ANSI/IES LM-90-20

Illuminating ENGINEERING SOCIETY

APPROVED METHOD:
MEASURING LUMINOUS FLUX WAVEFORMS FOR USE IN TEMPORAL LIGHT ARTIFACT (TLA) CALCULATIONS

AN AMERICAN NATIONAL STANDARD

Approved American National Standard ANSI

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Publication of this report has been approved by IES.
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Prepared for IES
By the Testing Procedures Committee

Approved by the IES Standards Committee October 11, 2019 as a Transaction of the Illuminating Engineering Society.

Approved June 18, 2020 as an American National Standard.

Published by the Illuminating Engineering Society, 120 Wall Street, New York, New York 10005

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Printed in the United States of America.

ISBN# 978-0-87995-063-7

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1.1 Introduction

Cyclic variations in luminous output from a light source or lighting system are known as temporal light modulation (TLM). TLM is known to affect visual perception, cognition, and brain activity. The variety of TLM patterns of solid-state lighting has brought these effects to the attention of the lighting community. Research seeks to create new metrics that predict the occurrence of visual, cognitive, and neurological effects based on measurements of the physical stimulus, the luminous flux waveform. This Lighting Measurement (LM) standard defines the method to reliably record, accurately measure, and reliably reproduce luminous flux waveforms and data sets from light sources for use in TLA calculations. **Informative Annex A** provides known calculation definitions typically utilized in TLA analysis.

1.2 Scope

This approved method describes the procedures to be followed and precautions to be observed in performing reproducible luminous flux waveform measurements for use in temporal light artifact (TLA) calculations under standard conditions. This document provides a description of the method of measurement, equipment requirements, and formulation of luminous flux waveforms for use in the calculations of temporal light artifacts from light sources. Luminous flux waveforms utilized in TLA calculations are for luminous flux frequencies between 1 Hz and 3,000 Hz under various control conditions. In addition, data reporting formats are described.

Intentionally flashing or signaling lights outside the defined frequency range are not included within the scope of this document.

2.0 Normative References

2.1 CIE TN 006:2016

International Commission on Illumination (CIE). CIE TN 006:2016, Visual Aspects of Time-Modulated Lighting Systems – Definitions and Measurement Models. Vienna: CIE; 2016.

2.2 ANSI/IES LM-9-20

Illuminating Engineering Society. Approved Method: Electrical and Photometric Measurement of Fluorescent Lamps. New York: IES; 2020.

For measurements of fluorescent lamps, the laboratory shall meet the requirements stated therein.

2.3 ANSI/IES LM-45-20

Illuminating Engineering Society. Approved Method: Electrical and Photometric Measurement of General Service Incandescent Filament Lamps. New York: IES; 2020.

For measurements of general service incandescent filament lamps, the laboratory shall meet the requirements stated therein.