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RECOMMENDATION ON RECOMMENDED PRACTICES FOR
NAVIGATION LIGHTS

RESOLUTION A.177(VI)
adopted on 28 October 1969

THE ASSEMBLY,

NOTING Article 16(i) of the IMCO Convention concerning
the functions of the Assembly,

NOTING FURTHER Recommendation 51 of the International
Conference on Safety of Life at Sea, 1960 which recommended
studies concerning transmissivity and chromaticity of ships'
navigation lights,

RECOGNIZING the need for uniform and improved performance
standards of ships' navigation lights as well as lights referred
to in the Regulations for Preventing Collisions at Sea, 1960,

DESIRING to ensure early identification among vessels of
their respective attitudes and conditions of operation,

HAVING CONSIDERED the Recommendation adopted by the
Maritime Safety Committee at its eighteenth session,

ADOPTS the Recommendation on Recommended Practices for
Navigation Lights, the text of which appears in the Annex to
this Resolution,

INVITES all Governments concerned to take steps for the
implementation of the Recommendation.

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ANNEX

RECOMMENDATION ON RECOMMENDED PRACTICE FOR NAVIGATION LIGHTS

The following recommended performance standards refer to Part B - Lights and Shapes - of the International Regulations for Preventing Collisions at Sea and are intended to ensure early identification among vessels of their respective attitudes and conditions of operation.

1. Colour

The chromaticities of all navigation lights should conform to the following standards, which lie within the boundaries specified by the International Commission on Illumination (CIE) but are restricted in various respects as explained below.

- 1.1 Red: the restricted area specified by the European Code for Inland Navigation (CEVNI) corresponding to the CIE area except at the yellow boundary. This is at $y = 0.320$ instead of $y = 0.335$ in order to avoid any possibility of an orange appearance. The recommended co-ordinates of the corners of the area are:

x	0.680	0.660	0.735	0.721
y	0.320	0.320	0.265	0.259

- 1.2 Yellow: the restricted area specified by CEVNI, which omits the paler yellow part of the CIE area in order to minimize confusion with white. The recommended co-ordinates of the corners of the area are:

x	0.612	0.618	0.575	0.575
y	0.382	0.382	0.425	0.406

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- 1.3 Green: the restricted green area proposed by the CIE in their 1967 revision of the 1959 document on Colours of Light Signals, but slightly extended on the boundary towards white in order to include many existing national regulations which are found satisfactory in practice. The recommended co-ordinates of the corners of the area are:

x	0.028	0.009	0.300	0.203
y	0.385	0.723	0.511	0.356

- 1.4 Blue: the area specified by CEVNI, which is smaller than that of the CIE and less easily confused with white at extreme range. The recommended co-ordinates of the corners of the area are:

x	0.136	0.218	0.185	0.102
y	0.040	0.142	0.175	0.105

- 1.5 White: the CIE area is recommended except for a limitation to $x = 0.525$ at the yellow boundary in order to minimize confusion with yellow. Light sources with colour temperatures as low as that of the paraffin flame are still included within the area. The recommended co-ordinates of the corners of the area are:

x	0.525	0.525	0.453	0.310	0.310	0.443
y	0.382	0.440	0.440	0.348	0.283	0.382

- 1.6 Note for information:

Some of these co-ordinates may introduce difficulties in compliance for some existing oil lanterns. Member Governments may therefore find it necessary to allow a period of grace before adopting the new standards.

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2. Intensity

2.1 Minimum intensity

The minimum intensities of navigation lights should be specified by using the formula accepted by the CIE, namely:

$$I = 3.43 \cdot 10^6 \cdot T \cdot D^2 \cdot K^{-D} \text{ where}$$

I - light intensity (candela)

T - threshold factor 2×10^{-7} (lux)^{1/}

D - visibility range of ship's light
(nautical miles)

K - atmospheric transmissivity factor per
nautical mile^{2/}

and the value of K should be as follows:

(a) for new power-driven vessels, $K = 0.8$ or less;

1/ Threshold factor: The value of T is an extreme threshold value with no factor of safety.

2/ Atmospheric transmissivity factor: Values of K have been measured in the Baltic-North Sea area with the following results:

K = 0.9 on less than 1% of occasions;

K = 0.8 on approximately 35% of occasions;

K = 0.74 on approximately 50% of occasions.

It is accepted that for many years $K = 0.9$, which just about corresponds to the intensity of light given by an oil lantern, may have satisfied the requirement of "visible on a dark night with a clear atmosphere". Whilst many ships may still be using lanterns corresponding to this value, the aim should be to adopt $K = 0.8$ which can be complied with by electric lanterns.

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(b) for existing power-driven vessels with electric generators or batteries, whenever it is reasonable and practicable,
 $K = 0.8$ or less;

(c) for all other vessels, $K = 0.9$ or less.

2.2 Maximum intensity

To avoid undue glare, the intensity of a navigation light should not exceed 100 candelas under any circumstances.

TABLE OF LIGHT INTENSITIES OF NAVIGATION LIGHTS
IN THE HORIZONATAL PLANE

Visibility Nautical miles	Intensity in candelas for:		
	$K = 0.9$	$K = 0.8$	$K = 0.74$
1	0.76	0.86	0.93
2	3.4	4.3	5.0
3	8.5	12	15
5	29	53	77

3. Horizontal Sectors

The horizontal sectors of navigation lights should ensure that at least the minimum intensities are maintained over the arcs of the horizon prescribed by the governing rules of Part B. In the forward direction, port and starboard lights as fitted on the ship must show the minimum prescribed intensities; these must decrease to reach cut-off between 1° and 3° outside the

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prescribed sectors. At $22\frac{1}{2}^{\circ}$ (2 points) abaft the beam the following considerations apply: from 5° inside the prescribed sectors the lateral intensity may decrease by 50% up to the prescribed limit; it shall decrease steadily to reach cut-off between 2° and 5° outside the prescribed limit.

4. Vertical Sectors

The vertical sectors of electrical navigation lights should ensure that:

- (a) at least the prescribed minimum intensity is maintained at all angles from 5° above the horizontal to 5° below; and
- (b) at least 60% of the prescribed minimum intensity is maintained from $7\frac{1}{2}^{\circ}$ above the horizontal to $7\frac{1}{2}^{\circ}$ below.

In the case of lanterns other than electrical these provisions shall be fulfilled as nearly as possible.

5. Spare lanterns

If the spare lanterns are non-electric, they must have at least the minimum intensities corresponding to a K value of 0.9.

6. Acceptance

The construction of navigation lanterns and their performance as installed aboard the vessel should be to the satisfaction of the Administration.

COLOURS OF NAVIGATION LIGHTS:
LIMIT AREAS ON C.I.E.
CHROMATICITY CHART



