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| IALA RECOMMENDATION |

IALA Recommendation E-200-4

Determination and Calculation of Effective Intensity

Edition 1.0

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 |
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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 the performance of flashing lights needs to be determined.
2. that there are several methods of determining the performance of flashing lights at the threshold of visual perception.
3. that there is growing evidence of a method for determining the performance of flashing lights as observed at levels above the threshold of illuminance.

**NOTING**

1. that defined standards for the determination of the performance of flashing lights shall 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.

**CONSIDERING** the proposals of the ENG Committee, their lights experts and the IALABATT/IALALITE working group,

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

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

**RECOMMENDS** that IALA Members and other appropriate Authorities providing marine aids to navigation adopt the Modified Allard Method described in ANNEX A for the determination and calculation of effective intensity of a rhythmic light.

1. Modified Allard Method
2. Continuous-time Version

In the Modified Allard Method, given that *I(t)* is the instantaneous intensity of a flash, the effective intensity, *Ie*, is determined by:

1. : Modified Allard Method

Where:

s for night and daytime use for colours except blue where s for night time use.

1. Discrete-time Version

The method allows for discrete time-resolved flash data, *I(t)*, by utilising the following equation to calculate the convolution product, *i(tj)*:

1. : Discrete-time Convolution Equation

Where:

s for night and daytime use for colours except blue where s for night time use.

*N* is the number of data points.

*tk* is the time of the k-th data point.

*tj*is the time of the j-th data point.

The effective intensity, *Ie*, is then calculated using

1. : Effective Intensity from the Discrete-time Convolution Equation

Where:

*i(tj)* is calculated in Equation 2.