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Author(s) / Submitter(s) China MSA

Cover Note on IALA Guideline Draft

Measurement of Marine Lights Performance

# Summary

The transformation of marine lights measurement recommendations into guidelines is a task within the IALA ENG 2023-2027 work plan. Its objective is to develop existing Recommendation E200-3 into a guideline pertaining to the principles and techniques of marine light measurement. According to the arrangement of ENG's 16th session, this guideline document draft is being led by the Maritime Safety Administration of the People’s Republic of China and will be submitted to ENG's 17th session. Consequently, this proposal primarily introduces the draft of this guideline draft.

The draft guideline primarily delineate detailed methods for the optical measurement of AtoN light performance, encompassing aspects such as luminous intensity, color, flash rhythm, and duration. The guideline aim to provide comprehensive guidance on photometry and colorimetry for AtoN light manufacturers and regulatory authorities in various countries.

## Purpose of the document

To introduce the draft of Measurement of Marine Lights Performance Guideline.

## Related documents

1. IALA Recommendation R0203 Definitions of Marine Signal Lights Terms of Measurement
2. Draft IALA Guideline - Measurement of Marine Light Performance
3. Compilation Basis on Draft IALA Guideline - Measurement of Marine Light Performance

# Background

Regarding the task of developing E200-3 into a guideline document by IALA, China, Germany, and the United Kingdom have each shared their respective practices in AtoN light measurement. Specifically, the Maritime Safety Administration of the People’s Republic of China has submitted three proposals: "Intelligent Measurement of the Character of Aids to Navigation Light "Measurement and Calculation of Effective Intensity of Aids to Navigation Light" and "Proposed Modifications to the Effective Intensity Definition in R0203". Trinity House from the United Kingdom has submitted "Method of Measuring Light Source Degradation" and the German Federal Waterways and Shipping Administration has submitted "Guideline on Light Measurement Goniophotometry of Marine Signa Lights".

During the 16th ENG meeting, the ENG WG1 extensively discussed how to incorporate these proposals from different countries into the guideline and formed initial opinions on the drafting of these guidelines.

# Discussion

## Drafting principles

The original Recommendation E200-3 document was formulated over a decade ago. Over time, significant differences have emerged between the circumstances during which the original document was created and the current state of AtoN light source development, optical performance measurement technologies, and related measurement equipment. Presently, LED light sources for AtoN lights have become more prevalent, and measurement methods and equipment for optical performance have also become more diverse and sophisticated.

The drafting of the current draft guideline adheres to the principles of advancement, comprehensiveness, practicality, and readability:

1. Outdated content descriptions from the original document have been deleted or modified to reflect the current state of measurement technology. Simultaneously, reference has been made to the latest research findings from other international organizations such as IEC/CIE technical documents or standards to enhance alignment with their technical content.

2. Drawing from proposals and practical experiences from various countries, the draft guideline has been supplemented and improved with details regarding measurement methods, measurement equipment, and measurement procedures. This ensures broad coverage of measurable optical performance and applicable scenarios.

3. The content is aligned with practical application and has been verified to be convenient and feasible through practical testing.

4. The draft has undergone adjustments and structuring to enhance its readability and reduce comprehension barriers.

## Main Changes

Compared to the original Recommendation E200-3, the draft guideline have undergone structural adjustments in the chapter framework as follows:

1. Deleted Chapters 5 and 11 from the original document, integrating them into a new Chapter 4, which is based on the original Chapter 3 (Objective), Chapter 5 (Models and Functions), and Chapter 11 (Definitions).

2. Revised Chapter 7, changing "General Laboratory Procedures" to "General Measurement Conditions." The original content of Chapter 7 (Sections 7.1-7.4 and 7.10-7.17) has been merged and separated into Annex E - Laboratory Management.

3. Added Chapter 11 Measuring in field applications.

4. Added Annex F Analysis and reference of error factors in goniophotometry,

Annex G Implementation of the Convolution Function to Determine Flash Duration,

Annex I Method for Detecting Character of AtoN Light Based on Spectral Analysis,

Annex J Detection Method of AtoN Light Based on Image Processing Techniques,

Annex K Practical Methods of Measuring Light Source Degradation.

For specific technical content modifications and their basis, please refer to the draft guideline and the compilation basis document.

## Chapter Description (Guidleline)

The chapters of the current draft guideline are arranged as follows:

Chapter 1 Introduction (Original Chapter 1, with minor modifications)

Chapter 2. Scope (Original Chapter 2, with minor modifications)

Chapter 3. Objective (Original Chapter 3, with minor modifications)

Chapter 4. Terms and Definitions (Original Chapters 3, 5, and 11, with supplementary and modified content)

Chapter 5. Measurement principles (Original Chapters 4, with supplementary and modified content)

Chapter 6. Measurement equipment (Original Chapters 6, with supplementary and modified content)

Chapter 7. General measurement conditions (Original Chapters 7, with supplementary and modified content)

Chapter 8. Photometry methods and requirements (Original Chapters 8, with supplementary and modified content)

Chapter 9. Colorimetry method and requirements (Original Chapters 9, with supplementary and modified content)

Chapter 10. Presentation of Results (Original Chapter 10, with modifications)

Chapter 11. Measuring in field applications (Newly added)

Chapter 12. Acronyms (Original Chapter 12, with modifications)

Chapter 13. References (Original Chapter 13, with supplementary modifications)

Annex A Detailed Measurement Method - Zero Length Photometry (Original Annex A)

Annex B Detailed Measurement Method - Outdoor Telephotometry (Original Annex B)

Annex C Detailed Measurement Method - Tristimulus Colorimetry (Original Annex C)

Annex D Detailed Measurement Method - Spectroradiometry (Original Annex D, with modifications)

Annex E Laboratory Measurement Management (Derived from original Chapter 7)

Annex F Analysis and reference of error factors in goniophotometry (Newly added)

Annex G Implementation of the Convolution Function to Determine Flash Duration (Newly added)

Annex H Example of A Photometry Uncertainty Budget (Original Annex E)

Annex I Method for Detecting Character of AtoN Light Based on Spectral Analysis (Newly added)

Annex J Detection Method of AtoN Light Based on Image Processing Techniques (Newly added)

Annex K Practical Methods of Measuring Light Source Degradation (Newly added)

# References

None

# Action requested of the Committee

The Committee is requested to review the draft guideline and take actions as appropriate.

# ANNEX A: Compilation Basis of Draft IALA Guideline xxxx - Measurement of Marine Lights Performance

# ANNEX B: Draft IALA Guideline xxxx - Measurement of Marine Lights Performance

1. Input document number, to be assigned by the Committee Secretary [↑](#footnote-ref-1)
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