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INLAND TRANSPORT COMMITTEE

Working Party on Inland Water Transport

(Forty-ninth session, 17-19 October 2000,
agenda item 7 (b))

UPDATING THE EUROPEAN CODE FOR INLAND WATERWAYS (CEVNI)

Note by the secretariat

During its twentieth session, the Working Party on the Standardization of Technical and Safety Requirements in Inland Navigation (SC.3/WP.3) considered a proposal by the delegation of the Russian Federation (TRANS/SC.3/WP.3/2000/13) to supplement CEVNI with national rules of the Russian Federation and other Commonwealth of Independent States countries which cannot at the present stage be harmonized with the provisions of CEVNI and must therefore be annexed to it for information purposes only. The secretariat was asked to prepare, in collaboration with the delegation of the Russian Federation, a draft resolution of the Working Party SC.3 a draft resolution amending CEVNI with an appendix containing the above-mentioned national provisions (TRANS/SC.3/WP.3/40, para. 15).

The draft resolution is reproduced below.

Additions and Amendments to resolution No. 24 on CEVNI:
European Code for Inland Navigation

Resolution No.

(adopted on .. October 2000 by the Working Party
on Inland Water Transport)

The Working Party on Inland Water Transport,

Considering resolution No. 24 of the Working Party on Inland Water Transport concerning CEVNI: European Code for Inland Waterways (TRANS/SC.3/115), as amended by its resolutions Nos. 26 (TRANS/SC.3/115/Add.1), 27 (TRANS/SC.3/115/Add.2), 37 (TRANS/SC.3/115/Add.3) and 39 (TRANS/SC.3/115/Rev.1/Amend.1),

Noting that, through the application of these resolutions by Governments and river commissions, further progress has been made towards the harmonization of the corresponding regulations in force on European inland waterways,

Noting also the persistence of certain differences between CEVNI and the national regulations of [Belarus, Kazakhstan, Lithuania, the Republic of Moldova,] the Russian Federation and Ukraine which cannot at the present stage be harmonized with the provisions of CEVNI,

Wishing in the interests of shipping safety and the facilitation of international carriage on European inland waterways to inform the operators of craft engaging in inland and river-sea navigation of the specific requirements in the national regulations of the aforementioned countries,

At the same time noting the firm resolve of the Governments of those countries to continue to make every effort to harmonize their national regulations with the provisions of CEVNI to the greatest extent possible,

Noting also the report of the Working Party on the Standardization of Technical and Safety Requirements in Inland Navigation on the work of its twentieth session (TRANS/SC.3/WP.3/40, para. 15),

Proposes that the text of CEVNI should be amended by the addition of the text annexed to this resolution.

Annex

Addendum

**SPECIFIC REQUIREMENTS IN THE NATIONAL REGULATIONS OF [BELARUS,
KAZAKHSTAN, LITHUANIA, THE REPUBLIC OF MOLDOVA,] THE RUSSIAN
FEDERATION AND UKRAINE THAT DIFFER AT PRESENT
FROM THE PROVISIONS OF CEVNI**

Chapter 1

GENERAL PROVISIONS

Article 1.01 - Meaning of certain terms

(d) The term "small size craft" means any vessel with a hull less than 7 m long, including rowing boats of any length.¹

Chapter 3

VISUAL SIGNALS (MARKING) ON VESSELS²

Article 3.08 - Night marking for motorized vessels proceeding alone

1. Single motorized vessels shall carry:

(a) A masthead light; a vessel 50 m, but not more than 110 m, long may carry a second masthead light placed behind and above the forward light; a vessel 110 m or more long shall carry a second masthead light;

(b) Side lights;

(c) On vessels with a width of more than 5 m, three stern lights placed in a triangle with the base downwards or, on vessels with a width of not more than 5 m, one stern light placed on the centreline of the vessel.

2. Motorized displacement passenger vessels operating on ferry services or intra-urban lines within the limits of port waters and motorized ferries shall, when under way, carry in addition to the lights prescribed in paragraph 1 of the present article a yellow flashing light visible from all directions placed above the masthead light.

¹ The term "small size craft" should apply to a subcategory of "small craft", as defined in CEVNI article 1.01 (d).

² CEVNI prescribes day markings for vessels under way. The national regulations in force in the Russian Federation [Belarus, Lithuania, Republic of Moldova, Kazakhstan] and Ukraine make no provision for such markings.

Article 3.10 - Night marking for pushed convoys

1. The pushing vessel shall carry:
 - S Three masthead lights placed in the same plane in an equilateral triangle with the base downwards, the top light to be placed on the centreline of the vessel;
 - S Side lights;
 - S Three stern lights placed in the same plane in an equilateral triangle with the base downwards and above it a towing light, save that a vessel with a width of 5 m or less shall carry only a towing light.
2. Pushed vessels shall carry:
 - S In the case of a single vessel, one masthead light at the bow;
 - S In the case of a convoy, one masthead light at the bow of each leading vessel.

Article 3.14 - Additional night marking for vessels carrying out certain transport operations involving dangerous substances

1. Vessels carrying out the transport operations involving dangerous substances of Classes 1 and 2 that are referred to in Annex B.1, marginal 10 500, of the European Provisions concerning the International Carriage of Dangerous Goods by Inland Waterway (ADN) or vessels that have not been degassed following the transport of such substances shall carry, in addition to the lights prescribed in these regulations, two red masthead lights placed below the forward white light.
2. Vessels carrying out transport operations involving dangerous substances of Classes 3, 4 (other than ore or coal), 5, 6 or 7 or vessels that have not been degassed following the transport of such substances shall carry, in addition to the lights prescribed elsewhere in these regulations, one red masthead light placed below the forward white light.
3. Towing vessels or pushers shall carry, in addition to the lights prescribed in these regulations:
 - (a) If the convoy contains vessels such as are referred to in paragraph 1, two red masthead lights placed above the white lights or the triangle;
 - (b) If the convoy contains vessels such as are referred to in paragraph 2, one red masthead light placed above the white lights or the triangle;
 - (c) If the convoy contains vessels such as are referred to in paragraph 1 and in paragraph 2 (mixed convoy), two red masthead lights placed above the white lights or the triangle.

Article 3.16 - Night marking for ferry-boats under way

1. Ferry-boats not moving independently shall carry:
 - (a) A white light visible from all directions, placed at a height of not less than 5 m; this height may, however, be reduced to 3 m if the ferry-boat is not more than 15 m long;

(b) A yellow light visible from all directions, placed about 1 m above the light referred to in (a) above;

(c) The leading boat or float of a longitudinal-cable ferry-boat shall carry a white light visible from all directions, placed not less than 3 m above the water level.

The ferry cable shall be illuminated near each bank by lights covered at the top by protective visors.

2. A motorized vessel engaged in ferry traffic by pushing, or by towing on a cable or alongside a non-self-propelled vessel (ferry) shall carry, in addition to the prescribed lights, a flashing yellow light visible from all directions.

The non-self-propelled vessel shall carry: if being pushed, one white masthead light; if being towed and less than 50 m long, one white light visible from all directions; if being towed and more than 50 m long, two lights visible from all directions, placed at the bow and stern.

Chapter 5

WATERWAY SIGNS AND MARKING

Article 5.01 - Signs

Annex 7 to the Inland Waterway Navigation Rules of the Russian Federation [Belarus, Ukraine, Republic of Moldova and Kazakhstan] defines the prohibitory, mandatory and informative signs and gives their meanings.

Article 5.02 - Waterway marking

Annex 8 to the Inland Waterway Navigation Rules of the Russian Federation [Belarus, Lithuania, Republic of Moldova, Kazakhstan] defines the marking and lights which may be used to indicate the position of the channel on waterways and to regulate the movement of vessels.

Chapter 6

RULES OF THE ROAD

Article 6.02 - Small size craft

1. Small size craft shall remain outside the limits of the channel or of the prescribed traffic lanes. Where waterway conditions make this impossible, they may proceed along the channel within 10 m of its right-hand edge; in doing so, they shall not hamper other vessels' movement or manoeuvring in the channel and shall let them pass in good time without the exchange of sound or visual signals. Small size craft may not require other vessels to give way to them.

2. When two small size craft are crossing in such a manner that there is a risk of collision, the following rules shall apply:

S Motorized small size craft shall give way to all other small size craft;

S Small size craft that are neither motorized nor under sail shall give way to small size craft under sail.

3. When two craft under sail are crossing in such a manner that there is a risk of collision, one of them shall give way to the other as follows:

(a) When each craft has the wind on a different side, the craft with the wind on the port side shall give way to the other;

(b) When both craft have the wind on the same side, the craft which is to windward shall give way to the craft to leeward;

(c) If a craft which has the wind on the port side sees another craft to windward and cannot determine with certainty whether the other craft has the wind on the port or on the starboard side, it shall give way to that other craft. However, a craft which is on the starboard side of the channel shall maintain its course.

4. Small size craft and craft under sail may, if necessary, cross the channel (traffic lane, recommended course) or make turns involving crossing of the channel, generally astern of passing vessels. Any such manoeuvre ahead of an approaching vessel shall be made not less than 1 km from it.

The crossing shall be effected at an angle of close to 90 degrees and in as short a time as possible.

5. Small size craft and craft under sail may not, except when they are performing work-related tasks:

(a) Manoeuvre or stop in the vicinity of, or in the spaces between other vessels, dredgers, floating cranes, etc. that are under way or stationary;

(b) Stop or anchor within the limits of the channel (traffic lane, recommended course) or near floating navigation signs;

(c) Enter the channel in visibility of less than 1 km. Craft under sail may not enter the channel at night either.

Article 6.04 - Meeting: normal rules

1. Vessels on sections with two-way traffic shall proceed along the right-hand side of the traffic lane or, where that is difficult (because of waterway, hydrometeorological or other conditions), shall keep to the centreline of the channel, remaining ready to pass safely to port of oncoming vessels. To this end, each vessel shall, insofar as that is necessary and safe, veer in good time to starboard and shall continue in that manner until the oncoming vessel has been left astern.

2. The vessel proceeding upstream shall first, and in good time or, in the event that its field of view is restricted by waterway conditions, on sighting an oncoming vessel coordinate its actions by radiotelephone and give a visual signal from its port side.

The vessel proceeding downstream shall accept the side designated for passing and confirm it without delay by giving a visual signal.

3. In the event that, because of waterway conditions or any other reasons, passing is difficult, a vessel proceeding upstream shall, as soon as it detects a vessel proceeding downstream, regulate

its own movement in such a manner that the meeting occurs at the most convenient place. To this end, it shall, insofar as that is necessary and safe, veer in good time to starboard and shall pass the oncoming vessel to port.

4. When two vessels are meeting in such a manner that there is a risk of collision, each vessel shall alter its course to starboard so as to pass to port of the other.

5. When passing, vessels which do not have properly functioning radiotelephone sets and vessels which have been unable to communicate with each other by radiotelephone shall exchange sound signals.

Article 6.05 - Meeting: Departures from normal rules

1. In the event that passing an oncoming vessel to port is impossible, the vessel proceeding upstream shall move in good time to the most convenient place on the left-hand side of the channel, veer to port insofar as that is necessary and safe and pass the oncoming vessel to starboard. To this end, it shall coordinate its actions in advance by radiotelephone and by visual signals from its starboard side.

Article 6.22 bis - Navigation when passing floating equipment at work or grounded or sunken vessels or vessels with a limited ability to manoeuvre

1. A vessel approaching a dredger at work in the channel or a grounded vessel shall, at a distance of not less than 1 km, give the sound signal "Caution" (one long blast) and agree on the passing side by VHF radio.

2. A dredger engaged in deepening the channel shall free enough of the channel for the vessel to pass and shall indicate the passing side: at night, by two scintillating awning lights (green if the dredger has moved to the left-hand side and red if it has moved to the right); in the daytime, by a rhythmic light signal or a flag signal.

3. A dredger engaged in clearing the channel shall indicate the passing side: at night, by one scintillating light visible from all directions (white if it is working on the left-hand side of the channel and red if it is working on the right); in the daytime, by a rhythmic light signal or a flag signal.

4. On receiving the permission signal, the vessel shall give a visual signal from the side concerned and proceed, taking the requisite precautions.

5. The exchange of signals with, and the passing of a vessel engaged in underwater or diving operations in the channel (raising of wrecks, laying of pipes or cables, etc.) or a grounded vessel shall be effected in the same way as for dredgers engaged in clearing the channel.

6. When vessels are simultaneously approaching a dredger from upstream and from downstream, the vessel proceeding downstream or, irrespective of its direction, the high-speed vessel shall pass first.

7. When passing is impossible, dredgers and grounded vessels shall give the "Warning" signal (series of short blasts) in good time, but not less than 1 km from the approaching vessel.

A vessel which has received the "Warning" signal shall immediately stop until it receives permission to proceed without further inquiry.

8. A dredger shall not allow hopper barges servicing it to approach or move away while vessels are passing it.

E. PASSAGE UNDER BRIDGES AND THROUGH WEIRS AND LOCKS

Articles 6.24, 6.25 and 6.26 - Passage under bridges

1. Passage under bridges shall be permitted only through bays intended for that purpose and equipped with navigation signs and lights approved under State standards in force.

The centreline of the navigable bays of fixed bridges shall be indicated by:

- S For the passage of vessels coming from downstream: square boards;
- S For the passage of vessels coming from upstream: diamond-shaped boards;
- S For the passage of convoys of rafts: round boards; for the passage of small size craft: triangular boards.

The colour of the boards shall be red or white, depending on whether the background formed by the bridge structure is light or dark.

The lights on the boards shall be continuous:

- S For vessels coming from downstream or upstream: two red lights placed in the vertical;
- S For convoys of rafts: two green lights placed in the vertical.

To indicate the overhead clearance and the sides of the channel in bridge bays, one, two, three or four green or white square boards shall be installed on each bridge pier or at each side of the channel. The number of boards will show the height of the bay measured from the water level to be up to 10, 13, 16 m or more respectively.

All lights shall be green and fixed.

2. To indicate the navigable bay of a movable floating bridge, three lights shall be installed: two on the mobile part of the bridge and one at the end of the non-moving part.

The lights shall be fixed: red lights on the right-hand bank and green lights on the left-hand bank.

3. The passage of vessels through movable or floating bridges shall be regulated by the bridge owners with the help of traffic-light signals, in accordance with the following conventions:

- S One or more red lights shall mean "Passage prohibited";
- S One or more green lights shall mean "Passage permitted".

4. When approaching floating bridges, vessels shall, at a distance of not less than 1 km, give the "Caution" signal.

When passing under movable or floating bridges, vessels shall comply with the instructions of the body authorized to regulate navigation.

5. When vessels are simultaneously approaching a bridge having a single navigable bay from upstream and from downstream, the vessel proceeding downstream or, irrespective of its direction, the high-speed vessel shall pass under the bridge first.

6. When visibility is less than 1 km, vessels and pushed convoys shall only be permitted to pass under bridges if the navigable bays are fitted with navigation aids that enable the bays to be recognized reliably at a distance of not less than 0.5 km and vessels to orient themselves with confidence (visually or with the aid of instruments) on the approach to them. In addition, the width of the navigable bays shall be:

(a) For single vessels and single-file convoys: not less than five times the width of the vessel (convoy);

(b) For other pushed convoys: not less than three times the width of the convoy.

Article 6.27 - Passage through weirs

1. Passage through an opening in a weir shall be permitted if the opening is marked to the right and to the left by signs:

(a) To the right: two red lights at the upper and lower corners of the opening;

(b) To the left: two white lights at the same points.

2. Prohibition of passage through an opening in a weir shall be indicated by one or more red lights or (in the daytime) red-white-red boards.

Article 6.28 - Passage through locks

1. Vessels proceeding towards locking must notify the lock controller by radiotelephone not less than 1.5 hours beforehand (or, where this is impossible, as soon as reliable communication can be established) of the estimated time of approach to the limits of the lock.

2. The boatmaster shall, on approaching the limits of the lock, but at a distance of not less than 1 km, request from the lock controller by radiotelephone detailed information concerning the order of locking and give notice of his readiness for locking.

3. Passenger hydrofoils and hovercraft shall, in the event of joint locking, enter the lock chamber last and be positioned in such a manner that the only displacement vessels on their beam are small size craft.

4. Vessels carrying explosive or toxic substances shall enter locks in accordance with the locking schedule without stopping at tie-up walls.

5. On vessels heading for locking, the crew shall check the steering and the propelling-machinery remote-control system for reliability of operation, as well as the presence of the requisite air pressure in the starting-air bottles for the main engines.

6. Vessels (convoys) shall enter locks at a safe speed so as to avoid damaging the gates or protective devices or other vessels present in the lock and so that they can be stopped at their designated mooring places. To this end, it is recommended that, on displacement vessels having two or more main engines, one of the engines should be put into reverse in good time.

7. Vessels having a length of more than 75 m should be moored by not less than two mooring lines on one side.

For mooring to lock-chamber bollards, the lock staff shall apportion the requisite number of mooring hands. Mooring to floating mooring rings shall be effected by the crew of the vessel.

8. Joint locking of vessels shall be permitted as follows:

- S Tankers and petroleum-product convoys carrying cargoes (or residues thereof) of any Class in any combination;
- S Dry-cargo vessels/convoys (other than vessels carrying toxic or explosive or other flammable cargoes) and dredgers and marker vessels with tankers carrying petroleum products (or residues thereof) having a vapour flashpoint of 60° C or higher;
- S Passenger vessels (including high-speed vessels) with dry-cargo vessels/convoys (other than vessels carrying toxic or explosive or inflammable cargoes) or dredgers and marker vessels, as well as with tankers carrying fuel oil (or residues thereof) that is at a temperature of no more than 45° C and has a vapour flashpoint of 60° C or higher.

9. In the event of joint locking, the following rules shall apply:

(a) Tankers shall, as a rule, enter the lock and take up position first; mooring of passenger vessels abeam of tankers shall be prohibited and the gap between a tanker and a passenger vessel shall be not less than 10 m;

(b) Dry-cargo vessels may be placed in a lock chamber abeam of a tanker providing the gap between the sides of the vessels is not less than 1 m;

(c) Tankers and other vessels that are locked jointly shall take the special fire precautions provided for in such cases.

10. Compliance with the instructions of the lock controller (watch-leader) concerning the positioning of vessels along tie-up walls, the order of locking and the positioning of vessels in the lock chamber shall be mandatory for the boatmasters of all vessels, who shall confirm receipt of those instructions by radiotelephone or, if the radiotelephone is out of order, by a sound signal.

If a boatmaster considers that an instruction he has received cannot be carried out, he must inform the lock controller accordingly and may not take any action until an agreed decision has been reached.

Article 6.28 bis - Entering and leaving locks

1. Vessels may only enter a lock chamber, move from one chamber to another or leave a chamber when the entry (exit) traffic light shows a green signal.

In the event of two-way locking, the vessels may only begin to move into the lock when the intermediate traffic light shows a green signal.

2. The absence of a signal from a traffic light is a prohibitory signal (equivalent to a red light). In such a case, a vessel may only continue moving with the permission of the lock controller as recorded in writing in the vessel's log and the lock records.

F. REDUCED VISIBILITY - NAVIGATION BY RADAR

Article 6.30 - General rules for navigation in visibility of less than 1 km

1. The rules of the present article shall apply to all vessels and convoys, with the exception of small size craft and craft under sail, during navigation in visual visibility of less than 1 km on inland waterways where the marking is to the sides and during navigation on waterway sections with navigation signs that are not illuminated at night.

2. Vessels shall be permitted to move in visibility of less than 1 km only if they have on board and use the following:

- (a) A radar set and a device indicating their rate of turn that are in good working order;
- (b) A radiotelephone providing vessel-to-vessel and vessel-to-shore communication that is in good working order;
- (c) A device for emitting sound signals.

3. Movement on any inland waterway (other than waterways of zone "M")³ in visibility of less than 1 km shall be prohibited for passenger vessels and vessels carrying petroleum products having a vapour flashpoint of less than 60° C or residues thereof or explosive or toxic substances or residues thereof.

4. Movement in visibility of less than 1 km shall be permitted for vessels other than those referred to in paragraph 3 of this article depending on the size of the channel, as follows:

- (a) When the width of the channel is less than 100 m: movement by single vessels and pushed convoys having a single non-self-propelled vessel upstream only;
- (b) When the width of the channel is 100 m or more, but less than 200 m: movement by single vessels in both directions, and movement by pushed convoys upstream only;
- (c) When the width of the channel is 200 m or more: movement by vessels and convoys in both directions (in these conditions, movement by convoys of rafts shall only be permitted on lakes and reservoirs);
- (d) On canals irrespective of the width of the channel: movement by single vessels and pushed convoys in both directions.

³ Note by the secretariat: the Working Group may wish to explain in a footnote that waterways of zone "M" are assimilated to maritime waterways.

5. In reduced visibility, passing and overtaking of vessels (convoys) shall be prohibited on sections where the channel has a width of less than 200 m if visual visibility is less than three vessel (convoy) lengths.

6. Vessels shall keep, in addition to a visual and a listening watch, a continuous radar watch by qualified crew.

When navigating by radar, there shall always be in the wheelhouse two boatmasters, one of whom shall be the captain or a steersman holding qualifications as a captain and helmsman.

7. When conducting radiotelephone conversations, it must be clearly established, by giving of the position relative to discernible reference points, that the conversation is indeed being conducted with the vessel with which action must be coordinated.

8. Vessels under way or stationary in reduced visibility must give the following signals:

Single vessels under way: one long blast;

Convoys and rafts under way: one long and two short blasts at intervals of not more than one minute;

Single vessels or convoys at anchor or aground within the limits of the channel: one short, one long and one short blast;

A non-self-propelled vessel with a crew at anchor or aground within the limits of the channel: frequent peals of a bell or blows on a metal object.

Article 6.32 - Provisions for vessels navigating by radar

1. As soon as they see on the radar screen vessels (echoes) whose positions or movement may cause a dangerous situation, or when they are approaching a section where vessels not yet visible on the screen may be present, vessels navigating by radar shall:

(a) If single vessels, give one long blast, and if convoys, two long blasts. The signal shall be repeated as often as necessary;

(b) Give oncoming vessels, by radiotelephone, the information necessary for safe navigation;

(c) Reduce speed and, if necessary, stop.

2. A vessel which has only detected the presence of another vessel by radar must determine whether a situation of excessive proximity and danger of collision is developing. If that is the case, it shall take action in good time to pass. When that action is to change course, it shall, so far as that is possible, avoid:

(a) Changing course to port if the other vessel is forward of its beam and cannot be overtaken;

(b) Changing course towards a vessel that is on or abaft its beam.

3. In visibility of less than 1 km, vessels and convoys proceeding in the same direction that do not intend to overtake one another shall maintain between themselves a safe distance, which shall not in any event be less than five times the vessel's braking distance at the speed in question.

4. In visibility of less than 1 km, vessels shall agree in good time by radiotelephone on the most convenient point for passing and shall only pass each other to port as follows:

(a) A vessel proceeding upstream shall, on approaching the agreed point, veer aside or reduce speed to a minimum and pass the oncoming vessel (convoy) to port;

(b) A vessel proceeding downstream shall, on approaching the agreed point, reduce speed in good time to a minimum, veer to starboard insofar as that is necessary and safe and continue in that manner until the oncoming vessel has been left astern;

(c) A vessel proceeding upstream shall pass a convoy of rafts on the side indicated by the vessel towing the convoy.

5. A vessel that is overtaking another in visibility of less than 1 km shall, by radiotelephone, obtain permission to overtake and reach agreement on the overtaking point and the precautions to be taken by each vessel.

Vessels and convoys shall only be overtaken on their port side; convoys of rafts shall be overtaken as indicated by the raft-convoy master.

Annex 4

COLOURS OF LIGHTS ON VESSELS

1. Lights on vessels may be green, white, yellow or red.

The colour characteristics of signal lights should correspond to the standards given below, which fall within the chromaticity limits established for each colour by the International Commission on Illumination (CIE): CIE technical report 02.2-1975: Colours of light signals, 2nd ed.

The boundaries for each colour are defined by the coordinates given in Table 1.

Table 1

Light colour	Coordinate	Intersecting Points					
		1	2	3	4	5	6
Red	x	0.680	0.660	0.735	0.721	S	S
	y	0.320	0.320	0.265	0.259	S	S
Green	x	0.028	0.009	0.300	0.203	S	S
	y	0.385	0.723	0.511	0.356	S	S
White	x	0.525	0.525	0.452	0.310	0.310	0.443
	y	0.382	0.440	0.440	0.348	0.283	0.382
Yellow	x	0.612	0.618	0.575	0.575	S	S
	y	0.382	0.382	0.425	0.406	S	S

Annex 5**INTENSITY AND RANGE OF SIGNAL LIGHTS ON VESSELS**

The intensity I in candela of a light for the visibility range stipulated in Table 2 must be not less than that defined by the formula

$$I = 3.43 \times 10^6 \text{ TD}^2 k^{-D}$$

where $T = 2 \times 10^{-7}$ lux, the light threshold;
 D = the visibility range in nautical miles;
 $K = 0.8$, the atmospheric transmission coefficient corresponding to a meteorological optical range of approximately 13 nautical miles.

Intensity values calculated in accordance with this formula are given in Table 2.

The maximum permitted intensity may exceed the values shown in Table 2 by up to 70 per cent but must not be greater than 150 cd. This should not be attained by regulating the intensity of the light. The use of reflectors in signal and side lights is not permitted.

Table 2

Visibility range, D						
Nautical miles	1	2	3	4	5	6
km	1.85	3.7	5.55	7.4	9.26	11.1
Light intensity, I (cd) where $k = 0.8$	0.9	4.3	12	27	52	9/1

Visibility ranges and angles of illumination are shown in Table 3.

Table 3

No.	Type and colour of signal light	Visibility range (km)	Horizontal area illuminated	
			Angle of illumination (°)	Arc of visibility
1	Masthead light, white	8	225	In the diametral plane of the vessel, from the bow to 112.5° on either beam
2	Starboard side light, green	3.7	112.5	From directly ahead of the vessel to 22.5° abaft the starboard beam
3	Port side light, red	3.7	112.5	From directly ahead of the vessel to 22.5° abaft the port beam
4	Stern light, white	3.7	135	From directly astern the vessel to 67.5° on either beam
5	Towing light, white	3.7	135	Ditto
6	Circular light, white	3.7	360	In all directions
	Circular light, red	1.85		
	Circular light, green	1.85		
	Circular light, yellow	1.85		
7	Bi-coloured lantern, green and red	1.85	225	To 112.5° either side of the bow in the diametral plane: starboard - green sector, port - red sector
8	Mooring and side light, white	3.7	180	90° forward and aft of the beam
9	Flashing light:		112.5+	From the beam to the bow, overlapping in the diametral plane by 22.5°, and from the beam to the stern, overlapping in the diametral plane by 22.5°
	daytime	2	+112.5	
	night-time	4		
10	Sweeping light	4	112.5+ +112.5	Ditto

Notes:

1. The visibility range of the white masthead lights carried by self-propelled vessels less than 20 m in length should not be less than 5.5 km; that of the red masthead lights, not less than 3.7 km.
2. The visibility range of the lights carried by self-propelled vessels less than 12 m in length should not be less than:

Masthead lights	3.7 km
Side lights	1.85 km

3. The visibility range of the lights carried by non-self-propelled vessels should not be less than:

Masthead lights on vessels 50 m and more in length	4 km;
Masthead lights on vessels less than 50 m in length	2 km;
Circular lights	1.85 km.

The use of lights meeting the requirements of the 1972 International Regulations for Preventing Collisions at Sea (RIPAM) shall be permitted.
