

PUBLICLY AVAILABLE SPECIFICATION



Zhaga interface specification Book 1 and Book 10
ITh STANDARD PREVIEW
(standards.iteh.ai)

IEC PAS 63324:2020

<https://standards.iteh.ai/catalog/standards/sist/bdc1be59-6377-40a9-9650-86b93bdc8a44/iec-pas-63324-2020>



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2020 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

Electropedia - www.electropedia.org

The world's leading online dictionary on electrotechnology, containing more than 22 000 terminological entries in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary

67 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

[IEC PAS 63324:2020](https://standards.iec.ch/catalog/standards/sis/bdc1be59-6377-40a9-9650-86b93bdc8a44/iec-pas-63324-2020)

<https://standards.iec.ch/catalog/standards/sis/bdc1be59-6377-40a9-9650-86b93bdc8a44/iec-pas-63324-2020>

PUBLICLY AVAILABLE SPECIFICATION



Zhaga interface specification Book 1 and Book 10

ITh STANDARD PREVIEW
(standards.iteh.ai)

[IEC PAS 63324:2020](https://standards.iteh.ai/catalog/standards/sist/bdc1be59-6377-40a9-9650-86b93bdc8a44/iec-pas-63324-2020)

<https://standards.iteh.ai/catalog/standards/sist/bdc1be59-6377-40a9-9650-86b93bdc8a44/iec-pas-63324-2020>

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 29.140.99

ISBN 978-2-8322-8944-0

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

FOREWORD.....	10
INTRODUCTION.....	12
Subdivision 1	13
Zhaga Interface Specification Book 10	13
Summary (informative).....	13
Background	13
Contents	13
Intended Use.....	13
1 General	14
1.1 Introduction.....	14
1.2 Scope	14
1.3 Conformance and references	14
1.3.1 Conformance	14
1.3.2 References	15
1.4 Definitions.....	15
1.5 Acronyms.....	15
1.6 Symbols.....	15
1.7 Conventions.....	15
1.7.1 Precedence	15
1.7.2 Cross references	16
1.7.3 Informative text.....	16
1.7.4 Terms in capitals	16
1.7.5 Units of physical quantities	16
1.7.6 Decimal separator	16
1.7.7 Limits	16
2 Overview (Informative)	17
2.1 General.....	17
2.2 Description of the LED Module and LED Array Holder	17
2.3 Outline of this Book.....	18
Part 1: Interface Definition	19
3 Mechanical interface	20
3.1 Drawing principles	20
3.2 Mechanical references	20
3.3 Definition of the mechanical interface of the LED Module (and Holder)	21
3.3.1 LED Module demarcation.....	21
3.3.2 Optics Contact Area.....	23
3.3.3 Requirements on screw holes	25
3.3.4 LED Module Connection	25
3.3.5 Luminaire keepouts for interconnect	26
3.3.6 Inner Feature.....	26
3.4 Additional LED Array Holder properties (informative)	27
3.5 Luminaire mechanical properties.....	27
3.6 Optional “Locking Ring System” (LRS).....	27
4 Photometric interface	28
4.1 General.....	28
4.2 Light Emitting Surface.....	28

4.2.1	Additional hints for LES features to improve interchangeability with Luminaire Optics (Informative)	28
4.3	Operating conditions	29
4.4	Luminous flux	29
4.5	Luminous intensity distribution	29
4.6	Luminance uniformity	29
4.7	Correlated color temperature	30
4.8	Color rendering index	30
4.9	Luminaire Optics (Informative)	30
5	Electrical interface	32
5.1	Electrical interface to the ECG	32
5.2	Electrical insulation	32
6	Thermal interface	33
6.1	Background information (informative)	33
6.2	Generic thermal interface model	33
6.2.1	General case	33
6.2.2	Rated Operating Temperature and safety (informative)	33
6.2.3	Thermal overload protection	33
6.2.4	Thermal compatibility check	33
6.2.5	Thermal Interface Material	33
6.2.6	Surface planarity and roughness	34
6.2.7	Aging of LED Module (informative)	34
6.3	Luminaire Thermal requirements	34
6.4	Compatibility check	34
6.5	Ambient temperature and thermal resistance (Informative)	34
Part 2:	Compliance Tests	35
7	Compliance test tools	36
7.1	LED Module test tools	36
7.1.1	Test Fixture PETF (photometric and electrical)	36
7.2	Luminaire test tools	36
8	LED Module Compliance and LED Array Holder Tests	37
8.1	LED Module and LED Array Holder mechanical interface tests	37
8.1.1	Test of the mechanical interface of the LED Module or LED Array Holder	37
8.1.2	Test OCA of the LED Module or LED Array Holder for the D35 Category	37
8.1.3	Test OCA of the LED Module or LED Array Holder for the D50 Category	38
8.2.1	Test on luminous flux	38
8.2.2	Test on relative partial luminous flux and beam angle	38
8.2.3	Test on correlated color temperature (CCT)	38
8.2.4	Test on color rendering index	39
8.3	LED Module thermal interface tests	39
8.3.1	Test on thermal power (P_{th})	39
8.3.2	Temperature stabilization	39
8.3.3	Position of measurement point for the Reference Temperature	39
8.4	LED Module electrical interface tests	39
8.5	LED Module and LED Array Holder Product Data Set test	39
9	Luminaire compliance tests	40
9.1	Luminaire mechanical interface tests	40

9.1.1	Test on the mechanical interface of the Luminaire for mounting the LED Module(s)	40
9.2	Luminaire Product Data Set test	40
	Annexes	41
	Annex A Product Data Set requirements	42
	LED Module Product Data Set	42
	LED Array Holder Product Data Set	42
	Luminaire Product Data Set	42
	Annex B (informative) Guidelines for mechanical interface test	43
	Annex C (informative) Guidelines for LES and Luminance measurements	45
C.1	Test equipment	45
C.2	Test conditions	45
C.3	Test procedure	45
	Annex D (informative) Remarks	47
D.1	Photometric interchangeability	47
D.2	Color effects	47
	Annex E (informative) Luminaire thermal test tools	48
	Thermal Test Engine TTE – Spot (informative)	48
	Annex F History of changes	50
Subdivision 2	Zhaga Interface Specification Book 1	50
	Summary (informative)	50
	Background	50
	Contents	50
	Intended Use	50
1	General	51
1.1	Introduction	51
1.2	Scope	51
1.3	Conformance and references	51
1.3.1	Conformance	51
1.3.2	Normative references	51
1.3.3	Informative references	52
1.4	Common definitions	52
1.5	Common acronyms	54
1.6	Common symbols	55
1.7	Common conventions	55
1.7.1	Cross references	55
1.7.2	Informative text	55
1.7.3	Terms in capitals	55
1.7.4	Units of physical quantities	55
1.7.5	Decimal separator	55
2	Overview of Zhaga (informative)	56
2.1	About Zhaga	56
2.2	Zhaga building blocks and interfaces	56
2.3	Compatibility and Interchangeability	58
2.4	Product Data Set	58
2.5	Compliance testing	59

2.5.1	Certification	59
2.5.2	Market surveillance	60
2.6	Compatibility check	60
2.7	Zhaga product certification	61
3	Mechanical interface	61
3.1	Drawing principles	61
3.2	Mechanical interface between Separate ECG and Luminaire	61
3.3	Thermal expansion	61
3.4	Demarcation (Informative)	61
4	Photometric interface	63
4.1	Light Emitting Surface	63
4.1.1	LES categories	64
4.2	Operating conditions for measuring photometric parameters	64
4.3	Luminous flux	65
4.4	Luminous intensity distribution	66
4.4.1	Beam angle and beam angle categories	67
4.5	Luminance uniformity	67
4.6	Correlated color temperature (CCT)	67
4.7	Color rendering index (CRI)	68
4.8	Luminaire Optics (informative)	68
5	Electrical interface	68
5.1	Electrical insulation (informative)	68
6	Thermal interface	68
6.1	Background information (informative)	68
6.2	Generic thermal interface model	68
6.2.1	General case	68
6.2.2	Test Fixture TPTF	71
6.2.3	Rated Operating Temperature and safety (informative)	71
6.2.4	Thermal overload protection (Informative)	71
6.2.5	Ambient Temperature	71
6.2.6	Luminaires with multiple LLEs or multiple LED Modules	72
6.2.6.1	Separate heat sinks	72
6.2.6.2	One heat sink	72
6.2.7	Thermal compatibility check	72
6.2.8	Thermal uniformity	73
6.2.9	Thermal Interface Material	74
6.2.10	Surface planarity and roughness	74
6.2.11	Aging of LED Light Engine or LED Module/LED Array (informative)	74
6.2.12	Empty	74
6.2.13	Ambient Temperature and thermal resistance (R_{th})	74
6.3	Simplified thermal interface model	75
6.3.1	General case	75
6.3.2	Rated Operating Temperature and safety (informative)	75
6.3.3	Thermal overload protection (informative)	75
6.3.4	Thermal compatibility check	75
6.3.5	Thermal Interface Material	76
6.3.6	Surface planarity and roughness	76
6.3.7	Aging of LED Light Engine or LED Module/LED Array (informative)	76

7	Control interface	76
Annex A	Compliance tests	77
A.0	LED Module/LED Array compliance tests	77
A.0.1	LED Module/LED Array mechanical interface test	77
A.0.1.1	Test in the mechanical interface or the LED Module/LED Array	77
A.0.1.1.1	Test equipment	77
A.0.1.1.2	Test conditions	77
A.0.1.1.3	Test procedure	77
A.0.1.1.4	Pass criteria	77
A.0.2	LED Module/LED Array photometric interface tests	77
A.0.2.1	Test on Luminous Flux	77
A.0.2.1.1	Test equipment	77
A.0.2.1.2	Test conditions	77
A.0.2.1.3	Test procedure	77
A.0.2.1.4	Pass criteria	78
A.0.2.2	Test on Relative Partial Luminous Flux and beam angle	78
A.0.2.2.1	Test equipment	78
A.0.2.2.2	Test conditions	78
A.0.2.2.3	Test procedure	78
A.0.2.2.4	Pass criteria	78
A.0.2.3	Test on correlated color temperature (CCT)	79
A.0.2.3.1	Test equipment	79
A.0.2.3.2	Test conditions	79
A.0.2.3.3	Test procedure	79
A.0.2.3.4	Pass criteria	79
A.0.2.4	Test on color rendering index	79
A.0.2.4.1	Test equipment	79
A.0.2.4.2	Test conditions	79
A.0.2.4.3	Test procedure	80
A.0.2.4.4	Pass criteria	80
A.0.2.5	Test on Luminance Uniformity	80
A.0.3	LED Module/LED Array thermal interface tests	80
A.0.3.1	Test on thermal power (P_{th})	80
A.0.3.1.1	Test equipment	80
A.0.3.1.2	Test conditions	80
A.0.3.1.3	Test procedure	80
A.0.3.1.4	Pass criteria	80
A.0.4	LED Module/LED Array electrical interface tests	81
A.0.5	LED Module/LED Array Product Data Set test	81
A.0.5.1	Test	81
A.0.5.2	Pass criteria	81
A.1	LLE compliance tests	81
A.1.1	LLE mechanical interface tests	81
A.1.1.1	Test of the mechanical interface of the Integrated LLE	81
A.1.1.1.1	Test equipment	81
A.1.1.1.2	Test conditions	81
A.1.1.1.3	Test procedure	81
A.1.1.1.4	Pass criteria	81

A.1.2 LLE photometric interface tests	82
A.1.2.1 Test on Luminous Flux	82
A.1.2.1.1 Test equipment	82
A.1.2.1.2 Test conditions	82
A.1.2.1.3 Test procedure	82
A.1.2.1.4 Pass criteria	82
A.1.2.2 Test on Relative Partial Luminous Flux and beam angle	82
A.1.2.2.1 Test equipment	82
A.1.2.2.2 Test conditions	82
A.1.2.2.3 Test procedure	82
A.1.2.2.4 Pass criteria	83
A.1.2.3 Test on correlated color temperature (CCT)	83
A.1.2.3.1 Test equipment	83
A.1.2.3.2 Test conditions	83
A.1.2.3.3 Test procedure	83
A.1.2.3.4 Pass criteria	84
A.1.2.4 Test on color rendering index	84
A.1.2.4.1 Test equipment	84
A.1.2.4.2 Test conditions	84
A.1.2.4.3 Test procedure	84
A.1.2.4.4 Pass criteria	84
A.1.2.5 Test on Luminance Uniformity	84
A.1.3 LLE thermal interface tests	85
A.1.3.1 Test on thermal power (P_{th})	85
A.1.3.1.1 Test equipment	85
A.1.3.1.2 Test conditions	85
A.1.3.1.3 Test procedure	85
A.1.3.1.4 Pass criteria	85
A.1.3.2 Test on Thermal power through the Thermal Interface Surface ($P_{th, rear}$)	85
A.1.3.2.1 Test equipment	85
A.1.3.2.2 Test conditions	86
A.1.3.2.3 Calibration of $P_{th, rear}$ test setup	86
A.1.3.2.4 Measurement of $P_{th, rear}$ of the LLE	88
A.1.3.2.5 Pass criteria	88
A.1.3.3 Empty	88
A.1.3.4 Empty	88
A.1.3.5 Temperature stabilization	88
A.1.3.6 Position of measurement point for the temperature t_r	89
A.1.4 LLE electrical interface tests	89
A.1.5 LLE control interface tests	89
A.1.6 LLE Product Data Set test	89
A.1.6.1 Test	89
A.1.6.2 Pass criteria	89
A.2 Luminaire compliance tests	89
A.2.1 Luminaire mechanical interface tests	89
A.2.1.1 Test of the mechanical dimensions of the Luminaire	89
A.2.1.1.1 Test equipment	90
A.2.1.1.2 Test conditions	90
A.2.1.1.3 Test procedure	90

A.2.1.1.4 Pass criteria	90
A.2.2 Luminaire photometric interface tests.....	90
A.2.3 Luminaire thermal interface tests	90
A.2.3.1 Empty	90
A.2.4 Luminaire electrical interface tests.....	90
A.2.5 Luminaire control interface tests	90
A.2.6 Luminaire Product Data Set test.....	90
A.2.6.1 Test	90
A.2.6.2 Pass criteria.....	90
Annex B Guidelines for Demarcation measurement.....	91
Annex C History of changes	93
Figure 0-1 – Example 3D-drawing of a Book 10 D35 LED Module (informative).....	17
Figure 0-1 – Positions of the reference point and reference plane of the LED Module or LED Array Holder.....	20
Figure 0-2 – Positions of the reference point, plane and axis in a sketch of the LED Module (example for D50 category). Similar for Holders, except that they do not have an LES.....	21
Figure 0-3 – Drawing of the demarcation of the D35 LED Module	22
Figure 0-4 – Drawing of the demarcation of the D50 LED Module	23
Figure 0-5 – Optics Contact Area of the 35mm LED Module.....	24
Figure 0-6 – Height of the Optics Contact Area of the D35 LED Module	24
Figure 0-7 – Dimensions of OCAs for a D50 category	25
Figure 0-8 – Maximum Inner Feature outlines (dense hatched area).....	26
Figure 0-1 – Luminance property evaluation areas.....	30
Figure B-1 – Example of a LED Module	43
Figure B-2 – Example of a LED Module with sections	43
Figure B-3 – Example of a LED Module with measurement points	44
Figure C-1 – Set-up for measurement of luminance uniformity and LES diameter	45
Figure E-1 – Thermal Test Engine TTE-Spot schematic	48
Figure E-2 – Thermal Test Engine TTE-Spot – technical drawing of the aluminum part.....	49
Figure 2-3 – Schematic overview of a Luminaire and one or more non-integrated LED Light Engines.....	57
Figure 2-4 – Schematic overview of a Luminaire and one or more integrated LED Light Engines	57
Figure 2-5 – Schematic overview of a LED Light Engine with Integrated ECG	58
Figure 2-6 – Schematic overview of a LED Light Engine with Separate ECG.....	58
Figure 2-7 – Overview of test and certification of Zhaga products	60
Figure 2-8 – Compatibility check.....	61
Figure 3-1 – Example of a Demarcation Model (2-dimensional).....	62
Figure 3-2 – Example of a product which is compliant with the Demarcation Model.....	62
Figure 3-3 – Example of a product which is not compliant with the Demarcation Model.....	62
Figure 3-4 – Example of a product which is not compliant with the Demarcation Model.....	63
Figure 4-1 – Rotationally symmetric solid angle bounded by the polar angles γ_1 and γ_2 which is used to define the Relative Partial Luminous Flux.....	67

Figure 6-1 – Thermal model of a LLE – Luminaire or a LED Module – Luminaire combination	69
Figure 6-2 – Power conversion	70
Figure 6-3 – Position of the Thermal Interface Surface in case of a configuration with TIM.....	74
Figure A-1 – Heat sensor equipment with Test Fixture and LLE-under-test	86
Figure A-2 – Calibration of the heat flux measurement setup	87
Figure A-3 – Position of measurement point for the temperature t_r	89
Figure B-1 – Example of a LED Array	91
Figure B-2 – Example of a LED Array with sections	91
Figure B-3 – Example of a LED Array with measurement points	92
Table 0-1 – Mechanical dimensions of D35 LED Module Demarcation	22
Table 0-2 – Mechanical dimensions of D50 LED Module Demarcation	23
Table 0-3 – Maximum inner OCA diameter.....	25
Table 0-4 – Allowed minimum and maximum OCA heights within demarcation	25
Table 0-5 – Maximum height of inner feature (b).....	26
Table 0-1 – Association of LES Category to LED Module Category	28
Table 0-2 – Categorization of LES height.....	29
Table 0-3 – Requirements for a Lambertian light intensity distribution.....	29
Table F-1 – Changes	50
Table 4-1 – Definition of circular LES categories.....	64
Table 4-2 – Test voltages for different Rated input voltages of the LLE.....	65
Table 4-3 – Definition of luminous flux categories.....	66
Table 4-4 – Definition of beam angle categories	67
Table C-1 – Changes from Edition 1.7 to Edition 1.8	93

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ZHAGA INTERFACE SPECIFICATION BOOK 1 AND BOOK 10

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
<https://standards.ieh.ai/catalog/standards/sist/bdc1be59-6377-40a9-9650-8db7d8c87e1c/iec-pas-63324>
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

A PAS is an intermediate specification made available to the public and needing a lower level of consensus than an International Standard to be approved by vote (simple majority).

IEC PAS 63324 has been processed by subcommittee 34A: Electric light sources, of IEC technical committee 34: Lighting.

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/2194/DPAS	34A/2204/RVDPAS

Following publication of this PAS, which is a pre-standard publication, the technical committee or subcommittee concerned may transform it into an International Standard.

This PAS shall remain valid for an initial maximum period of 2 years starting from the publication date. The validity may be extended for a single period up to a maximum of 2 years, at the end of which it shall be published as another type of normative document, or shall be withdrawn.

IMPORTANT – The "colour inside" logo on the cover page of this document indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[IEC PAS 63324:2020](https://standards.iteh.ai/catalog/standards/sist/bdc1be59-6377-40a9-9650-86b93bdc8a44/iec-pas-63324-2020)

<https://standards.iteh.ai/catalog/standards/sist/bdc1be59-6377-40a9-9650-86b93bdc8a44/iec-pas-63324-2020>

INTRODUCTION

This PAS is a reproduction of Zhaga Book 1 Edition 1.8 and Book 10 Edition 1.0 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 10 Edition 1.0 – Circular LED modules for spot lighting.

Subdivision 2 comprises Zhaga Book 1 Edition 1.8 – Overview and common information, which is essential to the interpretation of Zhaga Book 10 (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.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

IEC PAS 63324:2020

<https://standards.iteh.ai/catalog/standards/sist/bdc1be59-6377-40a9-9650-86b93bdc8a44/iec-pas-63324-2020>

Subdivision 1

Zhaga Interface Specification Book 10

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

The LED Modules defined in this Book have an essentially circular outer shape with a small, also preferably circular Light Emitting Surface, so that they are well suited to be used with collimating Luminaire Optics in spot lighting applications. The LED Modules are disc shaped, and are grouped into several size categories, to allow for different LES sizes and flux categories. The LED Modules are intended to be used with a separate Electronic Control Gear, which is specified in Zhaga Book 13.

This Book should be read together with Zhaga Book 1.

<https://standards.iteh.ai/catalog/standards/sist/bdc1be59-6377-40a9-9650-86b93bdc8a44/iec-pas-63324-2020>

Intended Use

The LED module defined in this specification is intended to be screwed to a heat sink and to be connected to a separate electronic control gear. The light output is essentially Lambertian to enable the luminaire optics to shape the application's desired light distribution from a defined input.

The LED modules defined in this Book 10 are intended to be installed and replaced by luminaire manufacturers only.