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| IALA Recommendation |

E-200-3

on Defintions of Marine Signal Lights Performance

Edition 2.0

Document date

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 | Page / Section Revised | Requirement for Revision |
| 4 Dec 2008 |  | Edition 1 |
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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. that for the adequate performance of marine signal lights, both their photometric and colorimetric parameters have to be ensured;
2. that a great variety of light sources have been and are still being developed;
3. that there are many different methods and equipment for the measurement of light.

**NOTING** that

1. defined standards for photometry and colorimetry should be used worldwide to ensure the quality of signal lights for mariners;
2. that this document only applies to marine Aid-to-Navigation signal lights that are installed after the publication date of this document;
3. that there should be available laboratories, which are working according to this documentation, for all IALA members and other appropriate Authorities which could be operated by themselves, by other Authorities in the same country or another country, or by private companies;

**CONSIDERING** the proposals of the ENG Committee,

**ADOPTS** the Recommendation on Marine Aid-to-Navigation Signal Lights in the Annex of this recommendation; and,

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

**RECOMMENDS** that

* National Members and other appropriate Authorities providing marine aids to navigation services carry out photometric and colorimetric measurements of Marine Aid-to-Navigation Signal Lights in accordance with this recommendation;
* Industrial Members shall specify the performance of their visual aids-to-navigation in accordance with this recommendation;

**REQUESTS** the ENG Committee or such other committee as the Council may direct to keep the Recommendation under review and to propose amendments as necessary.

**REVOKES** IALA Recommendation E-200-3 Edition 1.

1. Definitions of marine signal Lights performance
2. Overview

The definitions contained within this annex should be considered as the minimum requirement when reporting on the performance of a Marine Signal Lights. Where additional definitions are required for a particular application, they shall not conflict with definitions given below.

1. measurement Geometry

Make reference to CIE Documents CIE 43 Photometry of Floodlights 1979 and remove CIE 121 1996.

1. Luminous Intensity versus Angle

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| **Vertical Divergence** | For omnidirectional lights, performance shall be based on a minimum of three vertical planes, preferably including and equidistant from the reference vertical plane or datum.  For directional or sector lights, the performance shall be based on the vertical divergence at the centre of each sector or optical axis.  The average of all Full Width Half Maximum (FWHM) values shall be reported as the vertical divergence, along with the maximum deviation from horizontal plane of the maximum intensity. |
| **Horizontal Divergence** | For directional beacons, the Full Width Half Maximum value shall be measured in the horizontal plane and reported as the horizontal divergence, along with the deviation from the reference vertical plane of the maximum. |
| **Intensity** | The intensity of a sector shall be defined as the 10th percentile of the intensity measured across the sector. |

1. Luminous Intensity versus Time

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| **Flash Duration** | The duration of the measured flash profile should be taken from the point in time when the intensity first exceeds 50% of the peak intensity value to the point in time when the intensity finally falls below 50% of the peak intensity value. The end of a flash should be considered as when the intensity falls below 5% of the peak intensity value for more than 100 ms. |
| **Effective Intensity** | The effective intensity shall be determined using the method described in IALA Recommendation E-200-4. The effective intensity shall be scaled to represent the 10th percentile intensity of the sector being measured.  When a group of flashes make up a flash character, the reported effective intensity shall be that of the lowest flash effective intensity in the group. |
| **Nominal Range** | The nominal range shall be determined using the reported effective intensity by applying the method described in IALA Recommendation E-200-2. The application of performance measurement uncertainty shall allow for 95% confidence in the result. |

1. Colour and Sectors

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| **Signal Colour** | The measured colour of the light should be reported in x, y coordinates according to the CIE 1931 chromaticity chart. Compliance, or not, with the appropriate IALA colour region should also be reported with reference to IALA Recommendation E-200-1. |
| **Sector Boundary** | The sector boundary is the angle at which the colour of the sector first exits the colour region as defined in IALA Recommendation E-200-1. If Sector Boundaries of the same Signal Colour occur with 0.1° of each other, then only the Sector Boundary that is closest to the main body of the sector shall be recorded. |
| **Sector of Uncertainty** | The Sector of Uncertainty shall be the largest angle between adjacent recorded Sector Boundaries. |