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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 COUNCIL

**RECALLING** the function of IALA with respect to Safety of Navigation, the efficiency of maritime transport and the protection of the environment;

**RECOGNISING** that for the adequate performance of marine signal lights the performance of flashing lights needs to be determined;

**RECOGNISING ALSO** that there are several methods of determining the performance of flashing lights at the threshold of visual perception;

**RECOGNISING FURTHER** that there are no adequate methods for determining the performance of flashing lights at observer levels above the threshold of illuminance;

**NOTING** that defined standards for the determination of the performance of flashing lights should be used worldwide to ensure the quality of signal lights for mariners;

**NOTING ALSO** 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 annexes of this recommendation; and,

**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:

for night time use

*T* is the total length of the flash (seconds).

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:

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.