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Item 6 (c) of the provisional agenda

Standardization of technical and safety requirements in inland navigation

Recommendations on Harmonized Europe-Wide Technical Requirements for Inland Navigation Vessels (Resolution No. 61)

Note by the secretariat

I. Introduction

1. In accordance with the decisions of the fifty-third session of the Working Party on Inland Water Transport (SC.3) (ECE/TRANS/SC.3/183, para. 18) and the SC.3 Resolution No. 66 on Additions and amendments to resolution No. 24 on CEVNI: European Code for Inland Waterways, (ECE/TRANS/SC.3/115/Rev.3/Amend.1, paras. 90–91 and 111), the Working Party on the Standardization of Technical and Safety Requirements in Inland Navigation (SC.3/WP.3) at its thirty-sixth and thirty-seventh sessions, finalized the amendment proposals to chapters 1, 2, 15 and to the appendix of the annex to Resolution No. 61 (ECE/TRANS/SC.3/WP.3/72, para. 27 and ECE/TRANS/SC.3/WP.3/74, paras. 24, 27 and 30).

2. Reproduced below is a draft resolution on amendment of Resolution No. 61 for consideration and approval by the Working Party on Inland Water Transport. Detailed information on the proposed changes is published in the working documents for the thirty-fifth and the thirty-seventh sessions of SC.3/WP.3 (ECE/TRANS/SC.3/WP.3/2009/24, ECE/TRANS/SC.3/WP.3/2010/12, ECE/TRANS/SC.3/WP.3/2010/13 and ECE/TRANS/SC.3/WP.3/2010/17).

3. In considering the draft resolution, the Working Party may wish to discuss the recommendation of SC.3/WP.3 to consider bringing article 15–9.1 of Resolution No. 61 with article 1.08 of CEVNI (ECE/TRANS/SC.3/WP.3/74, para. 27). Resolution No. 61 prescribes additional lifejackets for children in quantity equal to 10 per cent of the total

number of passengers while CEVNI states that life-saving devices should correspond to the number of adults and children.

II. Additions and amendments to Resolution No. 61 on Recommendations on Harmonized Europe-Wide Technical Requirements for Inland Navigation Vessels

Resolution No. ...

(adopted on ... October 2010 by the Working Party on Inland Water Transport)

The Working Party on Inland Water Transport,

Considering Resolution No. 61 of the Working Party on Inland Water Transport on recommendations on Harmonized Europe-Wide Technical Requirements for Inland Navigation Vessels (ECE/TRANS/SC.3/172), as amended by its Resolutions Nos. 64 and 65 (ECE/TRANS/SC.3/172/Amend.1 and ECE/TRANS/SC.3/172/Amend.2),

Bearing in mind the report of the Working Party on the Standardization of Technical and Safety Requirements in Inland Navigation on its thirty-sixth and thirty-seventh sessions (ECE/TRANS/SC.3/WP.3/72, para. 27 and ECE/TRANS/SC.3/WP.3/74, paras. 24, 27 and 30),

Noting the desirability of further developing Resolution No. 61 with due regard to the latest amendments to the Directive 2006/87/EC of the European Union laying down technical requirements for inland waterway vessels,

Taking into account Resolution No. 66 on Additions and amendments to resolution No. 24 on CEVNI: European Code for Inland Waterways and, in particular, the decision to transfer annexes 4, 5 and 10 of the third revised edition of CEVNI to Resolution No. 61 (ECE/TRANS/SC.3/115/Rev.3/Amend.1, paras. 90–91 and 111),

Decides to amend and supplement the text of the annex to Resolution No. 61 in accordance with the annex to this Resolution.

Annex

I. Amendment to Chapter 1

1. *Add the following definitions in section 1–2, “Definitions”*
 126. **Lanterns:** A lantern is a device for distributing the flux from a light source; it also includes the components needed to filter, refract or reflect the light, and hold or operate the light source. Lanterns intended to give signals on board a vessel are called signal lanterns.
 127. **Signal lights:** Signal lights are the light signals emitted by signal lanterns.
 128. **Light sources:** Light sources are electrical or non-electrical devices designed to produce light flux in signal lanterns.

II. Amendments to Chapter 2

2. *For section 2–7 substitute the text contained in Appendix 1.*

III. Amendments to Chapter 15

3. *For Chapter 15 substitute the text contained in Appendix 2.*

IV. Amendments to Appendix 2

4. *In point 3 of the model ship’s certificate for official number substitute Unique European Vessel Identification Number.*

V. Appendix 7

5. *Add new appendix 7 contained in Appendix 3.*

Appendix 1

2-7 Unique European Vessel Identification Number

2-7.1 General

2-7.1.1 The competent authority issuing a certificate shall enter on that certificate the European Identification Number. Unless the vessel possesses a European Identification Number at the time of issue of the certificate it shall be assigned to that vessel by the competent authority of the State in which the vessel has been registered or has its home port.

2-7.1.2 As far as the vessels from countries where an assignation of a European Identification Number is not possible are concerned the European Identification Number to be entered on the certificate shall be assigned by the competent authority issuing that certificate.

2-7.1.3 Only one single European Vessel Identification Number can be assigned to one vessel. The European Identification Number is issued only once and remains unchanged throughout the whole lifetime of the vessel.

2-7.1.4 The owner of a vessel, or his representative, shall be responsible for having the European Identification Number which is entered in the certificate affixed to the vessel.

2-7.1.5 Each Member State shall notify the secretariat of UNECE of the competent authorities responsible for assigning European Identification Numbers. The secretariat shall keep a register of those competent authorities and of competent authorities notified by third countries, and shall make the register available to the member States. On request this register shall also be made available to competent authorities of third countries.

2-7.1.6 Each competent authority shall make all necessary arrangements in order to inform all other competent authorities listed in the register of each European Identification Number it assigns as well as of data for the identification of the vessel set out in 2-7.3. These data may be made available to competent authorities of other States, as far as an equivalent level of privacy is guaranteed, on the basis of administrative agreements in order to perform administrative measures for maintaining safety and ease of navigation.

2-7.2 European Vessel Identification Number

2-7.2.1 The identification number shall consist of eight Arabic numerals, as follows:

The first three digits shall indicate the competent authority of the State which assigned the number. For this purpose the following key shall apply:

| | |
|---------|--|
| 001-019 | France |
| 020-039 | Netherlands |
| 040-059 | Germany |
| 060-069 | Belgium |
| 070-079 | Switzerland |
| 080-099 | Reserved for vessels from countries that are not party to the Mannheim Convention and for which a Rhine Vessel certificate has been issued before 01.04.2007 |
| 100-119 | Norway |
| 120-139 | Denmark |
| 140-159 | United Kingdom and Northern Ireland |
| 160-169 | Iceland |
| 170-179 | Ireland |

| | |
|---------|---|
| 180–189 | Portugal |
| 190–199 | Reserved |
| 200–219 | Luxembourg |
| 220–239 | Finland |
| 240–259 | Poland |
| 260–269 | Estonia |
| 270–279 | Lithuania |
| 280–289 | Latvia |
| 290–299 | Reserved |
| 300–309 | Austria |
| 310–319 | Liechtenstein |
| 320–329 | Czech Republic |
| 330–339 | Slovakia |
| 340–349 | Reserved |
| 350–359 | Croatia |
| 360–369 | Serbia |
| 370–379 | Bosnia and Herzegovina |
| 380–399 | Hungary |
| 400–419 | Russian Federation |
| 420–439 | Ukraine |
| 440–449 | Belarus |
| 450–459 | Republic of Moldova |
| 460–469 | Romania |
| 470–479 | Bulgaria |
| 480–489 | Georgia |
| 490–499 | Reserved |
| 500–519 | Turkey |
| 520–539 | Greece |
| 540–549 | Cyprus |
| 550–559 | Albania |
| 560–569 | The former Yugoslav Republic of Macedonia |
| 570–579 | Slovenia |
| 580–589 | Montenegro |
| 590–599 | Reserved |
| 600–619 | Italy |
| 620–639 | Spain |
| 640–649 | Andorra |
| 650–659 | Malta |
| 660–669 | Monaco |
| 670–679 | San Marino |
| 680–699 | Reserved |
| 700–719 | Sweden |
| 720–739 | Canada |
| 740–759 | United States of America |
| 760–769 | Israel |
| 770–799 | Reserved |
| 800–809 | Azerbaijan |
| 810–819 | Kazakhstan |
| 820–829 | Kyrgyzstan |
| 830–839 | Tajikistan |
| 840–849 | Turkmenistan |
| 850–859 | Uzbekistan |
| 860–869 | Iran |

870–999 Reserved

2–7.2.2 The next five of the identification number shall indicate the serial number in the register kept by the competent authority.

2–7.3 Data for the identification of a vessel

2–7.3.1 All vessels

1. Unique European Identification Number
2. Name of the vessel
3. Type of vessel as defined in Article 1–2
4. Length over all as defined in Article 1–2
5. Breadth over all
6. Draught as defined in Article 1–2
7. Source of data (ship's certificate)
8. Deadweight for cargo vessels
9. Displacement for vessels other than cargo vessels
10. Operator (owner or his representative), if possible with regard to privacy
11. Issuing Authority
12. Number of vessel certificate
13. Expiration date of vessel certificate
14. Creator of dataset (in case of electronic databases)

2–7.3.2 Where available

1. National number
2. Type of vessels in accordance with the standard for Electronic Ship Reporting in inland navigation
3. Single or double hull in accordance with ADN/ADNR
4. Height as defined in Article 1–2
5. Gross tonnage (for maritime vessels)
6. IMO number (for maritime vessels)
7. Call sign (for maritime vessels)
8. MMSI number
9. ATIS code
10. Type, number, issuing authority and expiration date of other certificates.

Appendix 2

Chapter 15

Special Provisions for Passenger Vessels

15-1 General provisions

15-1.1 The following provisions shall not apply:

- (i) 4-4.2, 4-4.3.11 and 4-4.4;
- (ii) 8-1.6.2 sentence 2 and 8-1.6.7;
- (iii) 9-2.11.3 sentence 2 for rated voltages of over 50V.

15-1.2 The following items of equipment are prohibited on passenger vessels:

- (i) lamps powered by liquefied gas or liquid fuel;
- (ii) vaporizing oil-burner stoves;
- (iii) solid fuel heaters;
- (iv) devices fitted with wick burners;
- (v) liquefied gas devices according to chapter 14.

15-1.3 Vessels without their own power cannot be licensed for passenger transport.

15-1.4 On passenger vessels, areas shall be provided for use by persons with reduced mobility, according to the provisions of this chapter and with due regard to the Guidelines for passenger vessels also suited for carrying persons with reduced mobility (annex to Resolution No. 25, revised). If the application of the provisions of this chapter which take into account the specific safety needs of people with reduced mobility is difficult in practice or incurs unreasonable costs, the Administration can allow derogations from these provisions. These derogations shall be mentioned in the ship's certificate.

15-2 Vessel's hull

15-2.1 In the course of periodical inspections referred to in 2-4, the thickness of the outside plating of steel passenger vessels shall be determined as follows:

- (i) The minimum thickness t_{min} of the bottom, bilge and side plating of the outer hull of passenger vessels is determined in accordance with the larger value of the following formulae:

$$t_{1\ min} = 0.006 \cdot a \cdot \sqrt{T} \quad [\text{mm}]; \quad t_{2\ min} = f \cdot 0.55 \cdot \sqrt{L_{WL}} \quad [\text{mm}].$$

In these formulae:

$$f = 1 + 0.0013 \cdot (a - 500);$$

a = longitudinal or transverse frame spacing [mm], and where the frame spacing is less than 400 mm, $a = 400$ mm should be entered.

- (ii) It is permissible to fall short of the minimum value determined in accordance with (i) above for the plate thickness in cases where the permitted value has been determined and certified on the basis of a mathematical proof for the sufficient strength (longitudinal, transverse and local) of the vessel's hull.

- (iii) At no point of the outside plating shall the thickness calculated in accordance with (i) or (ii) above be less than 3 mm.

- (iv) Plate renewals shall be carried out when bottom, bilge or side plate thicknesses have fallen short of the minimum value determined in accordance with (i) or (ii), in conjunction with (iii) above.

15-2.2 The number and position of bulkheads shall be selected such that, in the event of flooding, the vessel remains buoyant according to 15-3.7 to 15-3.13. Every portion of the internal structure which affects the efficiency of the subdivision of such vessels shall be watertight, and shall be of a design which will maintain the integrity of the subdivision.

15-2.3 The distance between the collision bulkhead and the forward perpendicular shall be at least $0.04 L_{WL}$ and not more than $0.04 L_{WL} + 2$ m.

15-2.4 A transverse bulkhead may be fitted with a bulkhead recess, if all parts of this offset lie within the safe area.

15-2.5 The bulkheads, which are taken into account in the damaged stability calculation according to 15-3.7 to 15-3.13, shall be watertight and be installed up to the bulkhead deck. Where there is no bulkhead deck, these bulkheads shall extend to a height at least 20 cm above the margin line.

15-2.6 The number of openings in these bulkheads shall be kept as low as is consistent with the type of construction and normal operation of the ship. Openings and penetrations shall not have a detrimental effect on the watertight function of the bulkheads.

15-2.7 Collision bulkheads shall have no openings and no doors.

15-2.8 Bulkheads according to 15-2.5 separating the engine rooms from passenger areas or crew and shipboard personnel accommodation shall have no doors.

15-2.9 Manually operated doors without remote control in bulkheads referred to in 15-2.5, are permitted only in areas not accessible to passengers. They shall:

- (i) remain closed at all times and be opened only temporarily to allow access;
- (ii) be fitted with suitable devices to enable them to be closed quickly and safely;
- (iii) display the following notice on both sides of the doors: "Close door immediately after passing through".

15-2.10 Doors in bulkheads referred to in 15-2.5, that are open for long periods shall comply with the following requirements:

- (i) They shall be capable of being closed from both sides of the bulkhead and from an easily accessible point above the bulkhead decks;
- (ii) After being closed by remote control the door shall be such that it can be opened again locally and closed safely. Closure shall not be impeded by carpeting, foot rails or other obstructions;
- (iii) The time taken for the remote-controlled closure process shall be at least 30 seconds but not more than 60 seconds;
- (iv) During the closure procedure an automatic acoustic alarm shall sound by the door;
- (v) The door drive and alarm shall also be capable of operating independently of the main on-board power supply. There shall be a device at the location of the remote control that displays whether the door is open or closed.

15-2.11 Doors in bulkheads referred to in 15-2.5, and their actuators shall be located in the safe area.

15-2.12 There shall be a warning system in the wheelhouse to indicate which of the doors in bulkheads referred to in 15-2.5 is open.

15-2.13 Open-ended piping and ventilation ducts shall be offset in such a way that, in any conceivable flooding, no additional spaces or tanks are flooded through them.

(i) If several compartments are openly connected by piping or ventilation ducts, such piping and ducts shall, in an appropriate place, be lead above the waterline corresponding to the worst possible flooding;

(ii) Piping need not meet the requirement above, if shut-off devices are fitted in the piping where it passes through the bulkheads and which can be remotely controlled from a point above the bulkhead deck;

(iii) Where a pipe work system has no open outlet in a compartment, the pipe work shall be regarded as intact in the event of this compartment being damaged, if it runs within the safe area and is more than 0.50 m from the bottom of the vessel.

15-2.14 Remote controls of bulkhead doors according to 15-2.10 and shut-off devices according to 15-2.13 (ii) above the bulkhead deck shall be clearly indicated as such.

15-2.15 Where double bottoms are fitted, their height shall be at least 0.60 m, and where wing voids are fitted, their width shall be at least 0.60 m.

15-2.16 Windows may be situated below the margin line, if they are watertight, cannot be opened, possess sufficient strength and conform to 15-6.15.

15-3 Stability

15-3.1 It shall be proved by a calculation based on the results from the application of a standard for intact stability that the intact stability of the vessel is appropriate. All calculations shall be carried out free to heel, trim and sinkage. The light ship data taken into account for the stability calculation shall be determined by means of a heeling test.

15-3.2 The intact stability shall be proven for the following standard load conditions:

(i) at the start of the voyage: 100 per cent passengers, 98 per cent fuel and fresh water, 10 per cent waste water;

(ii) during the voyage: 100 per cent passengers, 50 per cent fuel and fresh water, 50 per cent waste water;

(iii) at the end of the voyage: 100 per cent passengers, 10 per cent fuel and fresh water, 98 per cent waste water;

(iv) unladen vessel: no passengers, 10 per cent fuel and fresh water, no waste water.

For all standard load conditions, the ballast tanks shall be considered as either empty or full in accordance with normal operational conditions.

In addition, the requirement of 15-3.3(iv) shall be proved for the following load condition:

100 per cent passengers, 50 per cent fuel and fresh water, 50 per cent waste water, all other liquid (including ballast) tanks are considered filled to 50 per cent.

15-3.3 The proof of adequate intact stability by means of a calculation shall be produced using the following definitions for the intact stability and for the standard load conditions mentioned in 15-3.2 i) to iv):

- (i) the maximum righting lever h_{max} shall occur at a heeling angle $\varphi_{max} \geq (\varphi_{mom} + 3^\circ)$ and shall not be less than 0.20 m. However, in case $\varphi_f < \varphi_{max}$ the righting lever at the downflooding angle φ_f shall not be less than 0.20 m;
- (ii) the downflooding angle φ_f shall not be less than $(\varphi_{mom} + 3^\circ)$;
- (iii) the area A under the curve of the righting levers shall, depending on the position of φ_f and φ_{max} , reach at least the following values:

| Case | A | |
|------|---|--|
| 1 | $\varphi_{max} \leq 15^\circ$ or $\varphi_f \leq 15^\circ$ | 0.05 m·rad up to the smaller of the angles to angles φ_{max} or φ_f |
| 2 | $15^\circ < \varphi_{max} < 30^\circ$ | $\varphi_{max} \leq \varphi_f$ 0.035 + 0.001 · (30 - φ_{max}) m·rad up to the angle φ_{max} |
| 3 | $15^\circ < \varphi_f < 30^\circ$ | $\varphi_{max} > \varphi_f$ 0.035 + 0.001 · (30 - φ_f) m·rad up to the angle φ_f |
| 4 | $\varphi_{max} \geq 30^\circ$ and $\varphi_f \geq 30^\circ$ | 0.035 m·rad up to the angle $\varphi = 30^\circ$ |

where:

h_{max} is the maximum lever;

φ is the heeling angle;

φ_f is the downflooding angle, that is the heeling angle, at which openings in the hull, in the superstructure or deck houses which cannot be closed so as to be watertight, submerge;

φ_{mom} the maximum heeling angle according to (v);

φ_{max} is the heeling angle at which the maximum righting lever occurs;

A area beneath the curve of the righting levers.

(iv) the initial metacentric height, \overline{GM}_0 , corrected by the effect of the free surfaces of liquid in tanks, shall not be less than 0.15 m;

(v) in each of the following two cases the heeling angle φ_{mom} shall not exceed 12° :

- in application of the heeling moment due to passengers and wind according to 15-3.4 and 15-3.5;
- in application of the heeling moment due to passengers and turning according to 15-3.4 and 15-3.6;

(vi) for a heeling moment resulting from moments due to passengers, wind and turning according to 15-3.4, 15-3.5 and 15-3.6, the residual freeboard shall be not less than 200 mm;

(vii) for vessels with windows or other openings in the hull located below the bulkhead decks and not closed watertight, the residual safety clearance shall be at least 100 mm on the application of the three heeling moments resulting from subsection (vi).

15-3.4 The heeling moment due to one-sided accumulation of persons shall be calculated according to the following formulae:

$$M_p = g \cdot P \cdot y = g \cdot \sum P_i \cdot y_i \quad [\text{kNm}]$$

where:

- P = total mass of persons on board in [t], calculated by adding up the maximum permitted number of passengers and the maximum number of shipboard personnel and crew under normal operating conditions, assuming an average mass per person of 0.075 t;
- y = lateral distance of centre of gravity of total mass of persons P from centre line in [m];
- g = acceleration of gravity ($g = 9.81 \text{ m/s}^2$);
- P_i = mass of persons accumulated on area A_i in [t];

$$P_i = n_i \cdot 0.075 \cdot A_i \text{ [t]}$$

where:

- A_i = area occupied by persons in [m²];
- n_i = number of persons per square meter;
- n_i = 3.75 for free deck areas and deck areas with movable furniture; for deck areas with fixed seating furniture such as benches, n_i shall be calculated by assuming an area of 0.50 m in width and 0.75 m in seat depth per person;
- y_i = lateral distance of geometrical centre of area A_i from centre line in [m].

The calculation shall be carried out for an accumulation of persons both to starboard and to port.

The distribution of persons shall correspond to the most unfavourable one from the point of view of stability. Cabins shall be assumed unoccupied for the calculation of the persons' heeling moment.

For the calculation of the loading cases, the centre of gravity of a person should be taken as 1 m above the lowest point of the deck at $0.5 L_{WL}$, ignoring any deck curvature and assuming a mass of 0.075 t per person.

A detailed calculation of deck areas which are occupied by persons may be dispensed with if the following values are used:

- P = $1.1 \cdot F_{max} \cdot 0.075$ for day trip vessels
 $1.5 \cdot F_{max} \cdot 0.075$ for cabin vessels

where:

- F_{max} = maximum permitted number of passengers on board;
- Y = $B/2$ in [m].

15-3.5 The heeling moment due to wind pressure (M_{wst}) shall be calculated as follows:

$$M_{wst} = p_w \cdot A_w \cdot (l_w + T/2) \text{ [kNm]}$$

where:

- p_w = the specific wind pressure of 0.15 kN/m² for zone 3 and 0.25 kN/m² for zones 1 and 2;
- A_w = lateral plane of the vessel above the waterline according to the considered load conditions as given in 15-3.2, in m²;

l_w = distance of the centre of gravity of the lateral plane A_w from the waterline according to the considered load conditions as given in 15-3.2, in m.

15-3.6 The heeling moment due to centrifugal force (M_{cf}), caused by the turning of the vessel, shall be calculated as follows:

$$M_{cf} = c_{cf} \cdot C_B \cdot v^2 \cdot D/L_{WL} \cdot (KG - T/2) \text{ [kNm]}$$

where:

c_{cf} = a coefficient of 0.45;

C_B = block coefficient (if not known, taken as 1.0);

v = maximum speed of the vessel in m/s;

KG = distance between the centre of gravity and the baseline in m.

For passenger vessels with propulsion systems according to 6-6, M_{cf} shall be derived from full-scale or model tests or else from corresponding calculations.

15-3.7 It shall be proved, by means of a calculation that the damaged stability of the vessel is appropriate.

15-3.8 Buoyancy of the vessel in the event of flooding shall be proven for the standard load conditions specified in 15-3.2. Accordingly, mathematical proof of sufficient stability shall be determined for the three intermediate stages of flooding (25 per cent, 50 per cent and 75 per cent of flood build-up) and for the final stage of flooding.

15-3.9 Vessels operating in zones 1, 2 and 3 shall comply with 1-compartment status and 2-compartment status.¹

The following assumptions concerning the extent of damage shall be taken into account in the event of flooding:

| | <i>1-compartment status</i> | <i>2-compartment status</i> |
|---------------------------------------|--|--|
| Dimension of the side damage | | |
| longitudinal l [m] | $0,10 \cdot L_{WL}$, however not less than 4,00 m | $0,05 \cdot L_{WL}$, however not less than 2,25 m |
| transverse b [m] | $B/5$ | 0,59 |
| vertical h [m] | from vessel bottom to top without delimitation | |
| Dimension of the bottom damage | | |
| longitudinal l [m] | $0,10 \cdot L_{WL}$, however not less than 4,00 m | $0,05 \cdot L_{WL}$, however not less than 2,25 m |
| transverse b [m] | $B/5$ | |
| vertical h [m] | 0,59; pipe work installed according to 15-2.13 (iii), shall be deemed intact | |

(i) For 1-compartment status the bulkheads can be assumed to be intact if the distance between two adjacent bulkheads is greater than the damage length. Longitudinal bulkheads at a distance of less than $B/3$ from the outer plating measured perpendicular to centre line from the shell plating at the maximum draught shall not be taken into account for calculation purposes;

¹ The Basin administration may waive the requirements prescribed in this paragraph with regard to the 2-compartment status.

- (ii) For 2-compartment status, each bulkhead within the extent of damage, will be assumed to be damaged. The vessel shall remain buoyant after flooding;
- (iii) The lowest point of every non-watertight opening (e.g. doors, windows, access hatchways) shall lie at least 0.10 m above the damaged waterline. The bulkhead deck shall not be immersed in the final stage of flooding;
- (iv) Permeability is assumed to be 95 per cent. If it is proven by a calculation that the average permeability of any compartment is less than 95 per cent, the calculated value can be used instead;

The values to be adopted shall not be less than:

- | | |
|---------------------------|-------------|
| • Lounges | 95 per cent |
| • Engine and boiler rooms | 85 per cent |
| • Luggage and store rooms | 75 per cent |

Double bottoms, fuel bunkers, ballast tanks and other tanks, depending on whether, according to their intended purpose, they are to be assumed to be full or empty for the vessel floating at the plane of maximum draught 0 or 95 per cent;

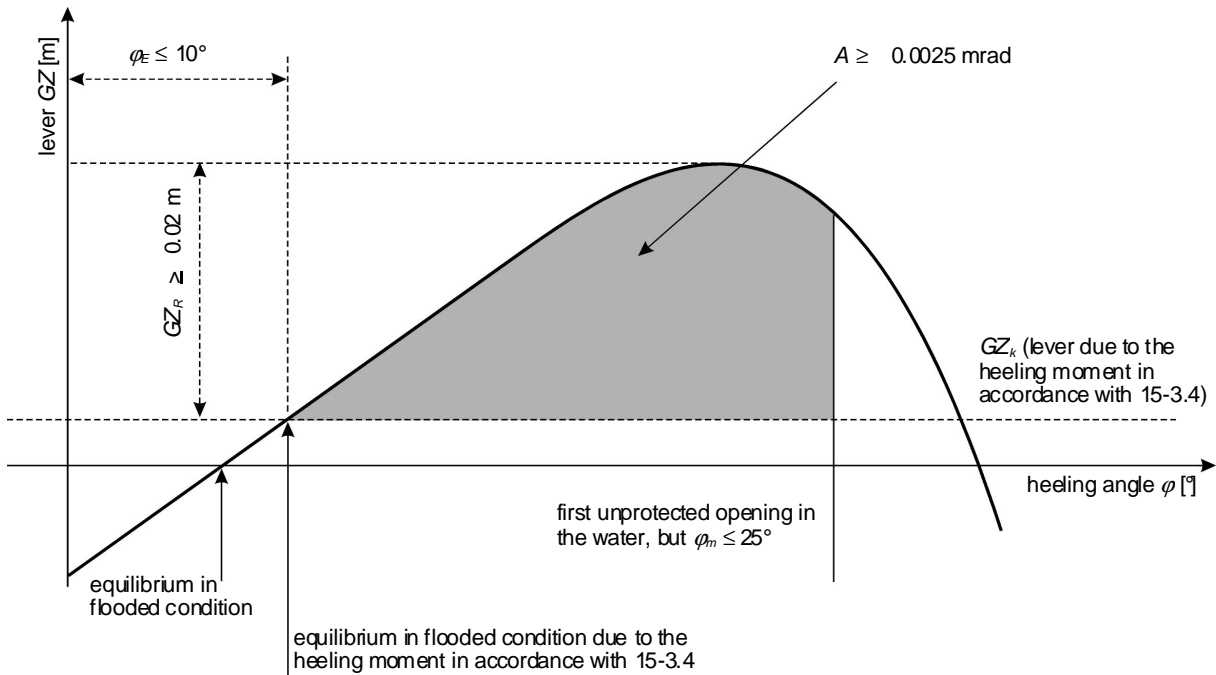
(v) If damage of a smaller dimension than specified above produces more detrimental effects with respect to heeling or loss of metacentric height, such damage shall be taken into account for calculation purposes.

15-3.10 For all intermediate stages of flooding referred to in 15-3.8, the following criteria shall be met:

- (i) the heeling angle ϕ at the equilibrium position of the intermediate stage in question shall not exceed 15° ;
- (ii) beyond the heel in the equilibrium position of the intermediate stage in question, the positive part of the righting lever curve shall display a righting lever value of $GZ \geq 0.02$ m before the first unprotected opening becomes immersed or a heeling angle ϕ of 25° is reached;
- (iii) non-watertight openings shall not be immersed before the heel in the equilibrium position of the intermediate stage in question has been reached;
- (iv) The calculation of free surface effect in all intermediate stages of flooding shall be based on the gross surface area of the damaged compartments.

15-3.11 During the final stage of flooding, the following criteria shall be met taking into account the heeling moment in accordance with 15-3.4:

- (i) the heeling angle ϕ_E shall not exceed 10° ;
- (ii) beyond the equilibrium position the positive part of the righting lever curve shall display a righting lever value of $GZ_R \geq 0.02$ m with an area $A \geq 0.0025$ m rad. These minimum values for stability shall be met until the immersion of the first unprotected opening or in any case before reaching a heeling angle ϕ_m of 25° ;
- (iii) non-watertight openings shall not be immersed before the equilibrium position has been reached; if such openings are immersed before this point, the rooms affording access are deemed to be flooded for damaged stability calculation purposes.



Where:

φ_E is the heeling angle in the final stage of flooding taking into account the moment in accordance with 15-3.4;

φ_m is the angle of vanishing stability or the angle at which the first unprotected opening immerses or 25° ; whichever is less is to be used;

GZ_R is the remaining righting lever in the final stage of flooding taking into account the moment in accordance with 15-3.4;

GZ_K is the heeling lever resulting from the moment in accordance with 15-3.4;

15-3.12 The shut-off devices which shall be able to be closed watertight shall be marked accordingly.

15-3.13 If cross-flood openings to reduce asymmetrical flooding are provided, they shall meet the following conditions:

- (i) for the calculation of cross-flooding, IMO Resolution A.266 (VIII) shall be applied;
- (ii) they shall be self-acting;
- (iii) they shall not be equipped with shut-off devices;
- (iv) the total time allowed for compensation shall not exceed 15 minutes.

15-4 Safety clearance and freeboard

15-4.1 The safety clearance shall be at least equal to the sum of:

- (i) the additional lateral immersion, which, measured on the outside plating, is produced by the permissible heeling angle according to 15-3.3 (v); and
- (ii) the residual safety clearance according to 15-3.3 (vii).

For vessels without a bulkhead deck, the safety clearance shall be not less than: 1900 mm in zone 1, 1000 mm in zone 2 and 500 mm in zone 3.

15-4.2 The freeboard shall be at least equal to the sum of:

- (i) the additional lateral immersion, which, measured on the outside plating, is produced by the heeling angle according to 15-3.3 (v), and
- (ii) the residual freeboard according to 15-3.3 (vi).

However, the remaining freeboard shall be not less than: 600 mm in zone 1, 400 mm in zone 2 and 300 mm in zone 3.

15-4.3 The maximum draught level is to be set so as to ensure compliance with the safety clearance according to 15-4.1, and the freeboard according to 15-4.2, 15-2 and 15-3.

15-4.4 For safety reasons, the Administration may stipulate a greater safety clearance or a greater freeboard.

15-5 Maximum permitted number of passengers

15-5.1 The Administration sets the maximum permitted number of passengers and enters this number on the certificate.

15-5.2 The maximum permitted number of passengers shall not exceed any of the following values:

- (i) number of passengers for whom the existence of an evacuation area according to 15-6.8 has been proven;
- (ii) number of passengers that has been taken into account for the stability calculation according to 15-3;
- (iii) number of available berths for passengers on cabin vessels used for voyages including overnight stays.

15-5.3 For cabin vessels which are also used as day trip vessels, the number of passengers shall be calculated for use, both as a day trip vessel and as a cabin vessel, and entered on the certificate.

15-5.4 The maximum permitted number of passengers shall be displayed on clearly legible and prominently positioned notices on board the vessel.

15-6 Passenger rooms and areas

15-6.1 Passenger rooms shall:

- (i) on all decks, be located aft of the level of the collision bulkhead and, as long as they are below the bulkhead deck, forward of the level of the aft-peak bulkhead;
- (ii) be separated from the engine and boiler rooms in a gas-tight manner; and
- (iii) be so arranged, that sight lines in accordance with 7-2 do not pass through them.

15-6.2 Cupboards and rooms referred to in 3A-3 and intended for the storage of flammable liquids shall be outside the passenger area.

15-6.3 The number and width of the exits of passenger rooms shall comply with the following requirements:

- (i) Rooms or groups of rooms designed or arranged for 30 or more passengers or including berths for 12 or more passengers shall have at least two exits. On day trip vessels, one of these two exits can be replaced by two emergency exits; rooms, with the exception of cabins, and groups of rooms that have only one exit, shall have at least one emergency exit;

- (ii) If rooms are located below the bulkhead deck, one of the exits can be a watertight bulkhead door, according to 15-2.10, leading into an adjacent compartment from which the upper deck can be reached. The other exit shall lead directly or, if permitted in accordance with (i), as an emergency exit into the open air, or to the bulkhead deck. This requirement does not apply to individual cabins;
- (iii) Exits according to (i) and (ii) shall be suitably arranged and shall have a clear width of at least 0.80 m and also a clear height of at least 2.00 m. For doors of passenger cabins and other small rooms, the clear width can be reduced to 0.70 m;
- (iv) In the case of rooms or groups of rooms intended for more than 80 passengers the sum of the widths of all exits intended for passengers and which shall be used by them in an emergency, shall be at least 0.01 m per passenger;
- (v) If the total width of the exits is determined by the number of passengers, the width of each exit shall be at least 0.005 m per passenger;
- (vi) Emergency exits shall have a shortest side at least 0.60 m long or a minimum diameter of 0.70 m. They shall open in the direction of escape and be marked on both sides;
- (vii) Exits of rooms intended for use by persons with reduced mobility shall have a clear width of at least 0.90 m. Exits normally used for embarking and disembarking people with reduced mobility shall have a clear width of at least 1.50 m.

15-6.4 Doors of passenger rooms shall comply with the following requirements:

- (i) With the exception of doors leading to connecting corridors, they shall be capable of opening outwards or be constructed as sliding doors;
- (ii) Cabin doors shall be made in such a way that they can also be unlocked from the outside at any time;
- (iii) Powered doors shall open easily in the event of failure of the power supply to this mechanism;
- (iv) For doors intended for use by persons with reduced mobility, there shall be from the direction from which the door opens, a minimum clearance of 0.60 m between the inner edge of the doorframe on the lock side and an adjacent perpendicular wall.

15-6.5 Connecting corridors shall comply with the following requirements:

- (i) They shall have a clear width of at least 0.80 m. If they lead to rooms used by more than 80 passengers, they shall comply with the provisions mentioned in 15-6.3 (iv) and (v) regarding the width of the exits leading to connecting corridors;
- (ii) Their clear height shall be not less than 2.00 m;
- (iii) Connecting corridors intended for use by persons with reduced mobility shall have a clear width of 1.30 m. Connecting corridors more than 1.50 m wide shall have hand rails on either side;
- (iv) Where a part of the vessel or a room intended for passengers is served by a single connecting corridor, the clear width thereof shall be at least 1.00 m;
- (v) Connecting corridors shall be free of steps;
- (vi) They shall lead only to open decks, rooms or staircases;
- (vii) Dead ends in connecting corridors shall be not longer than 2.00 m.

15-6.6 In addition to the provisions of 15-6.5, escape routes shall also comply with the following requirements:

- (i) Stairways, exits and emergency exits shall be so disposed that, in the event of a fire in any given area, the other areas may be evacuated safely;
- (ii) The escape routes shall lead by the shortest route to evacuation areas according to 15-6.8;
- (iii) Escape routes shall not lead through engine rooms or galleys;
- (iv) There shall be no rungs, ladders or the like installed at any point along the escape routes;
- (v) Doors to escape routes shall be constructed in such a way as not to reduce the minimum width of the escape route referred to in 15-6.5 (i) or (iv);
- (vi) Escape routes and emergency exits shall be clearly signed. The signs shall be lit by the emergency lighting system.

15-6.7 Escape routes and emergency exits shall have a suitable safety guidance system.

15-6.8 For all persons on board, there shall be muster areas available which satisfy the following requirements:

- (i) The total area of the muster areas (A_S) shall correspond to at least the following value:

- Day trip vessels: $A_S = 0,35 \cdot F_{max} [m^2]$
- Cabin vessels: $A_S = 0,45 \cdot F_{max} [m^2]$

In these formulae, the following definition applies:

F_{max} = maximum permitted number of passengers on board;

- (ii) Each individual muster or evacuation area shall be larger than 10 m²;
- (iii) The muster areas shall be clear of furniture, whether movable or fixed;
- (iv) If movable furniture is located in a room in which muster areas are defined, it shall be secured appropriately to avoid slipping;
- (v) If fixed seats or benches are located in a room in which muster areas are defined the corresponding number of persons need not be taken into account when calculating the total area of muster areas according to (i). However, the number of persons for whom fixed seats or benches in a certain room are taken into account must not exceed the number of persons for whom muster areas are available in this room;
- (vi) Life-saving appliances shall be easily accessible from the evacuation areas;
- (vii) It shall be possible to evacuate people safely from these evacuation areas, using either side of the vessel;
- (viii) The muster areas shall lie above the margin line;
- (ix) The muster and evacuation areas are to be shown as such in the safety plan and signposted on board the vessel;
- (x) The provisions of (iv) and (v) also apply to free decks on which muster areas are defined;

(xi) If collective life-saving appliances complying with 10-5.1.1.1, are available on board, the number of persons for whom such appliances are available may be disregarded when calculating the total surface area of the muster areas referred to in (i);

(xii) However, in all cases where reductions to (v), (x) and (xi) are applied the total area according to (i) shall be sufficient for at least 50 per cent of the maximum permitted number of passengers.

15-6.9 Stairs and their landings in the passenger areas shall comply with the following requirements:

(i) They shall be constructed in accordance with a recognized international standard;

(ii) They shall have a clear width of at least 0.80 m or, if they lead to connecting corridors or areas used by more than 80 passengers, at least 0.01 m per passenger;

(iii) They shall have a clear width of at least 1.00 m if they provide the only means of access to a room intended for passengers;

(iv) Where there is not at least one staircase on each side of the vessel in the same room, they shall lie in the safe area;

(v) In addition, stairs intended for use by persons with reduced mobility shall comply with the following requirements:

- the gradient of the stairs shall not exceed 32°;
- the stairs shall have a clear width of at least 0.90 m;
- spiral staircases are not allowed;
- the stairs shall not run in a direction transverse to the vessel;
- the handrails of the stairs shall extend approximately 0.30 m beyond the top and bottom of the stairs without restricting traffic routes;
- handrails, front sides of at least the first and the last step as well as the floor coverings at the ends of the stairs shall be colour highlighted.

15-6.10 Lifts intended for persons with reduced mobility, and lifting equipment, like stairlifts or lifting platforms, shall be constructed according to a relevant standard or a regulation of the Administration.

15-6.11 Parts of the deck intended for passengers, and which are not enclosed, shall comply with the following requirements:

(i) They shall be surrounded by a fixed bulwark or guard rail at least 1.00 m high or a railing according to a recognized international standard. Bulwarks and railings of decks intended for use by persons with reduced mobility shall be at least 1.10 m high;

(ii) Openings and equipment for embarking or disembarking and also openings for loading or unloading shall be such that they can be secured and have a clear width of at least 1.00 m. Openings, used normally for the embarking or disembarking of persons with reduced mobility, shall have a clear width of at least 1.50 m;

(iii) If the openings and equipment for embarking or disembarking cannot be observed from the wheelhouse, optical or electronic aids shall be provided;

(iv) Passengers sitting down shall not interrupt sight lines in accordance with 7-2.

15-6.12 The parts of the vessel not intended for passengers, in particular access to the wheelhouse, to the winches and to the engine rooms, shall be such that they can be secured against unauthorized entry. At any such access, a symbol corresponding to sketch 1 in appendix 3 shall be displayed in a prominent position.

15-6.13 Gangways shall be constructed in accordance with a recognized international standard. By way of derogation from 10-2.1 fifth indent, their length can be less than 4 m.

15-6.14 Traffic areas intended for use by persons with reduced mobility shall have a clear width of 1.30 m and be free of doorsteps and sills more than 0.025 m high. Walls in traffic areas, intended for use by persons with reduced mobility shall be equipped with handrails at a height of 0.90 m above the floor.

15-6.15 Glass doors and walls in traffic areas and also window panes shall be manufactured from pre-stressed glass or laminated glass. They may also be made from a synthetic material, provided this is authorized for use in a fire-protection context.

Transparent doors and transparent walls extending as far as the floor on traffic areas shall be prominently marked.

15-6.16 Superstructures or their roofs consisting completely of panoramic panes shall only be manufactured from materials which, in the event of an accident, reduce as much as possible the risks of injury to the persons on board.

15-6.17 Potable water systems shall, at least, comply with the requirements of 12-8.

15-6.18 There shall be toilets available for passengers. At least one toilet shall be fitted for use by persons with reduced mobility according to a relevant standard or a regulation of the Administration and shall be accessible from areas intended for use by persons with reduced mobility.

15-6.19 Cabins without an opening window shall be connected to a ventilation system.

15-6.20 By analogy, rooms in which crew members or shipboard personnel are accommodated shall comply with the provisions of this section.

15-7 Propulsion system²

15-7.1 In addition to the main propulsion system, vessels shall be equipped with a second independent propulsion system so as to ensure that, in the event of a breakdown affecting the main propulsion system, the vessel can continue to make steerageway under its own power.

15-7.2 The second independent propulsion system shall be placed in a separate engine room. If both engine rooms have common partitions, these shall be built according to 15-11.2.

15-8 Safety devices and equipment

15-8.1 All passenger vessels shall have internal communication facilities according to 7-6.6.3. Such facilities shall also be available in the operational rooms and – where there is no direct communication from the wheelhouse – in the muster and evacuation areas for passengers as referred to in 15-6.8.

15-8.2 All passenger areas shall be reachable via a loudspeaker system. The system shall be designed in such a way as to ensure that the information transmitted can be clearly

² The Basin administration may waive the requirements prescribed in this section.

distinguished from background noise. Loudspeakers are optional where direct communication between the wheelhouse and the passenger area is possible.

15-8.3 The vessel shall be equipped with an alarm system. The system shall include:

- (i) An alarm system enabling passengers, crew members and shipboard personnel to alert the vessel's command and crew.

This alarm shall be given only in areas assigned to the vessel's command and to the crew; it shall only be possible for the vessel's command to stop the alarm. The alarm shall be capable of being triggered from at least the following places:

- in each cabin;
- in the corridors, lifts and stairwells, with the distance to the nearest trigger not exceeding 10 m and with at least one trigger per watertight compartment;
- in lounges, dining rooms and similar recreation rooms;
- in toilets, intended for use by persons with reduced mobility;
- in engine rooms, galleys and similar rooms where there is a fire risk;
- in the cold-storage rooms and other store rooms.

The alarm triggers shall be installed at a height above the floor of 0.85 m to 1.10 m.

- (ii) An alarm system enabling the vessel's command to alert passengers.

This alarm shall be clearly and unmistakably audible in all rooms accessible to passengers. It shall be capable of being triggered from the wheelhouse and from a location that is permanently staffed.

- (iii) An alarm system enabling the vessel's command to alert the crew and shipboard personnel.

The alarm system referred to in 7-5.2, shall also reach the recreation rooms for the shipboard personnel, the cold-storage rooms and other store rooms.

Alarm triggers shall be protected against unintentional use.

15-8.4 Each watertight compartment shall be fitted with a bilge level alarm.

15-8.5 Two motor-driven bilge pumps shall be provided.

15-8.6 A bilge pumping system with permanently installed pipe work shall be available.

15-8.7 Cold storage room doors, even when locked, shall also be capable of being opened from the inside.

15-8.8 Where CO₂ bar-systems are situated in rooms below deck these rooms shall be fitted with an automatic ventilation system. The ventilation ducts shall run down to 0.05 m from the floor of this room.

15-8.9 In addition to the first-aid kit specified in 10-2.1, additional first-aid kits shall be provided in sufficient number. The first-aid kits and their storage shall comply with the requirements set out in 10-2.1, ninth indent.

15-9 Life-saving appliances

15-9.1 In addition to the life jackets specified in 10-5.4.2.1 (iii) and 10-5.4.3 (ii) passenger vessels shall be supplied with additional lifejackets for children in quantity equal to 10 per cent of the total number of passengers. In addition to the lifebuoys specified in 10-5.3.4, 10-5.4.2.1 (iv) and 10-5.4.3 (iii) all parts of the deck intended for passengers and

not enclosed shall be equipped with lifebuoys on both sides of the vessel, positioned not more than 20 m apart. Lifebuoys shall be considered as suitable if they comply with 10-5.2.3.

Half of all the prescribed lifebuoys shall be fitted with a buoyant cord at least 30 m long with a diameter of 8 to 11 mm. The other half of the prescribed lifebuoys shall be fitted with a self-igniting, battery-powered light which will not be extinguished in water.

15-9.2 In addition to the lifebuoys referred to in 15-9.1, individual life-saving equipment according to 10-5.4.2.1 (iii) and 10-5.4.3 (ii) shall be within reach for all shipboard personnel. For shipboard personnel not responsible for undertaking duties according to the safety rota, not inflatable or semi-automatically inflatable lifejackets according to the standards mentioned in 10-5.2.2, are allowed.

15-9.3 Passenger vessels shall have appropriate equipment to enable persons to be transferred safely to shallow water, to the bank or to another vessel.

15-9.4 In addition to the life-saving equipment referred to in 15-9.1 and 15-9.2, individual life-saving equipment shall be available for 100 per cent of the maximum permitted number of passengers. Not inflatable or semi-automatically inflatable lifejackets according to 10-5.2.2 are also allowed.

15-9.5 The life-saving appliances shall be stowed on board in such a way that they can be reached easily and safely when required. Concealed storage places shall be clearly marked.

15-9.6 The ship's boat shall be equipped with an engine and a searchlight.

15-9.7 A suitable stretcher shall be available.

15-9.8 For vessels with 2-compartment status or 1-compartment status and having double skins the administration may reduce the aggregate capacity of collective life-saving appliances referred to in 10-5.4.2.1 or 10-5.4.3.

15-10 Electrical equipment

15-10.1 Only electrical equipment is permitted for lighting.

15-10.2 The provision of 9-2.13.4 applies also for passageways and recreation rooms for passengers.

15-10.3 For the following rooms and locations, adequate lighting shall be provided:

- (i) locations where life-saving equipment is stored and where such equipment is normally prepared for use;
- (ii) escape routes, access for passengers, including gangways, entrances and exits, connecting corridors, lifts and accommodation area companionways, cabin areas and accommodation areas;
- (iii) markings on the escape routes and emergency exits;
- (iv) in other areas intended for use by persons with reduced mobility;
- (v) control centres, engine rooms, steering equipment rooms and their exits;
- (vi) wheelhouse;
- (vii) emergency power supply room;
- (viii) points at which extinguishers and fire extinguishing equipment controls are located;

- (ix) areas in which passengers, shipboard personnel and crew muster in the event of danger.

15-10.4 In addition to 9-2.16.6, adequate emergency lighting shall be provided for the following rooms and locations:

- (i) escape routes, access for passengers, including gangways, entrances and exits, connecting corridors, lifts and accommodation area companionways, cabin areas and accommodation areas;
- (ii) markings on the escape routes and emergency exits;
- (iii) in other areas intended for use by persons with reduced mobility;
- (iv) control centres, steering equipment rooms and their exits;
- (v) emergency power supply room;
- (vi) points at which extinguishers and fire extinguishing equipment controls are located.

15-10.5 In addition to 9-2.16.5 the capacity of the emergency source shall be sufficient to supply also:

- (i) audible warning devices;
- (ii) a searchlight that can be operated from the wheelhouse;
- (iii) fire alarm system;
- (iv) lifts and lifting equipment within the meaning of 15-6.10.

15-11 Fire protection

15-11.1 The suitability for fire protection of materials and components shall be established by a competent body recognized by the Administration on the basis of appropriate test methods.

15-11.2 Partitions between rooms shall be designed in accordance with the following tables:

Table for partitions between rooms, in which no pressurized sprinkler systems according to 10–3.6 are installed

| <i>Rooms</i> | <i>Control centres</i> | <i>Stairwells</i> | <i>Muster areas</i> | <i>Lounges</i> | <i>Engine rooms</i> | <i>Galleys</i> | <i>Store rooms</i> |
|-----------------|------------------------|-------------------|---------------------|----------------------|---------------------|----------------|----------------------|
| Control centres | - | A0 | A0/B15 ³ | A30 | A60 | A60 | A60 |
| Stairwells | | - | A0 | A30 | A60 | A60 | A60 |
| Muster areas | | | - | A30/B15 ⁴ | A60 | A60 | A60 |
| Lounges | | | | -/B15 ⁵ | A60 | A60 | A60 |
| Engine rooms | | | | | A60/A0 ⁶ | A60 | A60 |
| Galleys | | | | | | A0 | A60/B15 ⁷ |
| Store rooms | | | | | | | - |

Table for partitions between rooms, in which pressurized sprinkler systems according to 10–3.6 are installed

| <i>Rooms</i> | <i>Control centres</i> | <i>Stairwells</i> | <i>Muster areas</i> | <i>Lounges</i> | <i>Engine rooms</i> | <i>Galleys</i> | <i>Store rooms</i> |
|-----------------|------------------------|-------------------|---------------------|----------------------|---------------------|----------------|--------------------|
| Control centres | - | A0 | A0/B15 ³ | A0 | A60 | A60 | A30 |
| Stairwells | | - | A0 | A0 | A60 | A30 | A0 |
| Muster areas | | | - | A30/B15 ² | A60 | A60 | A60 |
| Lounges | | | | -/B0 ³ | A0 | A30 | A0 |
| Engine rooms | | | | | A60/A0 ⁴ | A60 | A60 |
| Galleys | | | | | | - | B15 |
| Store rooms | | | | | | | - |

(i) Type “A” partitions are bulkheads, walls and decks which satisfy the following requirements:

- They are made of steel or of another equivalent material.
- They are appropriately stiffened.
- They are insulated with an approved non-combustible material such that the average temperature on the side facing away from the fire rises to not more

³ Partitions between control centres and internal muster areas shall correspond to Type A0, but external muster areas only to Type B15.

⁴ Partitions between lounges and internal muster areas shall correspond to Type A30, but external muster areas only to Type B15.

⁵ Partitions between cabins, partitions between cabins and corridors and vertical partitions separating lounges according to 15-11.10 shall comply with Type B15, for rooms fitted with pressurized sprinkler systems B0.

⁶ Partitions between engine rooms according to 15-7 and 9-2.16.4 (ii), shall comply with Type A60; in other cases, they shall comply with Type A0.

⁷ B15 is sufficient for the partitions between galleys, on the one hand, and cold-storage rooms or food storage rooms, on the other.

than 140°C above the initial temperature and at no point, including the gaps at the joints, does a temperature increase of more than 180°C above the initial temperature occur within the following specified periods:

Type A60 60 minutes

Type A30 30 minutes

Type A0 0 minutes.

- They are constructed in such a way as to prevent the transmission of smoke and flames until the end of the one-hour normal fire test.

(ii) Type-B partitions are bulkheads, walls, decks and ceilings together with facings that meet the following requirements:

- They are made of an approved non-combustible material. Furthermore, all materials used in the manufacture and assembly of partitions shall be non-combustible, except for the facing, which shall be at least flame-retardant.
- They demonstrate an insulation value such that the average temperature on the side facing away from the fire rises to not more than 140°C above the initial temperature and at no point, including the gaps at the joints, does a temperature increase of more than 225°C above the initial temperature occur within the following specified periods:

Type B15 15 minutes

Type B0 0 minutes.

- They are constructed in such a way as to prevent the transmission of flames until the end of the first half hour of the normal fire test.

(iii) The Administration can prescribe a test on a sample partition in order to ensure compliance with the above provisions.

15–11.3 Paints, lacquers and other surface-treatment products as deck coverings used in rooms except engine rooms and store rooms shall be flame-retardant. Carpets, fabrics, curtains and other hanging textile materials as well as upholstered furniture and components of bedding shall be flame-retardant if the rooms in which they are located are not equipped with a pressurized sprinkler system according to 10–3.6.

15–11.4 Lounge ceilings and wall claddings, including their substructures, shall, where these lounges do not have a pressurized sprinkler system according to 10–3.6 be manufactured from non-combustible materials with the exception of their surfaces, which shall be at least flame-retardant.

15–11.5 Furniture and fittings in lounges which serve as muster areas shall, where the rooms do not have a pressurized sprinkler system according to 10–3.6, be manufactured from non-combustible materials.

15–11.6 Paints, lacquers and other materials used on exposed internal areas shall not produce excessive amounts of smoke or toxic substances.

15–11.7 Insulation materials in lounges shall be non-combustible. This does not apply to insulations used on coolant-carrying pipes. The surfaces of the insulation materials used on these pipes shall be at least flame-retardant.

15–11.8 Doors in partitions according to 15–11.2 shall satisfy the following requirements:

- (i) They shall satisfy the same requirements set out in 15-11.2 as the partitions themselves;
- (ii) They shall be self-closing in the case of doors in partition walls according to 15-11.10 or in the case of enclosures around engine rooms, galleys and stairwells;
- (iii) Self-closing doors which remain open in normal operation shall be such that they can be closed from a location permanently manned by the ship's personnel. Once a door has been remotely closed, it shall be possible to reopen and close it safely on the spot;
- (iv) Watertight doors according to 15-2 need not be insulated.

15-11.9 Walls according to 15-11.2 shall be continuous from deck to deck or end at continuous ceilings, which satisfy the same requirements as referred to in 15-11.2.

15-11.10 The following passenger areas shall be divided by vertical partitions as referred to in 15-11.2:

- (i) passenger areas with a total surface area of more than 800 m²;
- (ii) passenger areas in which there are cabins, at intervals of not more than 40 m.

The vertical partitions shall be smoke-tight under normal operating conditions and shall be continuous from deck to deck.

15-11.11 Hollows above ceilings, beneath floors and behind wall claddings shall be separated at intervals of not more than 14 m by non-combustible draught stops which, even in the event of fire, provide an effective fireproof seal.

15-11.12 Internal stairs and lifts shall be encapsulated at all levels by walls according to 15-11.2. The following exceptions are permissible:

- (i) a staircase connecting only two decks does not need to be encapsulated, if on one of the decks the staircase is enclosed according to 15-11.2;
- (ii) in a lounge, stairs need not be encapsulated if they are located entirely within the interior of this room, and
 - if this room extends over only two decks, or
 - if there is a pressurized sprinkler system according to 10-3.6 installed in this room on all decks, this room has a smoke extraction system according to 15-11.15 and the room has access on all decks to a stairwell.

15-11.13 Ventilation systems and air supply systems shall satisfy the following requirements:

- (i) They shall be designed in such a way as to ensure that they themselves do not cause the spread of fire and smoke;
- (ii) Openings for air intake and extraction and air supply systems shall be such that they can be closed off;
- (iii) Ventilation ducts shall be made of steel or an equivalent non-combustible material;
- (iv) When ventilation ducts with a cross-section of more than 0.02 m² are passed through partitions according to 15-11.2. of Type A or partitions according to 15-11.10, they shall be fitted with automatic fire dampers which can be operated from a location permanently manned by shipboard personnel or crew members;

- (v) Ventilation systems for galleys and engine rooms shall be separated from ventilation systems which supply other areas;
- (vi) Air extraction ducts shall be provided with lockable openings for inspection and cleaning. These openings shall be located close to the fire dampers;
- (vii) Built-in ventilators shall be such that they can be switched off from a central location outside the engine room.

15-11.14 Galleys shall be fitted with ventilation systems and stoves with extractors. The air extraction ducts of the extractors shall satisfy the requirements according to 15-11.13 and, additionally, be fitted with manually operated fire dampers at the inlet openings.

15-11.15 Control centres, stairwells and internal evacuation areas shall be fitted with natural or mechanical smoke extraction systems. Smoke extraction systems shall satisfy the following requirements:

- (i) They shall offer sufficient capacity and reliability;
- (ii) They shall comply with the operating conditions for passenger vessels;
- (iii) If smoke extraction systems also serve as general ventilators for the rooms, this shall not hinder their function as smoke extraction systems in the event of a fire;
- (iv) Smoke extraction systems shall have a manually operated triggering device;
- (v) Mechanical smoke extraction systems shall additionally be such that they can be operated from a location permanently manned by shipboard personnel or crew members;
- (vi) Natural smoke extraction systems shall be fitted with an opening mechanism, operated either manually or by a power source inside the ventilator;
- (vii) Manually operated triggering devices and opening mechanisms shall be accessible from inside or outside the room being protected.

15-11.16 Lounges not constantly supervised by shipboard personnel or crew members, galleys, engine rooms and other rooms presenting a fire risk shall be connected to an appropriate fire alarm system. The existence of a fire and its exact whereabouts shall be automatically displayed at a location permanently manned by shipboard personnel or crew members.

15-12 Fire-fighting

15-12.1 In addition to the portable extinguishers according to 10-3.1, at least the following portable extinguishers shall be available on board:

- (i) one extinguisher for every 120 m² of gross floor area in passenger areas;
- (ii) one portable extinguisher per group of 10 cabins, rounded upwards;
- (iii) one portable extinguisher in each galley and in the vicinity of any room in which flammable liquids are stored or used. In galleys the quenching material shall be suitable for fighting fat fires.

These additional fire extinguishers shall meet the requirements laid down in 10-3.2 and be installed and distributed on the vessel so that, in the event of a fire starting at any point and at any time, a fire extinguisher can be reached immediately. In every galley and also in hairdressing salons and perfumeries, there shall be a fire blanket to hand.

15-12.2 Passenger vessels shall be provided with a hydrant system referred to in 10-3.7, consisting of:

- (i) two motor-driven fire extinguishing pumps of sufficient capacity, at least one of which is permanently installed;
- (ii) one fire extinguisher line with a sufficient number of hydrants with permanently connected fire hoses at least 20 m in length and fitted with a standard nozzle capable of producing both a mist and a jet of water and incorporating a shut-off facility.

For smaller vessels the Basin administration may give exemptions from these requirements.

15-12.3 Hydrant systems shall be designed and dimensioned in such a way that:

- (i) any point of the vessel can be reached from at least two hydrants in different places, each with a single hose length of not more than 20 m; and
- (ii) the pressure at the hydrants is at least 300 kPa.

If a hydrant chest is provided, an "extinguisher hose" symbol similar to that shown in sketch 5 in appendix 3, of at least 10 cm side length, shall be affixed to the outside of the chest.

15-12.4 Hydrant valves or cocks shall be such that they can be set so that each of the fire hoses can be separated and removed during operation of the fire extinguishing pumps.

15-12.5 Fire hoses in the internal area shall be rolled up on an axially connected reel.

15-12.6 Materials for fire-fighting equipment shall either be heat-resistant or shall be suitably protected against failure to work when subjected to high temperatures.

15-12.7 Fire-fighting systems shall be arranged in such a way that they can be completely drained to avoid the possibility of freezing.

15-12.8 The fire pumps shall:

- (i) be located in separate rooms;
- (ii) be such that they can be operated independently of each other;
- (iii) each be capable, on all decks, of maintaining the necessary pressure at the hydrants;
- (iv) be installed forward of the aft bulkhead.

Fire extinguishing pumps may also be used for general purposes.

15-12.9 Engine rooms shall be fitted with a fixed fire extinguishing system according to 10-3.6.

15-12.10 On cabin vessels there shall be:

- (i) two self-contained breathing apparatus sets;
- (ii) two sets of equipment consisting of at least a protective suit, helmet, boots, gloves, axe, crowbar, torch and safety-line; and
- (iii) four smoke hoods.

15-13 Safety organization

15-13.1 A safety rota shall be provided on board passenger vessels. The safety rota describes the duties of the crew and the shipboard personnel in the following eventualities:

- (i) breakdown;
- (ii) fire on board;

- (iii) evacuation of passengers;
- (iv) person overboard.

Specific safety measures for persons with reduced mobility shall be taken into consideration.

The crew members and shipboard personnel designated in the safety rota should be assigned their various duties, depending on the posts they occupy. Special instructions to the crew shall ensure that, in the event of danger, all doors and openings in the watertight bulkheads referred to in 15-2 shall be closed immediately.

15-13.2 The safety rota includes a safety plan, in which at least the following are clearly and precisely designated:

- (i) areas intended for use by persons with reduced mobility;
- (ii) escape routes, emergency exits and muster and evacuation areas as referred to in 15-6.8;
- (iii) life-saving appliances and ship's boats;
- (iv) fire extinguishers, fire hydrants and hoses and fire extinguishing systems;
- (v) other safety equipment;
- (vi) the alarm system referred to in 15-8.3(i);
- (vii) the alarm system referred to in 15-8.3(ii) and (iii);
- (viii) the bulkhead doors referred to in 15-2.5, and the location of their controls, as well as the other openings referred to in 15-2.9, 15-2.10 and 15-2.13 and 15-3.12;
- (ix) doors pursuant to 15-11.8;
- (x) fire dampers;
- (xi) fire alarm system;
- (xii) emergency power plant;
- (xiii) ventilation system control units;
- (xiv) shore connections;
- (xv) fuel line shut-offs;
- (xvi) liquefied gas installations;
- (xvii) public address systems;
- (xviii) radiotelephone equipment;
- (xix) first-aid kits.

15-13.3 The safety rota according to 15-13.1 and the safety plan according to 15-13.2 shall:

- (i) be duly stamped by the Administration; and
- (ii) be prominently displayed at an appropriate point on each deck.

15-13.4 Code of conduct for passengers shall be posted up in each cabin and also a simplified safety plan containing only the information referred to in 15-13.2(i) to (vi).

The instructions shall include at least:

- (i) emergency cases

- fire
- flooding
- general hazard
- (ii) description of various alarm signals
- (iii) information on
 - escape routes
 - what to do
 - need to keep calm
- (iv) information to prevent accidents due to
 - smoking
 - use of fire and open flames
 - opening windows
 - use of certain items of equipment

This information shall be prominently displayed in appropriate languages.

15-14 Exemptions for certain passenger vessels

15-14.1 Passenger vessels authorized to carry up to a maximum of 50 passengers and with a length L_{WL} of not more than 25 m, authorised to carry up to a maximum of 50 passengers shall prove adequate stability after damage according to paragraphs 15-3.7 to 15-3.13 or, as an alternative, prove that they comply with the following criteria after symmetrical flooding:

- (i) the immersion of the vessel shall not exceed the margin line; and
- (ii) the metacentric height GM_R shall not be less than 0.10 m.

The necessary residual buoyancy shall be assured through the appropriate choice of material used for the construction of the hull or by means of highly cellular foam floats, solidly attached to the hull. In the case of vessels with a length of more than 15 m, residual buoyancy can be ensured by a combination of floats and subdivision complying with the 1-compartment status according to 15-3.9.

15-14.2 If a vessel benefits from the derogations under 15-14.1, the equipment carried on board shall include – in addition to the life-saving equipment mentioned in 15-9.1 to 15-9.3 – collective life-saving equipment according to 10-5.1, in respect of 50 per cent of the maximum number of permitted passengers.

15-14.3 Where appropriate, the Administration may waive the application of 10-5.1.4 in the case of passenger vessels intended to carry a maximum number of 250 passengers and with a length L_{WL} of not more than 25 m, provided that they are equipped with a suitable installation to enable persons to be recovered safely from the water. Such installations shall be subject to the following conditions:

- (i) one person alone shall be able to operate the installation;
 - (ii) mobile installations are allowed;
 - (iii) the installations shall be outside the danger area of the propulsion systems;
- and

- (iv) effective communication shall be possible between the boatmaster and the person in charge of the installation.

15-14.4 The Administration may waive the application of 10-5.1.4 in the case of passenger vessels certificated to carry a maximum number of 600 passengers and with a length of not more than 45 m, provided that the passenger vessel is equipped with a suitable installation as in 15-14.3 and the vessel has:

- (i) a rudder propeller, a cycloidal propeller or a water jet as main propulsion; or
- (ii) a main propulsion system with 2 propulsion units; or
- (iii) a main propulsion system and a bow-thruster.

15-14.5 By way of derogation from 15-2.9, passenger vessels with a length not exceeding 45 m and permitted to carry at most a number of passengers corresponding to the length of the vessel in metres are allowed to have on board, in the passenger area, a manually controlled bulkhead door without remote control according to 15-2.5, if:

- (i) the vessel has only one deck;
- (ii) this door is accessible directly from the deck and is not more than 10 m away from the exit to the deck;
- (iii) the lower edge of the door opening lies at least 30 cm above the floor of the passenger area; and
- (iv) each of the compartments divided by the door is fitted with a bilge level alarm.

15-14.6 The provision of 15-1.2 (v) does not apply to passenger vessels with a length not exceeding 45 m when the liquefied gas installations are fitted with appropriate alarm systems for CO concentrations posing a health risk and for potentially explosive mixtures of gas and air.

15-14.7 The following provisions do not apply to passenger vessels with a length L_{WL} not exceeding 25 m:

- (i) 15-4.1 last sentence;
- (ii) 15-6.6 (iii), for the galleys, as long as a second escape route is available;
- (iii) 15-7.

15-14.8 For cabin vessels with a length of not more than 45 m 15-12.10 shall not be applied, provided smoke-hoods in a number corresponding to the number of berths are readily accessible in each cabin.

15-14.9 In addition to 1-1.8 the Administration may permit derogations for passenger vessels on its own territory without the restrictions in that section for the following:

- (i) 15-3.9, two-compartment status;
- (ii) 15-7, second independent propulsion system; and
- (iii) 15-11.15, smoke extraction systems.

15-14.10 For passenger vessels in accordance with 15-14.1 the competent authority may permit minor derogations from the clear height required in 15-6.3 (iii) and 15-6.5 (ii). The derogation shall not be more than 5 per cent. In the case of derogations the relevant parts shall be indicated by colour.

Appendix 3

Appendix 7

I. Lights and the colour of signal lights on vessels⁸

A. General

1. Technical requirements

The construction of and materials of signal lanterns shall be such as to ensure their safety and durability.

The components of the lantern (for example the cross braces) shall not modify the intensity, colours or dispersion of the light.

It shall be possible to install the lights on board simply and in the correct position.

It shall be easy to replace the light source.

B. Colour of signal lights

1. A five colour signal system is applied to the lights, and comprises the following colours:

“white”

“red”

“green”

“yellow” and

“blue”.

This system conforms to the recommendations of the International Commission on Illumination, “Colours of Signal Lights”, IEC publication No. 2.2 (TC-1.6) 1975.

The colours apply to the light fluxes emitted by the lantern.

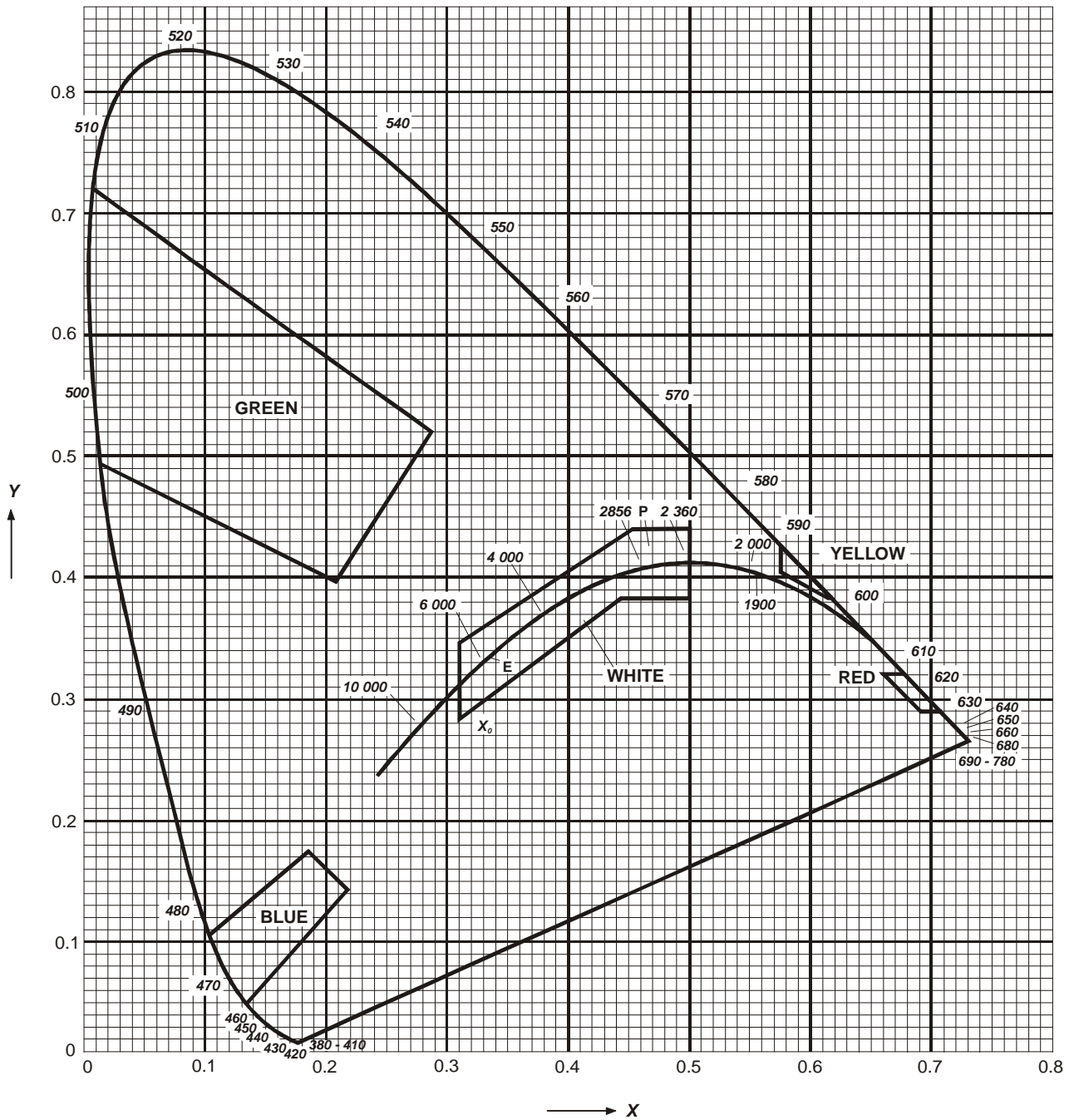
2. The colour boundaries of signal lights are demarcated by the coordinates (Table 1) of the intersecting points of the chromatic diagram of IEC publication No. 2.2 (TC-1.6) 1975 (Figure 1).

⁸ On the inland waterways of Belarus, Kazakhstan, Lithuania, Republic of Moldova, Russian Federation and Ukraine the colour of signal lights on vessels shall satisfy the requirements of the competent national authorities.

Table 1
Colour boundaries of signal lights

| <i>Colour of signal light</i> | <i>Coordinates of the intersecting points</i> | | | | | | |
|-------------------------------|---|-------|-------|-------|-------|-------|-------|
| White | x | 0.310 | 0.443 | 0.500 | 0.500 | 0.453 | 0.310 |
| | y | 0.283 | 0.382 | 0.382 | 0.440 | 0.440 | 0.348 |
| Red | x | 0.690 | 0.710 | 0.680 | 0.660 | | |
| | y | 0.290 | 0.290 | 0.320 | 0.320 | | |
| Green | x | 0.009 | 0.284 | 0.207 | 0.013 | | |
| | y | 0.720 | 0.520 | 0.397 | 0.494 | | |
| Yellow | x | 0.612 | 0.618 | 0.575 | 0.575 | | |
| | y | 0.382 | 0.382 | 0.425 | 0.406 | | |
| Blue | x | 0.136 | 0.218 | 0.185 | 0.102 | | |
| | y | 0.040 | 0.142 | 0.175 | 0.105 | | |

Figure 1
IEC chromaticity diagram



2360 K corresponds to the light of a vacuum filament lamp.

2848 K corresponds to the light of a gas-filled filament lamp.

II. Intensity and range of signal lights on vessels⁹

A. General

1. Signal lights

Signal lights are classified according to their luminous intensity as:

“ordinary lights”

“bright lights”

“strong lights”.

2. Relation between I_O , I_B and t

I_O is the photometric luminous intensity in candela (cd), measured at normal voltage for electric lights.

I_B is the operation luminous intensity in candela (cd).

t is the range in kilometres (km).

Taking into account, for example, the ageing of the light source, the degree of dirtiness of the optic and variations in the voltage of the on-board grid, I_B is 20 per cent less than I_O .

Consequently $I_B = 0.8 \cdot I_O$

The relation between I_B and t of signal lights is given by the following equation:

$$I_B = 0.2 \cdot t^2 \cdot q^{-t}$$

The atmospheric transmission coefficient q has been taken as 0.76, corresponding to a meteorological visibility of 14.3 km.

B. Intensity and range¹⁰

1. Luminous intensity and visibility range of signal lights

The following table contains the permitted limits for I_O , I_B and t according to the nature of signal lights. The values indicated apply to the light flux emitted by the lantern.

I_O and I_B are given in cd and t in nautical miles (nm) and kilometres (km).

⁹ On the inland waterways of Belarus, Kazakhstan, Lithuania, Republic of Moldova, Russian Federation and Ukraine, the luminous intensity and range of signal lights on vessels shall satisfy the requirements of the competent national authorities.

¹⁰ On certain inland waterways the competent authority may allow the carriage by vessels of signal lights in accordance with the requirements of the Convention on the International Regulations for Preventing Collisions at Sea (COLREG).

Table 2
Minimum and maximum values

| Nominal value of visibility range of signal lights | Minimum value of visibility range (t_{min}) | | Maximum value of visibility range (t_{max}) | | Operational luminous intensity (I_B) cd | Minimum horizontal photometric luminous intensity (I_O)* | Maximum horizontal photometric luminous intensity (I_O)* | Nature of signal lights |
|---|--|-------|--|-------|--|--|--|-------------------------|
| | nm | km | nm | km | | cd | cd | |
| 1 | 1 | 1.85 | 2 | 3.70 | 0.9 | 1.1 | 5.4 | Ordinary |
| 2 | 2 | 3.70 | 5 | 9.26 | 4.3 | 5.4 | 65 | Bright |
| 3 | 3 | 5.56 | 5 | 9.26 | 12 | 15 | 65 | Bright |
| 5 | 5 | 9.26 | 7.5 | 13.90 | 52 | 65** | 257 | Strong |
| 6 | 6 | 11.11 | 7.5 | 13.90 | 94 | 118** | 257 | Strong |

* To be measured in the laboratory.

** However, for daytime use of the strong yellow scintillating lights a minimum photometric luminous intensity I_o of 900 cd shall apply.

C. Signal light dispersion

1. Horizontal dispersion of intensity

(a) The luminous intensities indicated in section II apply to all directions of the horizontal plane passing through the focus of the optic or the luminous centre of gravity of the light source correctly adjusted within the operational sector of a vertically positioned lantern;

(b) For the masthead lights, stern lights and side lights, the luminous intensities prescribed shall be maintained throughout the horizontal arc within the sectors prescribed at least up to within 5° of the limits.

As from 5° within the sectors prescribed up to the limit, the luminous intensity may decrease by 50 per cent; it shall subsequently decrease gradually in such a way that, as from 5° beyond the limits of the sector, only a negligible amount of light remains;

(c) The side lights shall have the prescribed luminous intensity in the direction parallel to the axis of the vessel forward. The intensities shall decrease practically to zero between 1° and 3° beyond the limits of the prescribed sector;

(d) For bicoloured or tricoloured lanterns, the dispersion of the luminous intensity shall be uniform so that 3° on either side of the prescribed sector limits, the maximum permitted intensity is not exceeded and the minimum prescribed intensity is reached;

(e) The horizontal dispersion of the luminous intensity of the lanterns shall be uniform throughout the sector, so that the minimum and maximum values observed do not differ more than by a factor of 1.5 from the photometric luminous intensity.

2. Vertical dispersion of intensity

In the event of heeling of power driven vessels of up to $\pm 5^\circ$ or $\pm 7.5^\circ$ from the horizontal, the luminous intensity shall remain at least equal to 100 per cent in the first case, and 60 per cent in the second case, of the luminous intensity corresponding to 0° heeling, although it shall not exceed it by more than 1.2 times.

In the event of heeling of sailing vessels of up to $\pm 5^\circ$ or $\pm 25^\circ$ from the horizontal, the luminous intensity shall remain at least equal to 100 per cent in the first case, and 50 per cent in the second case, of the luminous intensity corresponding to 0° heeling, although it shall not exceed it by more than 1.2 times.

III. General technical specifications applicable to radar equipment

The technical parameters of radar installations must satisfy the following requirements:

| | |
|--|--|
| Minimum range of detection | 15 m |
| Maximum range of detection of shore 60 m high (at height of installation 10 m) | 32,000 m ¹¹ |
| Distance resolution | 15 m at scales 0.5–1.6 km; 1 per cent of the scale value at other scales |
| Angular resolution | 1.2° |
| Accuracy of measurement: range | 10 m for variable range circles; 1 per cent of fixed range circles at scales 0.5–2.0 km; 0.8 per cent of the value of the selected scale. |
| Accuracy of measurement: bearings line: | $\pm 1^\circ$ |
| Heading Width | 0.5° |
| Deviation | 0.5° |
| Effective diameter of screen indicator | 270 mm |
| Range scales | 0.5; 1; 1.6; 2; 3.2; 4; 8; 16; 32 km: not less than 4 fixed range circles within each scale |
| Off-centring | 1/4–1/3 of the effective diameter of the image |
| Bearing facilities: | |
| Timing | Up to 5 seconds |
| Error | $\pm 1^\circ$ |
| Transmission frequency | 9.3–9.5 GHz (3.2 cm) |
| Warm-up time | 4 minutes |
| Minimum antenna speed | 24 revolutions per minute |

¹¹ Maximum range of detection is only required to be ensured for radar equipment installed on vessels operated on large lakes, reservoirs and in coastal waters.