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| IALA RECOMMENDATION |

R0200-2 (E200-2)

Marine Signal Lights - Calculation, Definition and Notation of Luminous Range

Edition 2.0

December 2017

Revisions to this IALA document are to be noted in the table prior to the issue of a revised document.

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| Date | Details | Approval |
| December 2008 | 1st Edition | Council |
| December 2017 | Entire document to align with IALA strategy |  |
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THE IALA COUNCIL

**RECALLING:**

1. The function of IALA with respect to Safety of Navigation, the efficiency of maritime transport and the protection of the environment.
2. Article 8 of the IALA Constitution regarding the authority, duties and functions of the Council.

**RECOGNISING**

1. the need to publish the performance of marine signal lights.
2. the need to specify, design and quantify the performance of marine signal lights worldwide.

**NOTING** this document only applies to marine Aid-to-Navigation lights installed after the date of this publication,

**ADOPTS** the tables and charts in the annex of this recommendation,

**INVITES** Members and marine aids to navigation authorities worldwide to implement the provisions of the Recommendation

**RECOMMENDS**

* that National Members, other appropriate Authorities and manufacturers providing marine aids to navigation services design, specify and publish the performance of marine Aid-to-Navigation signal lights in accordance with this recommendation.
* that all luminous range calculations are based on Allard’s law:

Where: *I* is the luminous intensity of the light [cd]

*Er* is the required illuminance at the eye of the observer [lx]

*D* is the luminous range in metres [m]  
*V* is the meteorological visibility in metres [m]

* that the Nominal Range of a maritime signal light is calculated for a meteorological visibility of 10 nautical miles (18 520 m) and an illumination at the eye of the observer:
  + of 2 × 10-7 lx for night time range
  + of 1 × 10-3 lx for day time range
* that the Nominal Range of lights intended for the guidance of shipping should be published in the “Lists of Lights”. The following information should be published:
  + The nominal range of lights intended for the guidance of shipping by night;
  + Where applicable, the nominal range of lights intended for the guidance of shipping by day;
  + Nomograms permitting mariners to estimate the luminous range of lights intended for the guidance of shipping by day or by night as a function of their nominal range and the prevailing meteorological visibility.
* that the intensity used for range calculation takes into account the influence of the flash character and profile (R0200-4 Marine Signal Lights – Determination and Calculation of Effective Intensity).
* that the calculation takes into account a service condition factor.

1. LUMINOUS RANGE FOR NIGHT TIME

The chart is based on an illuminance is .



1. Luminous Range Diagram - Night Time
2. Night time nominal range table (rounded off to the nearest nautical mile)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Luminous  intensity | Nominal range (rounded) | Luminous intensity | Nominal range (rounded) | Luminous intensity | Nominal range (rounded) |
| candelas  (cd) | nautical miles (M) | kilocandelas  (103 cd) | nautical miles (M) | Megacandelas  (106 cd) | nautical miles (M) |
| 1 - 2 | 1 | 0.633 – 1.06 | 9 | 0.927 – 1.35 | 26 |
| 3 - 9 | 2 | 1.07 – 1.75 | 10 | 1.36 – 1.96 | 27 |
| 10 - 23 | 3 | 1.76 – 2.84 | 11 | 1.97 – 2.84 | 28 |
| 24 - 53 | 4 | 2.85 – 4.53 | 12 | 2.85 – 4.11 | 29 |
| 54 - 107 | 5 | 4.54 – 7.13 | 13 | 4.12 – 5.93 | 30 |
| 108 - 203 | 6 | 7.14 – 11.1 | 14 | 5.94 – 8.53 | 31 |
| 204 - 364 | 7 | 11.2 – 17.1 | 15 | 8.54 – 12.2 | 32 |
| 365 - 632 | 8 | 17.2 – 26.1 | 16 | 12.3 – 17.5 | 33 |
|  |  | 26.2 - 39.7 | 17 | 17.6 – 25.1 | 34 |
|  |  | 39.8 – 59.9 | 18 | 25.2 – 35.9 | 35 |
|  |  | 60.0 – 89.8 | 19 | 36.0 – 51.2 | 36 |
|  |  | 89.9 - 133 | 20 | 51.3 – 72.9 | 37 |
|  |  | 134 -198 | 21 | 73.0 - 103 | 38 |
|  |  | 199 - 293 | 22 | 104 -147 | 39 |
|  |  | 294 - 432 | 23 | 148 - 209 | 40 |
|  |  | 433 - 634 | 24 |  |  |
|  |  | 635 - 926 | 25 |  |  |

1. LUMINOUS RANGE FOR DAYTIME

The chart is based on an illuminance is .



1. Luminous range diagram – day time
2. Day time nominal range table (rounded off to the nearest nautical mile)

|  |  |  |  |
| --- | --- | --- | --- |
| Luminous  intensity | Nominal  range (rounded) | Luminous intensity | Nominal range (rounded) |
| kilocandelas  (103 cd) | nautical miles (M) | Megacandelas  (106 cd) | nautical miles (M) |
| 1 – 12.0 | 1 | 1.02 – 1.82 | 7 |
| 12.1 – 45.3 | 2 | 1.83 – 3.16 | 8 |
| 45.4 – 119 | 3 | 3.17 – 5.32 | 9 |
| 120 – 267 | 4 | 5.33 – 8.78 | 10 |
| 268 – 538 | 5 | 8.79 – 14.2 | 11 |
| 539 – 1010 | 6 | 14.3 – 22.6 | 12 |
|  |  | 22.7 – 35.6 | 13 |
|  |  | 35.7 – 55.5 | 14 |
|  |  | 55.6 – 85.6 | 15 |
|  |  | 85.7 – 130 | 16 |
|  |  | 131 – 198 | 17 |