



**TECHNICAL MEMORANDUM:**  
**STANDARD FORMAT FOR THE ELECTRONIC**  
**TRANSFER OF LUMINAIRE OPTICAL DATA**  
**AN AMERICAN NATIONAL STANDARD**





**ANSI/IES TM-33-23**

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AN AMERICAN NATIONAL STANDARD**

Publication of this Technical Memorandum  
has been approved by IES.  
Suggestions for revisions  
should be directed to IES.

**Prepared by the the IES Computer Committee**



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# CONTENTS

<b>Preface</b> .....	<b>1</b>
<b>1.0 Introduction and Scope</b> .....	<b>2</b>
1.1 Introduction.....	2
1.2 Scope.....	3
<b>2.0 Normative References</b> .....	<b>3</b>
2.1 ANSI C78.377-2017.....	3
2.2 ANSI/ASABE S640.....	3
2.3 ANSI/IES LS-1-22.....	3
2.4 CIE 13.3-1995.....	3
2.5 CIE 15:2004, 3RD ED.....	3
2.6 CIE 63-1984.....	3
2.7 CIE 117-1995.....	3
2.8 CIE 121-1996.....	3
2.9 CIE 224-2017.....	3
2.10 ECMA-404.....	4
2.11 IES LM-63-19.....	4
2.12 IES LM-75-19.....	4
2.13 IES TM-27-20.....	4
2.14 IES TM-30-20.....	4
2.15 RFC 4122.....	4
2.16 W3C Extensible Markup Language (XML) 1.1, 2 <sup>nd</sup> ed.....	4
2.17 W3C XML Schema Definition Language (XSD) 1.1. Part 1: Structures.....	4
2.18 W3C XML Schema Definition Language (XSD) 1.1. Part 2: Datatypes.....	4
<b>3.0 Definitions</b> .....	<b>4</b>
3.1 bandpass correction.....	4
3.2 channel multiplier.....	4
3.3 dimensions.....	5
3.4 document.....	5
3.5 emission areas.....	5
3.6 emitter.....	5
3.7 emitter center.....	6
3.8 far-field versus near-field.....	6
3.9 geometric center.....	6
3.10 gonioradiometer.....	6
3.11 luminous.....	6
3.12 photon flux.....	6
3.13 photon intensity.....	6
3.14 photon flux density.....	6

<b>4.0</b>	<b>XML Schema for Luminaire Optical Data</b>	<b>6</b>
<b>4.1</b>	<b>Version Element</b>	<b>7</b>
<b>4.2</b>	<b>Header Element</b>	<b>7</b>
4.2.1	Manufacturer Element	7
4.2.2	Catalog Number Element	7
4.2.3	GTIN Element	7
4.2.4	Description Element	8
4.2.5	Laboratory Element	8
4.2.6	Report Number Element	8
4.2.7	Report Date Element	8
4.2.8	Document Creator Element	8
4.2.9	Document Creation Date Element	8
4.2.10	Unique Identifier Element	8
4.2.11	Comment Element	8
4.2.12	Reference Element	8
4.2.13	More Information URI Element	9
<b>4.3</b>	<b>Luminaire Element</b>	<b>9</b>
4.3.1	Dimensions Element	9
4.3.2	Shape Element	9
4.3.3	Number of Emitters Element	10
<b>4.4</b>	<b>Equipment Element</b>	<b>10</b>
4.4.1	Gonioradiometer Element	10
4.4.2	Integrating Sphere Element	10
4.4.3	Spectroradiometer Element	11
<b>4.5</b>	<b>Emitter Element</b>	<b>11</b>
4.5.1	Quantity Element	12
4.5.2	Description Element	12
4.5.3	Catalog Number Element	12
4.5.4	Rated Emitter Lumens Element	12
4.5.5	Input Wattage Element	12
4.5.6	Power Factor Element	12
4.5.7	Ballast Factor Element	12
4.5.8	Tilt Angles Element	12
4.5.9	Correlated Color Temperature Element	13
4.5.10	Color Rendering Element	13
4.5.11	Duv Element	15
4.5.12	S/P Ratio Element	15
4.5.13	Data Generation Element	15
4.5.14	Luminous Data Element	16
4.5.15	Radiant Data Element	18
4.5.16	Photon Data Element	20
4.5.17	Spectral Data Element	22
4.5.18	Angular Color Element	25
4.5.19	Illuminance Data Element	27
4.5.20	Irradiance Data Element	28
4.5.21	Photon Flux Density Data Element	29
4.5.22	Spectral Irradiance Data Element	31

4.5.23	Channels Element	32
4.5.24	Emission Areas Element	33
4.5.25	Emitter Center Element	38
4.5.26	Regulatory Element	38
<b>4.6</b>	<b>Custom Data Element</b>	<b>39</b>
4.6.1	Name Element	39
4.6.2	Unique Identifier Element	39
4.6.3	Any Data Element	40
<b>4.7</b>	<b>XML Schema</b>	<b>40</b>
<b>4.8</b>	<b>JSON Document Format</b>	<b>58</b>
4.8.1	XML to JSON Mapping	58
4.8.2	JSON Schema	69
 <b>Annex A – Sample Luminous (Photometric) Documents</b>		<b>106</b>
A.1	Sample Luminous (Photometric) XML Document	106
A.2	Sample Luminous (Photometric) JSON Document	108
 <b>Annex B (Informative) – Photon Flux</b>		<b>111</b>
 <b>Annex C: Intensity Scaling &amp; Multiplier</b>		<b>111</b>
 <b>Annex D: Symmetry for Type C Coordinate Systems</b>		<b>114</b>
 <b>Annex E: Emitter Quantities</b>		<b>115</b>



## Preface

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*This preface is not part of ANSI/IES TM-33-23. It is included for informational purposes only.*

### Updates in the 2023 version:

- Angular Color

An `AngularColor` complex element (**Section 4.5.18**) has been added.

- Horizontal Symmetry

A `Symm` element has been added to these sections:

- 4.5.14.1 Luminous Intensity
- 4.5.15.3 Radiant Intensity
- 4.5.16.3 Photon Intensity
- 4.5.17.2 Angular Spectral
- 4.5.18.2 Angular Color

- Multiplier

A `Multiplier` element has been added to these sections:

- 4.5.14.1 Luminous Intensity
- 4.5.15.3 Radiant Intensity
- 4.5.16.3 Photon Intensity
- 4.5.17.1 Emitter Spectral
- 4.5.17.2 Angular Spectral
- 4.5.18 Angular Color
- 4.5.19 Illuminance
- 4.5.20 Irradiance
- 4.5.21 Photon Flux Density
- 4.5.22 Spectral Irradiance

- Absolute

An `Absolute` element has been added to these sections:

- 4.5.15.1 Radiant Intensity
- 4.5.16.1 Photon Intensity
- 4.5.17.2 Angular Spectral
- 4.5.18.1 Angular Color
- 4.5.19.1 Illuminance
- 4.5.20.1 Irradiance
- 4.5.21.1 Photon Flux Density
- 4.5.22.1 Spectral Irradiance

- Normalized

A `Normalized` element has been added to **Section 4.5.17.1 Emitter Spectral**.

- Timestamp

A `Timestamp` element has been added to **Section 4.5.17.1 Emitter Spectral**.

- Quantum

A `Quantum` element has been added to **Section 4.5.17 Emitter Spectral**.

- JSON Document Format

An equivalent JSON specification to the XML document specification is shown in **Section 4.8 JSON Document Format**.

## 1.0 Introduction and Scope

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### 1.1 Introduction

The architectural and roadway lighting communities have long relied on standardized data formats for the electronic transfer of far-field photometric data and related information. These data formats include IES LM-63-02, ANSI/IES LM-63-19, CIBSE TM14, and EULUMDAT. Apart from a few minor revisions, these data formats have remained essentially unchanged for the past several decades.

With the introduction of solid-state lighting with color-changing capabilities, there is a need to include spectral power distributions in these data representations. There is also a need to represent radiant and photosynthetically active radiation (PAR) intensity distributions for horticultural, aquacultural, and animal husbandry lighting applications. Unfortunately, it is difficult to impossible to incorporate such information in existing photometric data standards. It is also unreasonable to develop new standards specifically for specialized applications, such as horticultural lighting. This document therefore presents a standardized data format for use with all lighting applications.

The represented data may be obtained when testing or simulating the optical characteristics of a luminaire, which may then be used with lighting design and analysis software, architectural visualization software, or optical design software.

The data is formatted in accordance with W3C Extensible Markup Language (XML) 1.1 Recommendation and the W3C XML Schema Definition Language (XSD). This allows end users to utilize and view the data directly without the need for proprietary software.

In the event of any ambiguity or discrepancy with respect to the textual specification and the XML Schema in this document, the XML Schema shall take precedence.

In the event of any ambiguity or discrepancy with respect to the description of XML or XML Schema in this document, the W3C Recommendations shall take precedence.