

# PUBLICLY AVAILABLE SPECIFICATION



Zhaga interface specification book 1 and book 7  
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## ZHAGA INTERFACE SPECIFICATION BOOK 1 AND BOOK 7

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This PAS is a reproduction of Zhaga Books 1 and 7 with no changes introduced.

The document layout, terms and definitions, etc. within this PAS therefore do not follow the normal IEC drafting rules that would be applied for an International Standard.

Subdivision 1 comprises Zhaga Book 7 – Rectangular LED Module with undefined LES.

Subdivision 2 comprises Zhaga Book 1 – Overview and common information, which is essential to the interpretation of Zhaga Book 7 (and future Zhaga books).



The future intention is for the content of this PAS to be incorporated within one or more International Standards and at this time any conflict with IEC Directives and drafting rules will be addressed.

The text of this PAS is based on the following document:

This PAS was approved for publication by the P-members of the committee concerned as indicated in the following document

Draft PAS	Report on voting
34A/2048/PAS	34A/2054/RVDPAS

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## ZHAGA INTERFACE SPECIFICATION BOOK 1 AND BOOK 7

### Subdivision 1

#### Zhaga Interface Specification Book 7 Rectangular LED Module with undefined LES

##### Summary (informative)

###### Background

The Zhaga Consortium is a global lighting-industry organization that aims to standardize LED light engines and associated components such as LED modules, holders and electronic control gear (LED drivers).

Zhaga has created a set of interface specifications, known as Books. Each Book defines an LED light engine and/or associated components by means of the mechanical, photometric, electrical, thermal, and control interfaces of the product to its environment. This makes such products interchangeable in the sense that it is easy to replace one product with another, even if they have been made by different manufacturers.

###### Contents

This book 7 defines several LED modules. Each LED module has a rectangular shape and the only restriction to the light emitting surface is that no light is emitted in the direction of the reference plane of the LED module.

This book must be read together with book 1, which is included as Subdivision 2 of this document.

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###### Intended Use

The Book-7 LED module can be mounted in a luminaire, for example by means of screws. Book-7 LED modules are intended to be replaced by professionals only.

# 1 General

## 1.1 Introduction

The Zhaga Consortium is a global organization that aims to standardize LED Light Engines and associated components. A LED Light Engine is a light source for general lighting that is based on solid state technology, and typically consists of one or more LEDs combined with an Electronic Control Gear. Examples of associated components are LED Modules, Electronic Control Gears, and Holders. Zhaga has created a set of interface specifications, known as Books defining interfaces between LED Light Engines, associated components and Luminaires.

Book 1 is a special Book in the sense that it provides common information, which is relevant to all other Books in the series. In addition, Book 1 defines requirements and compliance tests, which are applicable across multiple Zhaga books. Such Books refer to those requirements and compliance tests as applicable.

## 1.2 Scope (informative)

This Book 7 defines LED Modules, which can be fixed in a Luminaire. This document defines:

- Ten categories of the rectangular shaped LED Modules.
- Luminaires that provide the appropriate environment for the Book-7 LED Module(s).

Book 7 LED Modules are intended to be installed and replaced by Luminaire manufacturers only. Book 1 is included as Subdivision 2 of this document.

## 1.3 Conformance and References

### 1.3.1 Conformance

All provisions in the Zhaga interface Specification are mandatory, unless specifically indicated as recommended, optional or informative. Verbal expressions of provisions in the Zhaga Interface Specification follow the rules provided in Annex H of ISO/IEC Directives, Part 2:2011. For clarity, the word “shall” indicates a requirement that is to be followed strictly in order to conform to the Zhaga Interface Specification, and from which no deviation is permitted. The word “should” indicates that among several possibilities one is recommended as particularly suitable, without mentioning or excluding others, or that a certain course of action is preferred but not necessarily required, or that (in the negative form) a certain possibility or course of action is deprecated but not prohibited. The word “may” indicates a course of action permissible within the limits of the Zhaga Interface Specification. The word “can” indicates a possibility or capability, whether material, physical or causal.

### 1.3.2 References

For references that are not listed in this section, see [Book 1]. For undated references, the most recently published edition applies.

[Book 1]	Zhaga Interface Specification, Book 1: Overview and Common Information. Book 1 is included as Subdivision 2 of this document.
[ISO/IEC 15948]	Information technology – Computer graphics and image processing – Portable Network Graphics (PNG): Functional specification.
[IEC 60598-1]	Luminaires – Part 1: General requirements and tests
[LEDset-Inf]	LEDset1 Information Interface Specification, Edition 1.2, November, 2016 available from md-sig.org.
[LEDset-Pow]	LEDset Power Interface Specification, Edition 1.1, November, 2016 available from md-sig.org.

## 1.4 Definitions

This section defines terms that have a specific meaning in the context of this Book 7. Terms that have a specific meaning across all Zhaga Books are defined in [Book 1].

Book-7 LED Module      LED Module according to the specifications in this book.

Uniformity Test Diffuser	Diffuser plate that is used for measuring luminance uniformity.
LED Module Demarcation	The mechanical boundary between a LED Module and its environment consisting of a Luminaire and interconnect.

## 1.5 Acronyms

This section defines acronyms that have a specific meaning in the context of this Book 7. Acronyms that have a specific meaning across all Zhaga Books are defined in [Book 1].

UTD	Uniformity Test Diffuser
-----	--------------------------

## 1.6 Symbols

This section defines symbols that have a specific meaning in the context of this Book 7. Symbols that have a specific meaning across all Zhaga Books defined in [Book 1].

$d_{UTD}$	Distance between the mounting plate and the UTD (unit: mm).
$t_p$	Temperature at a specific point on the LED Module (unit: °C).
$t_{p,normal}$	Value of the temperature $t_p$ at normal operating conditions (see section 8.3.1; unit: °C).
$t_{p,rated}$	Value of the temperature $t_p$ at which the Rated LED Module values are specified (unit: °C).
$t_{p,headroom}$	$= t_{p,rated} - t_{p,normal}$ (unit: °C).

## 1.7 Conventions

This section defines the notations and conventions used in the Zhaga Interface Specifications.

### 1.7.1 Precedence

In the case of any perceived discrepancy between the definitions provided in Part 1 of this document, Interface Definition and the definitions provided in Part 2 of this document, Compliance Testing, the definitions provided in Part 2 take precedence over the definitions provided in Part 1.

### 1.7.2 Cross references

Unless indicated otherwise, cross references to sections include the sub sections contained therein.

### 1.7.3 Informative text

Informative text is set in italics, unless the whole section is marked as informative.

### 1.7.4 Terms in capitals

Terms that have a specific meaning in the context of this Book 7 are capitalized. See section 1.4.

### 1.7.5 Units of physical quantities

Physical quantities are expressed in units of the International System of Units. All lengths that omit an explicit unit indication are in millimeters.

### 1.7.6 Decimal separator

The decimal separator is a comma.

### 1.7.7 Limits

Values that are indicated as typical, as well as values between parentheses, are informative.

## 2 System Overview (informative)

### 2.1 General

General information with respect to the Zhaga Interface Specifications and certification of products that comply with this Book 7 can be found in [Book 1], section 2.

### 2.2 Description of the LED Module

This Book 7 defines several categories of LED Modules. These LED Modules are intended to be mounted in a Luminaire. Figure 2-1 illustrates an example of an LED Module-Luminaire combination. In this example the Luminaire holds two LED Modules. In practice, a Luminaire may hold any number of LED Modules.

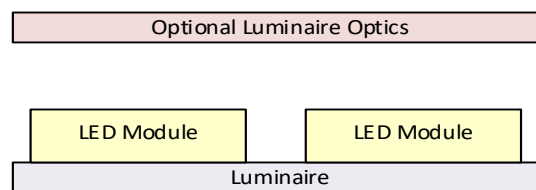


Figure 2-1: Example a Luminaire with two LED Modules

The Luminaire typically features Luminaire Optics which shape the light output of the LED Module(s). The photometric interface of the Book-7 LED Module is specified in such a way that using suitable Luminaire Optics, similar Luminaire performance is to be expected in typical applications using different LED Modules with the same luminance uniformity. The specification has been carefully evaluated to yield as much as possible “similar” performance without restricting the LED technology or the inner structure of the LED Module.

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### 2.3 Outline of this Book

This Book 7 consists of two parts:

Part 1, Interface Definition, defines the LED Module-Luminaire interface in terms of the four sub interfaces:

- The mechanical interface (section 3).
- The photometric interface (section 4).
- The electrical interface (section 5).
- The thermal interface (section 6).

Part 2, Compliance Tests, defines:

- Specific tools, which are used for testing compliance of a LED Module or a Luminaire (section 7).
- The LED Module tests (section 8).
- The Luminaire tests (section 9).

The Annexes to this Book 7 provide the following additional information:

- Requirements on the information that shall be part of the Product Data Set (Annex A).
- Measurement of Luminance uniformity (Annex B)
- Guidelines for mechanical interface test (Annex C)
- History of changes (Annex D)

# Part 1: Interface Definition

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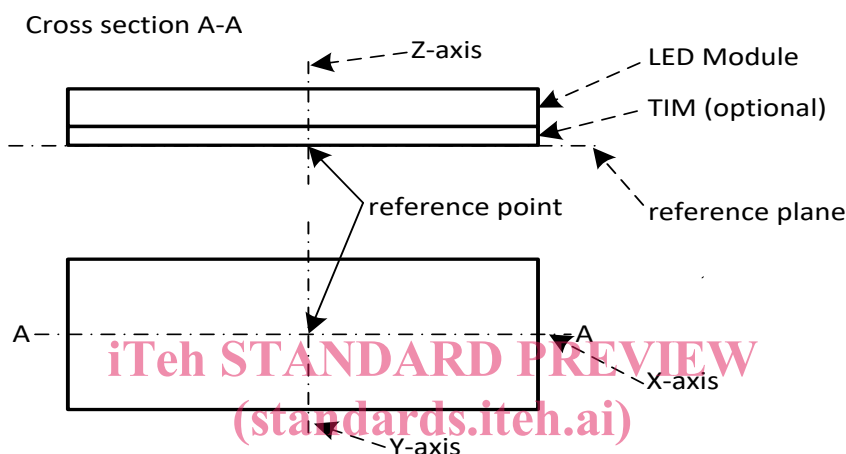
### 3 Mechanical Interface

#### 3.1 Drawing principles

For the purpose of this section, the provisions in [Book 1] - section 3.1, apply.

#### 3.2 Mechanical references

The reference plane and the reference point of a LED Module, including (optional) TIM are defined in Figure 3-1. Dimensions are specified relative to either the reference point or the reference plane unless indicated otherwise. Moreover, dimensions are specified to include the thickness of the TIM (if present).



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Figure 3-1: Positions of the reference point and the reference plane of the LED Module.

#### 3.3 Book-7 LED Module categories

This Book 7 specifies a number of LED Module categories<sup>1</sup> that are identified by a designation. In the following sub sections, the LED Module Demarcations of these Book-7 LED Module categories are specified.

No part of a LED Module shall cross the outline boundaries of the corresponding LED Module Demarcation. And no part of a Luminaire shall cross the outline boundaries of the corresponding LED Module Demarcation.

Unless stated otherwise, all holes shall be available and for each hole at least 25% of the circumference of the hole shall be present in the LED Module.

In case the LED Module is applied in combination with a Thermal Interface Material, this material is defined to be part of the LED module. Thus the total height of the Module + TIM shall not exceed the maximum height H.

Additionally, for the purpose of this section, the provisions in [Book 1] - section 3.3, apply.

<sup>1</sup> Note that the LED Module demarcations not only define restrictions for the LED Module but also for the Luminaire.