comply with 4.2.3(j) if powered from the emergency

(ii) Category B Craft

The electrical power available is to be sufficient to supply all those services that are essential for safety in an emergency, due regard being paid to such services as may have to be operated simultaneously. The emergency source of electrical power is to be capable, having regard to starting currents and the transitory nature of certain loads, of supplying simultaneously at least the following services for the periods specified hereinafter, if they depend upon an electrical source for their operation:

- (1) For a period of 12 hours, emergency lighting:
 - a) At the stowage positions of life-saving appliances;
 - b) At all escape routes such as alleyways, stairways, exits from accommodation and servicespaces, embarkation points, etc;
 - c) In the passenger compartments;
 - d) In the machinery spaces and main emergency generating spaces, including their control positions;
 - e) In control stations;
 - f) At the stowage positions for fireman's outfits; and
 - g) At the steering gear.
- (2) For a period of 12 hours
 - a) The navigation lights and other lights required by the International Regulations for Preventing Collisions at Sea in force;
 - b) Electrical internal communication equipment for announcements for passengers and crew required during evacuation;
 - e) Fire-detection and general alarm system and manual fire alarms; and
 - d) Remote control devices of fire-extinguishing systems, if electrical.
- (3) For a period of 4 hours of intermittent operation:
 - a) The daylight signaling lamps, if they have no independent supply from their own accumulator battery; and
 - b) The craft's whistle, if electrically driven; spaces, embarkation points, etc.
- (4) For a period of 12 hours:
 - a) The navigational equipment as required by Chapter 13 of the IMO's International Code of Safety for High-speed Craft. Where such provision is unreasonable or impracticable, the Administration may waive this requirement for craft of less than 5,000 GT;
 - b) Essential electrically powered instruments and controls for propulsion machinery, if alternate sources of power are not available for such devices;
 - e) One of the fire pumps required by Governmental Regulations;

- d) The sprinkler pump and drencher pump, if fitted;
- The emergency bilge pump and all the equipment essential for the operation of electrically powered remote controlled bilge valves; and
- f) Craft radio facilities and other loads as set out in 14.13.2 of the IMO's International Code of Safety for High speed Craft.
- (5) For a period of 30 minutes:
 - a) Any watertight doors to be power operated, together with their indicators and warning signals.
- (6) For a period of 10 min continuous operations:

a) Steering gear to comply with 4.2.3(i) if powered from the emergency.

(g) The emergency source of electrical power may be either a generator or an accumulator battery, which is to comply with the following:

i) Where the emergency source of electrical power is a generator, it is to be:

- (1) driven by a suitable prime mover with an independent supply of fuel having a flashpoint (closed cup test) of not less than 43°C;
- (2) started automatically upon failure of the electrical supply from the main source of electrical power and is to be automatically connected to the emergency switchboard; those services referred to 4.11.3(h) of this Part are then to be transferred automatically to the emergency generating set. The automatic starting system and the characteristic of the prime mover are to be such as to permit the emergency generator to carry its full rated load as quickly as is safe and practicable, subject to a maximum of 45 seconds; and
- (3) provided with transitional source of emergency electrical power according to 4.11.3(h) of this Part.
- (ii) Where the emergency source of electrical power is an accumulator battery, it is to be eable of:
 - (1) carrying the emergency electrical load without recharging while maintaining the voltage of the battery throughout the discharge period within 12% above or below its nominal voltage;
 - (2) automatically connecting to the emergency switchboard in the event of failure of the main source of electrical power; and
 - (3) immediately supplying at least those services specified in 4.11.3(h) of this Part.
- (iii) Where electrical power is necessary to restore propulsion, the capacity is to be sufficient to restore propulsion to the craft in conjunction with other machinery, as appropriate, from a dead craft condition within 30 minutes after blackout.

(h) The transitional source of emergency electrical power required by 4.11.3(g)(i)(3) above is to consist of an accumulator battery suitable located for use in an emergency which is to operate without recharging while maintaining the voltage of the battery throughout the discharge period within 12% above or below its nominal voltage and be of sufficient capacity and so arranged as to supply automatically in the event of failure of either the main or emergency source of electrical power at least the following services, if they depend upon an electrical source for their operation:

- (i) For a period of 30 min, the load specified in 4.11.3(f)(i)(1) through 4.11.3(f)(i)(3) or in 4.11.3(f)(ii)(1) through 4.11.3(f)(ii)(3)
- (ii) With respect to the watertight doors:
 - (1) Power to operate the watertight doors, but not necessarily simultaneously, unless an independent temporary source of stored energy is provided. The power source should have sufficient capacity to operate each door at least three times (i.e., closed - open - closed) against an adverse list of 15°; and
 - (2) Power to the control, indication and alarm circuits for the watertight doors for half an hour.

The above requirements may be considered satisfied without the installation of a transitional source of emergency electrical power if each of the services required by that paragraph has independent supplies, for the period specified, from accumulator batteries suitably located for use in an emergency. The supply of

emergency power to the instruments and controls of the propulsion and direction systems should be uninterruptible.

- (i) The emergency switchboard is to be installed as near as is practicable to the emergency source of electrical power.
- (j) Where the emergency source of electrical power is a generator, the emergency switchboard is to be located in the same space unless the operation of the emergency switchboard would thereby be impaired.
- (k) No accumulator battery fitted in accordance with this Regulation is to be installed in the same space as the emergency switchboard. An indicator is to be mounted in a suitable place on the main switchboard or in the machinery control room to indicate when the batteries constituting either the emergency source of electrical power or the transitional source of emergency electrical power referred to in 4.11.3(g)(i)(3) or 4.11.3(h) above are being discharged.
- (l) The emergency switchboard is to be supplied during normal operation from the main switchboard by an interconnector feeder which is to be adequately protected at the main switchboard against overload and short circuit and which is to be disconnected automatically at the emergency switchboard upon failure of the main source of electrical power. Where the system is arranged for feedback operation, the interconnector feeder is also to be protected at the emergency switchboard at least against short circuit.
- (m) In order to ensure ready availability of the emergency source of electrical power, arrangements are to be made where necessary to disconnect automatically non-emergency circuits from the emergency switchboard to ensure that power is to be available to the emergency circuits.
- (n) The emergency generator and its prime-mover and any emergency accumulator battery are to be so designed and arranged as to ensure that they are to function at full rated power when the craft is upright and when inclined at any angle of list up to 22.5° or when inclined up to 10° either in the fore or aft direction, or is in any combination of angles within those limits.
- (o) Provision is to be made for the periodic testing of the complete emergency system and is to include the testing of automatic starting arrangements.
- (p) In addition to the emergency lighting required by 4.11.3(f)(i)(1) or 4.11.3(f)(ii)(1), on every passenger craft with ro-ro-cargo spaces:
 - (i) All passenger public spaces* and alleyways are to be provided with supplementary electric lighting that can operate for at least 3 hours when all other sources of electric power have failed and under any condition of heel. The illumination provided is to be such that the approach to the means of escape can be ready seen. The source of power for the supplementary lighting is to be 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 are at least as effective may be accepted by the Society. The supplementary lighting is to be such that any failure of the lamp will be immediately apparent. Any accumulator battery provided is to be replaced at intervals having regard to the specified service life in the ambient conditions that they are subject to in service; and
 - (ii) a portable rechargeable battery operated lamp is to be provided in every crew space alleyway, recreational space and every working space which is normally occupied unless supplementary emergency lighting, as required by 4.11.3(f)(i)(1) / 4.11.3(f)(ii)(1), is provided.

<u>* In category A craft having limited public spaces, emergency lighting fittings of the type described</u> in 4.11.3(p)(i) as meeting the requirements of 4.11.3(f)(i)(1) and 4.11.3(h)(i) of this Chapter may be accepted, provided that an adequate standard of safety is attained. (q) Distribution systems are to be so arranged that fire in any main vertical zone 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 widely as is practicable.

Paragraph 4.11.4(e),(f)(vi),(g),(h),(k) have been renumbered and amended as follows:

4.11.44.11.3 Emergency Source of Electrical Power in Cargo Craft

- (a) For a cargo craft having a gross tonnage 500 and upward for unrestricted ocean service, there is to be a selfcontained emergency source of electric power.
- (b) The emergency sources of electrical power, associated transforming equipment, if any, transitional source of emergency power, emergency switchboard and emergency lighting switchboard are to be located above the uppermost continuous deck and are to be readily accessible from the open deck. They are not to be located forward of the collision bulkhead, except where permitted by the Society in exceptional circumstances.
- (c) The locations of the emergency source of electrical power, associated transforming equipment, if any, the transitional source of emergency power, the emergency switchboard and the emergency lighting switchboard in relation to the main source of electrical power, associated transforming equipment, if any, and the main switchboard are to be such as to ensure to the satisfaction of the Society that a fire or other casualty in the space containing the main source of electrical power, associated transforming equipment, if any, and the main switchboard, or in any machinery space of category A will not interfere with the supply, control and distribution of emergency electrical power. As far as practicable the spaces containing the emergency source of electrical power and the emergency switch-board are not to be contiguous to the boundaries of machinery spaces of category A or those spaces containing the main source of electrical power, associated transforming equipment, if any, and the main source of electrical power, associated transforming equipment, if any, the transitional source of machinery spaces of category A or those spaces containing the main source of electrical power, associated transforming equipment, if any, and the main switchboard. Where this is not practicable, the contiguous boundaries are to be Class A60.
- (d) Provided that suitable measures are taken for safeguarding independent emergency operation under all circumstances, the emergency generator may be used, exceptionally, and for short periods, to supply non-emergency circuits.
- (e) Alternative to Emergency Source of Power

Where the main source of electrical power is located in two or more compartments which are not contiguous, each of which has its own self-contained systems, including power distribution and control systems, completely independent of each other and such that a fire or other casualty in any one of the spaces will not affect the power distribution from the others, or to the services required by 4.11.4 4.11.3 (f), the requirements of 4.11.4 4.11.3 (a), 4.11.4 4.11.3 (b) and 4.11.4 4.11.3 (d) may be considered satisfied without an additional emergency source of electrical power, provided that:

- (i) There is at least one generating set, meeting the requirements of 4.11.44.11.3(n) and each of sufficient capacity to meet the requirements of 4.11.44.11.3(f), in each of at least two non-contiguous spaces;
- (ii) The arrangements required by 4.11.44.11.3(e)(i) above in each such space are equivalent to those required by 4.11.44.11.3(g)(i), 4.11.44.11.3(i), (j), (k), (l), (m), and 4.11.54.11.4 so that a source of electrical power is available at all times to the services required by 4.11.44.11.3, and
- (iii) The generator sets referred to in 4.11.44.11.3(e)(i) and their self-contained systems are installed in accordance with 4.11.44.11.3 (b).

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- (f) The electrical power available is to be sufficient to supply all those services that are essential for safety in an emergency, due regard being paid to such services as may have to be operated simultaneously. The emergency source of electrical power is to be capable, having regard to starting currents and the transitory nature of certain loads, of supplying simultaneously at least the following services for the periods specified hereinafter, if they depend upon an electrical source for their operation:
 - (i) For a Period of 12 Hours, Emergency Lighting:
 - (1) At the stowage positions of life-saving appliances;
 - (2) At all escape routes such as alleyways, stairways, exits from accommodation and service spaces, embarkation points, etc.;
 - (3) In the public spaces, if any;
 - (4) In the machinery spaces and main emergency generating spaces, including their control positions;
 - (5) In control stations;
 - (6) At the stowage positions for fireman's outfits, and
 - (7) At the steering gear.
 - (ii) For a Period of 12 Hours:
 - (1) The navigation lights and other lights required by the International Regulation for Preventing Collisions at Sea in force;
 - (2) Electrical internal communication equipment for announcements during evacuation;
 - (3) Fire-detection and general alarm system and manual fire alarms, and
 - (4) Remote control devices of fire-extinguishing systems, if electrical.
 - (5) The navigational equipment as required by Chapter 13 of the IMO International Code of Safety for High-Speed Craft. Where such provision is unreasonable or impracticable, the Administration may waive this requirement for craft of less than 5,000 GT.
 - (iii) For a Period of 4 Hours of Intermittent Operation:
 - (1) The daylight signaling lamps, if they have no independent supply from their own accumulator battery, and
 - (2) The craft's whistle, if electrically driven.
 - (iv) For a Period of 12 Hours:
 - (1) Navigational equipment;
 - (2) Essential electrically powered instruments and controls for propulsion machinery, if alternate sources of power are not available for such device;
 - (3) One of fire pumps required by 6.2.3(b) of this Part if dependent upon the emergency generator for its source of power;
 - (4) The sprinkler pump and drencher pump, if fitted;
 - (5) The emergency bilge pump and all the equipment essential for the operation of electrically powered remote controlled bilge valves; and
 - (6) Craft radio facilities and other loads as set out in 14.13.2 of the IMO International Code of Safety for High-Speed Craft.
 - (v) For a Period of 10 Minutes:

Power drives for directional controls devices including those required to direct thrust forward and astern.

- (vi) Craft on Short Duration Voyages
 In a craft engaged regularly in voyages of short duration where an adequate standard of safety is attained, a lesser period than the 12 hour period specified in 4.11.44.11.3(f)(i), 4.11.44.11.3(f)(ii), and 4.11.44.11.3(f)(iv)(3) but not less than 5 hours may be accepted.
- (g) The emergency source of electrical power may be either a generator or an accumulator battery, which is to comply with the following:
 - (i) Where the emergency source of electrical power is a generator, it is to be:

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- (2) started automatically upon failure of the main source of electrical power supply unless a transitional source of emergency electrical power in accordance with 4.11.44.11.3(g)(i)(3) of this Part is provided; where the emergency generator is automatically started, it is to be automatically connected to the emergency switchboard; those services referred to in 4.11.44.11.3(h) of this Part are then to be connected automatically to the emergency generator; and
- (3) provided with a transitional source of emergency electrical power as specified in 4.11.4 4.11.3(h) of this Part unless an emergency generator is provided capable both of supplying the services mentioned in 4.11.4 4.11.3(h) of this Part and of being automatically started and supplying the required load as quickly as is safe and practicable subject to a maximum of 45 seconds.
- (ii) Where the emergency source of electrical power is an accumulator battery it is to be capable of:
 - (1) carrying the emergency electrical load without recharging while maintaining the voltage of the battery throughout the discharge period within 12% above or below its nominal voltage;
 - (2) automatically connecting to the emergency switchboard in the event of failure of the main source of electrical power; and
 - (3) immediately supplying at least those services specified in $\frac{4.11.4}{4.11.3}$ (h) of this Part.
- (iii) Where electrical power is necessary to restore propulsion, the capacity is to be sufficient to restore propulsion to the craft in conjunction with other machinery, as appropriate, from a dead craft condition within 30 minutes after blackout.
- (h) The transitional source of emergency electrical power where required by 4.11.44.11.3(g)(i)(3) above is to consist of an accumulator battery suitably located for use in an emergency which is to operate without recharging while maintaining the voltage of the battery throughout the discharge period within 12% above or below its nominal voltage and be of sufficient capacity and is to be so arranged as to supply automatically in the event of failure of either the main or the emergency source of electrical power for half an hour at least the following services if they depend upon an electrical source for their operation:
 - (i) For a Period of 30 Minutes:

The loads specified in $\frac{4.11.4}{4.11.3}(f)(i)$, $\frac{4.11.4}{4.11.3}(f)(ii)$, and $\frac{4.11.4}{4.11.3}(f)(iii)$ and

- (ii) With Respect to the Watertight Doors:
 - (1) Power to operate the watertight doors, but not necessarily simultaneously, unless an independent temporary source of stored energy is provided. The power source should have sufficient capacity to operate each door at least three times (i.e., closed-open-closed) against an adverse list of 15°, and
 - (2) Power to the control, indication and alarm circuits for the watertight doors for half an hour. For the transitional phase of loads as per <u>4.11.44.11.3(h)(i)</u> above, such loads may not be connected to the transitional source of power provided that:
 - a) The services are fitted with an independent supply for the period specified from an accumulator battery suitably located for use in an emergency.
 - b) The emergency lighting, in respect of the machinery space and accommodation and service spaces are provided by permanently fixed, individual, automatically charged, relay operated accumulator lamps.
- (i) The emergency switchboard is to be installed as near as is practicable to the emergency source of electrical power.
- (j) Where the emergency source of electrical power is a generator, the emergency switchboard is to be located in the same space unless the operation of the emergency switchboard would thereby be impaired.
- (k) No accumulator battery fitted in accordance with this Regulation is to be installed in the same space as the emergency switchboard. An indicator is to be mounted in a suitable place on the main switchboard or in the machinery control room to indicate when the batteries constituting either the emergency source of electrical power or the transitional source of electrical power referred to 4.11.44.11.3(g)(ii) or 4.11.44.11.3(h) above are being discharged.

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- (1) The emergency switchboard is to be supplied during normal operation from the main switchboard by an interconnector feeder which is to be adequately protected at the main switchboard against overload and short circuit and which is to be disconnected automatically at the emergency switchboard upon failure of the main source of electrical power. Where the system is arranged for feedback operation, the interconnector feeder is also to be protected at the emergency switchboard at least against short circuit.
- (m) In order to ensure ready availability of the emergency source of electrical power, arrangements are to be made where necessary to disconnect automatically non-emergency circuits from the emergency switchboard to ensure that electrical power is to be available automatically to the emergency circuits.
- (n) The emergency generator and its prime-mover and any emergency accumulator battery are to be so designed and arranged as to ensure that they will function at full rated power when the craft is upright and when inclined at any angle of list up to 22.5° or when inclined up to 10° either in the fore or aft direction, or is in any combination of angles within those limits.
- (o) Provision is to be made for the periodic testing of the complete emergency system and is to include the testing of automatic starting arrangements.

Paragraph 4.11.5 has been renumbered and amended as follows:

4.11.54.11.4 Starting Arrangements for Emergency Generating Sets

- (a) Emergency generating sets are to be capable of being readily started in their cold condition at a temperature of 0°C. If this is impracticable, or if lower temperatures are likely to be encountered, provision acceptable to the Society is to be made for the maintenance of heating arrangements, to ensure ready starting of the generating sets.
- (b) Each emergency generating set arranged to be automatically started is to be equipped with starting devices approved by the Society with a stored energy capability of at least three consecutive starts. The source of stored energy is to be protected to preclude critical depletion by the automatic starting system, unless a second independent means of starting is provided. In addition, a second source of energy is to be provided for an additional 3 starts within 30 minutes unless manual starting can be demonstrated to be effective.
- (c) The stored energy is to be maintained at all times, as follows:
 - (i) electrical and hydraulic starting systems are to be maintained from the emergency switchboard;
 - (ii) compressed air starting systems may be maintained by the main or auxiliary compressed air receivers through a suitable non-return valve or by an emergency air compressor which, if electrically driven, is supplied from the emergency switchboard;
 - (iii) all of these starting, charging and energy storing devices are to be located in the emergency generator space; these devices are not to be used for any purpose other than the operation of the emergency generating set. This does not preclude the supply to the air receiver of the emergency generating set from the main or auxiliary compressed air system through the non-return valve fitted in the emergency generator space.
- (d) Where automatic starting is not required, manual starting is permissible, such as manual cranking, inertia starters, manually charged hydraulic accumulators, or power charge cartridges, where they can be demonstrated as being effective.
- (e) When manual starting is not practicable, the requirements of 4.11.54.11.4(b) and 4.11.54.11.4(c) above are to be complied with except that starting may be manually initiated.

Paragraph 4.11.6 has been renumbered as follows:

4.11.64.11.5Use of Emergency Generator in Port

- (a) To prevent the emergency generator or its prime mover from becoming overloaded when used in port, arrangements are to be provided to shed sufficient non-emergency loads to ensure its continued safe operations.
- (b) The prime mover is to be arranged with fuel oil filters and lubrication oil filters, monitoring equipment and protection devices as requested for the prime mover for main power generation and for unattended operation.
- (c) The fuel oil supply tank to the prime mover is to be provided with a low level alarm, arranged at a level ensuring sufficient fuel oil capacity for the emergency services for the period of time as required in 4.11.3 and 4.11.4.
- (d) The prime mover is to be designed and built for continuous operation and is to be subjected to a planned maintenance scheme ensuring that it is always available and capable of fulfilling its role in the event of an emergency at sea.
- (e) Fire detectors are to be installed in the location where the emergency generator set and emergency switchboard are installed.
- (f) Means are to be provided to readily change over to emergency operation.
- (g) Control, monitoring and supply circuits for the purpose of the use of the emergency generator in port are to be so arranged and protected that any electrical fault will not influence the operation of the main and emergency services. When necessary for safe operation, the emergency switchboard is to be fitted with switches to isolate the circuits.
- (h) Instructions are to be provided on board to ensure that, even when the vessel is underway, all control devices (e.g. valves, switches) are in a correct position for the independent emergency operation of the emergency generator set and emergency switchboard. These instructions are also to contain information on the required fuel oil tank level, position of harbour/sea mode switch, if fitted, ventilation openings, etc.

Paragraph 4.11.7 has been renumbered and amended as follows:

4.11.74.11.6Craft of less than 500 GT having electrical plants of 75 kW and above

(a) General

This requirement is intended for craft less than 500 GT having electrical plants of an aggregate capacity of 75 kW and above. The emergency source of electrical power is to be self-contained and readily available. 4.11.44.11.3(b), 4.11.44.11.3(c), 4.11.44.11.3(g) through 4.11.44.11.3(o) and 1.1 of Part V of CR Rules for High Speed Craft are also applicable. Where the source of electrical power is a battery, see 4.6 for the arrangement. For emergency lighting, a relay-controlled, battery-operated lantern is acceptable.

(b) Capacity

The emergency source of electrical power is to be capable of supplying simultaneously at least the following services for the period as specified herein:

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- (c) For a Period of 6 Hours, Emergency Lighting:
 - (i) At the stowage positions of life-saving appliances;
 - (ii) At all escape routes such as alleyways, stairways, exits from accommodation and service spaces, embarkation points, etc.;
 - (iii) In the public spaces, if any;
 - (iv) In the machinery spaces and main emergency generating spaces, including their control positions;
 - (v) In control stations;
 - (vi) At the stowage positions for fireman's outfits, and
 - (vii) At the steering gear.
- (d) For a Period of 6 Hours:
 - (i) The navigation lights and other lights required by the International Regulation for Preventing Collisions at Sea in force;
 - (ii) Craft radio facilities and other loads as set out in 14.13.2 of the IMO International Code of Safet y for High-Speed Craft.
 - (iii) Electrical internal communication equipment for announcements during evacuation.

Paragraph 4.18.1 has been amended as follows:

4.18 Electrical Plants of less than 75 kW

4.18.1 General



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