Zhaga

Making LED light sources interchangeable

Find out more about Zhaga and interchangeable LED light sources at:
www.zhagastandard.org

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Interface specifications boost LED adoption

The lighting industry is used to working with standardized light sources. LED technology offers many benefits, but the lack of specifications can make it difficult to exchange one LED light source for another.

Zhaga is a global consortium of companies from the international lighting industry. Its overall aim is to develop interface specifications that allow LED light sources from different suppliers to be used interchangeably, without changing the luminaire design. In turn, this should speed up the adoption of LEDs for general lighting.

Vision

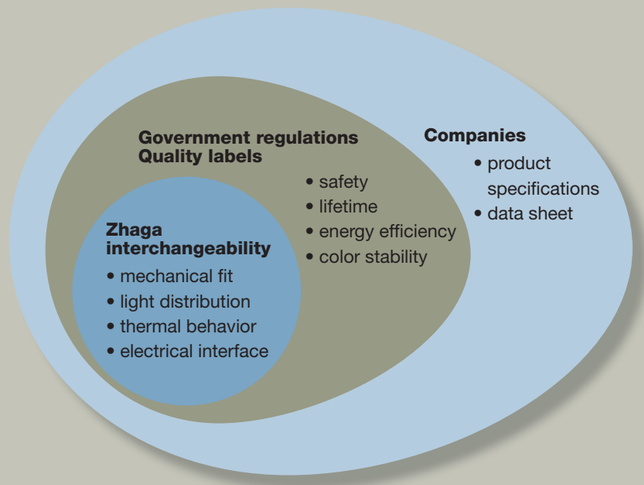
- **The Zhaga Consortium is an industry-wide cooperation that will enable the interchangeability of LED light sources.**
- **Zhaga will accelerate the adoption of LED lighting solutions in the marketplace.**
- **Zhaga members will actively share their experiences and work closely together to increase customer confidence in specifying and purchasing interchangeable LED light engines.**
- **Zhaga-compliant products will be commercially available from multiple suppliers, and will be able to continuously benefit from the performance upgrades that LED technology brings.**

Mission

The mission of the Zhaga Consortium is:

- **To develop interface specifications that cover the physical dimensions, as well as the photometric, electrical and thermal behavior, of LED light engines.**
- **To ensure that Zhaga-compliant products are in line with global standards, upgradeable and future proof.**
- **To make Zhaga-certified products easily identifiable and traceable.**
- **To promote the use and benefits of Zhaga-compliant LED light engines for all applications in general lighting.**

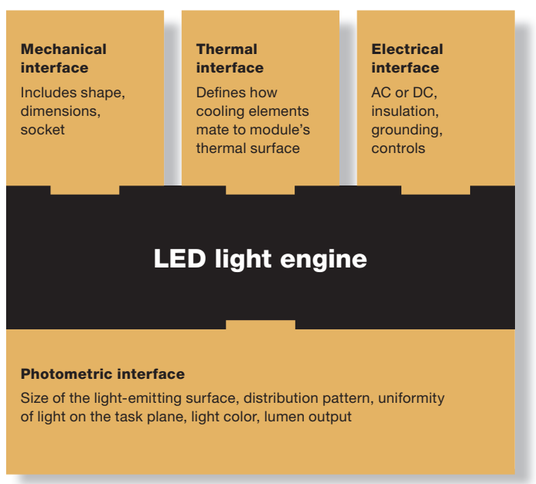
The goal: Interchangeable LED light sources



Zhaga specifications are just one small aspect of a lighting product's design. They are not law, but voluntary. Their scope is limited to making LED light sources interchangeable. The Zhaga logo has no intended meaning for safety, reliability, light-output performance or energy efficiency.

Zhaga is developing specifications for the interfaces between LED light engines and LED luminaires. These will enable LED luminaire manufactures to interchange LED light sources from multiple suppliers in their luminaire designs.

- **Zhaga establishes specifications for four key interfaces of an LED light engine: mechanical, thermal, electrical and photometric.**
- **Zhaga uses the term "LED light engine" to describe the combination of an LED module and its associated electronic control gear.**
- **Suppliers can offer differentiated LED light engines, provided they have compatible interfaces.**



The method: Specifications for light-source interfaces

There are many examples of specifications for interfaces in lighting; for instance, the E27 base of the traditional incandescent lamp, the diameter of a halogen reflector lamp, or the tube diameter and length of a linear fluorescent lamp are well-known standards.

Zhaga specifies only what is necessary to enable the interchangeability of LED light engines. This makes it easier for manufacturers to innovate and differentiate their products in aspects that do not influence interchangeability, such as product lifetime and efficiency.

Compliance to Zhaga specifications is voluntary for manufacturers of LED lighting products. Zhaga does not create mandatory standards, regulations or codes. These are set by governments and by international certification organizations.

Progress: Specifications approved, more on the way

Zhaga interface specifications are referred to as “Books”. Zhaga has made rapid progress and by the end of 2012 the consortium had already approved eight Books. Several more are on the way. Some Books were developed with certain applications in mind e.g. downlighting (Book 2), spotlights (Book 3) and street lighting (Book 4). However, all the Zhaga-defined light engines can be used in any appropriate application.

Zhaga specifications are developed by member companies, and then tested and revised. Each book is made available for public download once the full Zhaga certification procedure is in place, and once Zhaga-certified products are already on the market. For the latest information on Zhaga interface specifications, please visit www.zhagastandard.org/specifications.

Book 1

General description containing definitions, principles and electronic control gear dimensions.

Book 2

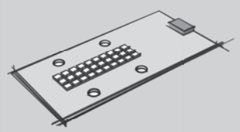
- Socketable
- Integrated electronic control gear
- 65-mm-diameter base

Book 3

- Non-socketable
- Separate electronic control gear

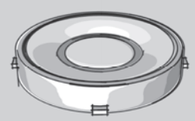
Book 4

- Non-socketable
- Separate electronic control gear
- Street-lighting applications



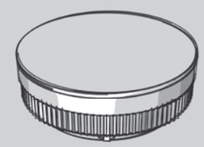
Book 5

- Socketable
- Separate electronic control gear



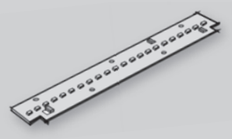
Book 6

- Socketable
- Integrated electronic control gear



Book 7

- Non-socketable
- Separate electronic control gear
- Indoor lighting applications



Book 8

- Socketable
- Integrated electronic control gear
- 85-mm-diameter base

Available now: Certified Products

Products that have been tested and certified according to Zhaga interface specifications are now available from multiple suppliers. Examples are shown below. The complete database of Certified Products can be viewed at www.zhagastandard.org/products/certified-products.html.

The Zhaga Logo:

- **Delivers the message of interchangeability**
- **Can only be used for Certified Products**
- **Denotes that any necessary third-party testing has been carried out**
- **Confirms compatibility with other Certified Products**


Book 3 module


Book 2 light engine


Book 2 light engine & holder


Book 2 holders


Book 3 luminaire


Book 3 module


Book 3 module


Book 2 holder


Book 2 light engine

The products on this page are not yet certified, but are designed to compliant with Zhaga interface specifications.


Book 6 light engine


Book 5 module


Book 4 module


Book 8 light engine & holder


Book 4 modules & ECG


Book 7 module

Zhaga provides certification for:

- **LED modules**
- **LED light engines**
- **Electronic control gear (ECG)**
- **LED holders**
- **LED luminaires**

Zhaga: Everyone benefits

Today, the advantages that LED technology brings to lighting when it comes to energy efficiency, light quality and lifetime are widely known. But the ability to interchange LED light sources from different suppliers also brings advantages to various user groups, as described below.

LED luminaire manufacturers

Faster development, less effort

Lower R&D costs

- New, upgraded generations of standardized LED light engines can be adopted with less re-engineering and fewer modifications.

Greater product diversity

- Luminaire portfolio can be expanded easily without incurring costs for additional R&D.
- Luminaire portfolio can be segmented into different price and performance categories.

Easier procurement

- Increased availability of interchangeable modules can reduce prices.
- Simplified negotiating with suppliers, since the cost of changing light sources is lower.

Less risk

- Reduced volatility, vulnerability and uncertainty stabilize the supply chain.
- Lower inventory levels thanks to availability of interchangeable LED module sources from multiple suppliers.

New markets

- Standardization breaks down barriers to international markets

Specifiers and other end-users

Reliable replacement, easier procurement

Easier upgrades

- LED technology will continue to improve in terms of quality, efficiency, and control. Zhaga interfaces will allow you to upgrade your LED luminaires.

More options

- Luminaire properties such as light output or color temperature can be changed by using a different, compatible light source.

Reduced risk

- The Zhaga logo gives peace of mind and indicates compatibility with other certified products.
- Luminaires can be specified in the knowledge that a current, up-to-date LED light source can be fitted when the project is actually installed.

Easier procurement

- If replacement is necessary, standardized parts will be in stock from numerous suppliers, rather than being “specials” with long lead times.

Cost-effective replacement

- As standardization increases, there will be more competition among suppliers to fill your Zhaga “sockets”. This will drive volumes up and prices down.

Optimized for LED technology

- Unlike conventional lamp form-factors, LED modules are designed to deal with thermal issues faced by LEDs.

A global consortium with a common goal

Zhaga aims to enable the interchangeability of LED light sources by developing international interface specifications. Today, Zhaga is represented by several hundred members across the international lighting industry–including luminaire manufacturers, LED module makers, material and lighting component suppliers as well as service providers.

- **Zhaga is an open-membership association. Any company that shares the consortium's vision and is willing to contribute to achieving its goals can become a member.**
- **Zhaga is global. The member companies are from across the globe and the Zhaga specifications are for global use.**
- **The Zhaga consortium is governed by a charter that defines rules regarding confidentiality, intellectual property and decision making (see www.zhagastandard.org/about-us).**
- **Zhaga members meet regularly, typically 4-5 times per year. Various task forces and working groups address technical issues, and the development and maintenance of the Zhaga interface specifications. All members are free to make proposals for light-engine interfaces that they would like to be standardized by Zhaga.**
- **Zhaga appoints independent, third-party testing companies to test products for compliance with the Zhaga specifications. Each of these Authorized Test Labs must have separate authorization for each Zhaga specification (see www.zhagastandard.org/specifications/certification.html).**

Membership of Zhaga

Companies can join Zhaga as Regular Members or Associate Members. Visit the Zhaga website for more information on these options. Our Member list is updated regularly, and the most recent version can be viewed at: www.zhagastandard.org/about-us/our-members.

Regular Members*

A.A.G. STUCCHI s.r.l. u.s.
AB Fagerhult
Acuity Brands Lighting, Inc.
Amphenol LTW
Bayer MaterialScience AG
Beijing Lampearl Photoelectric Co., Ltd.
BJB GmbH & Co. KG
BöSha Technische Produkte GmbH & Co. KG
Bridgelux, Inc.
Citizen Electronics Co., Ltd.
Cooper Lighting, LLC
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Epistar Corporation
Everlight Electronics Co., Ltd.
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Guangzhou LEDWAY Lighting Technology Co., Ltd.
Hangzhou Hangke Optoelectronics Co., Ltd.
Hebei Daqi Lighting Technology Co., Ltd.
Ideal Industries, Inc.
iGuzzini illuminazione Spa
Infineon Technologies AG
Insta Electro GmbH
Instituto Italiano del Marchio di Qualità - IMQ
Intematix Corporation
Intertek Testing Services NA
Korea Institute of Lighting Technology
Leedarson Lighting
Legrand
Leviton Manufacturing Company
LG Electronics Inc.
LG Innotek Co., Ltd.
LLC "Lighting Technologies Production"
Lutron Electronics Inc.
Molex Incorporated
Neonlite International Limited
Nuventix
NXP B.V.
OMS s.r.o
OSRAM AG
Panasonic Corporation
Phihong Technology Co., Ltd.
Philips Lighting B.V.
PhotonStar LED Group plc
Posco LED
Regent Beleuchtungskörper AG
Samsung Electronics Co. Ltd.
Schréder SA
Seoul Semiconductors
Shanghai Yaming Lighting Co., Ltd.
Sharp Corporation
Targetti Sankey SpA
Tatung Co.
TE Connectivity Ltd.
Toshiba Corporation
TRILUX GmbH / BAG electronics
Unilumin Group Co. Ltd.
VDE Testing and Certification Institute
WAGO Kontakttechnik GmbH & Co. KG
Wieson Technologies Co., Ltd.
Wintek Corporation
Zhejiang Shenghui Lighting Co., Ltd.
Zumtobel AG / Tridonic GmbH

*Correct at time of publication.
Visit our website for most recent version.

Associate Members*

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abalight GmbH
ADATA Technology Co., Ltd.
Adolf Schuch GmbH
Advanced LEds Ltd.
Advanced Photoelectronic Technology
AEG Power Solutions
Alanod Aluminium-Veredlung GmbH & Co. KG
Almeco S.p.A.
Alppilux Oy
Alux-Luxar GmbH & Co. KG
American Illumination Inc.
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Ansorg GmbH
Arditi S.p.A.
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Auer Lighting GmbH
Aura Light International AB
Award New Optoelectronic
Bay Area Compliance Laboratories Corp. (Shenzhen)
BEGA Gantenbrink-Leuchten KG
Bender + Wirth GmbH + Co.
Bestdisc Technology Corp
Bilton International GmbH
Blueview Elec-optic Tech Co., Ltd.
BLV Licht- und Vakuumtechnik GmbH
Brumberg Leuchten GmbH & Co. KG
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Carclo Optics
Castaldi Illuminazione
CE Lighting Ltd.
Cemdag Aydinlatma San. ve Tic. A.S.
CESI (Guangzhou) Opto-electr. stds & testing inst.
Chroma ATE
Cicor Technologies Ltd.
Compucase Enterprise Co., Ltd.
Cordelia Lighting
Corlight srl
Cree, Inc.
DEL-Ko GmbH
Delta Electronics, Inc.
Delta Light nv
Dietal
dilitronics GmbH
Dongguan Kingsun Optoelectronics Co., Ltd
Doosan Electro-Materials Corporation
e3Light Group A/S
ebm-papst St. Georgen GmbH & Co. KG
EDC Gmbh
Edison Opto Corporation
EKL AG
Elec-Tech International Co., Ltd.
Electronics Testing Center, Taiwan
Eleko Industries (Zhongshan) Limited
ELT - Especialidades Luminotécnicas, S.A.
Energy Recovery Products
Enplas Corporation
ERCO GmbH
ES-System S.A.
EYE Lighting International of North America, Inc.
F.W. Thorpe plc
Fairchild Semiconductor Corporation
Fin-Core Corp.
Forma Lighting (HK) Ltd.
Foshan Nationstar Optoelectronics Co. Ltd.
Foxsemicon Integrated Technologies Inc.
Future Lighting Solutions
Gaash Lighting Products Ltd.
Generation Brands
Gerard Lighting Pty Ltd
Glamox ASA
Good Earth Lighting, Inc.
Green Ray LED International, LLC
H.E. Williams, Inc.
Hanbeam. Co., Ltd.
Hangzhou Hpwinner Opto Corporation
Harvard Engineering Plc
Harvatek Corporation
Havells Sylvania Europe Ltd.
Heatron Inc.
Helvar Oy Ab
Hengdian Tospo Lighting Co., Ltd.
Herbert Waldmann GmbH & Co. KG
Hoffmeister Leuchten GmbH
HomeLights Research Asia Ltd.
Huaqiang Lighting Equipment (Taizhou) Co., Ltd.
Huizhou Foryou Opto-Electronics Techn. Co., Ltd.
ILUmetrix GmbH
Indata d.o.o.
Instrument Systems GmbH
iWatt Inc
JENOPTIK Polymer Systems GmbH
Jordan Reflektoren GmbH & Co.
Juno Lighting Group
Kangrong Fine Ceramic Co., Ltd.
Ketra, Inc.
Khatod optoelectronic s.r.l.
Kingbright Electronic Co., Ltd.
KOHA Co., Ltd.
Korea Photonics Technology Institute
Kuantech (Bei Hai) Co., Ltd.
Kumho Electric, Inc
L&E Solid State Co.,Ltd.
Labsphere
LED Lighting
LED Linear GmbH
Ledil Oy
Ledionopto Lighting Inc.
Lei Yueh Enterprise Co., Ltd.
Lextar Electronics Corporation
Light Engine Ltd.
Lightconsulting GmbH
Lightel Technologies, Inc.
Lite-on Technology Corp.
Litecontrol Corporation
LTG Crilite Ltd
Lumberg Connect GmbH
Lumenetix Inc
Lumicenter Ind E Com De Luminarias LTDA
Lumimicro Co., Ltd.
Lumini Equipamentos
Luminus Devices
Lunoo N.V.
Lustrous Technology Ltd
Mackwell Electronics Ltd
Martech UK Ltd
Mechatronix Koahsiung Co. Ltd.
Metalmek Illuminazione SRL
Metrolight LTD
Minebea Co. Ltd.
Mitsubishi Chemical Corporation
Mitsubishi Electric Lighting Corporation
Nanoflex Limited
Neo-Neon LED Lighting International Ltd
Neolumens Inc.
Neon EC
Niko nv
Nippon Keiki Works, Ltd.
Nordic light AB
Novar ED&S Limited, a Honeywell company
Nualight
NVC Lighting Technology Cooperation
Oceans King Lighting Science & Technology CO., Ltd
Okamura Electric Corporation
Opple Lighting Co., Ltd.
Optotech Corporation
Oree Advanced Illumination Solutions
Pathway Lighting Products, Inc.
Paulmann Licht GmbH
Phoenix Contact GmbH & Co. KG
Polymer Optics Limited
ProLight Opto Technology Corp.
PTR Messtechnik GmbH & Co. KG
Radiant Opto-Electronics Corporation
RECOM Electronic GmbH
Relco Group
RIDI Leuchten GmbH
Roal Electronics S.p.A
Sansi Electronic Engineering Co., Ltd.
Selmic Oy
SemiLEDs Optoelectronics Co., Ltd.
SGS Taiwan Ltd.
Shanghai Dais Electric Co., Ltd.
Shanghai Mikia Lighting Co., Ltd.
Shanxi Guangyu LED Lighting Co., Ltd.
Shenzhen Ac. of Metrology and Quality Inspection
Shenzhen Refond Optoelectronics Co., Ltd.
Sichuan Jiuzhou Optoelectronics Technology Co.
Sichuan Sunfor Light Co., Ltd
Simontech, S.L.
Sky-Lighting B.V.
Solomon Systech Limited
Soon Light & Project
Spaapen Handelsmaatschappij B.V.
Spittler Lichttechnik GmbH
Sunonwealth Electric Machine Industry Corp.
Suzhou DK Lighting Co., Ltd.
Sylumis
Taiwan Oasis Technology Co., Ltd.
TCI Telecomunicazione Italia S.r.l.
TD Elektronik Sanavi ve Dı Ticaret A
TechnoTeam Bildverarbeitung GmbH
tecnolight Leuchten GmbH
Telefunken Licht AG
Tepcomp Oy
TerraLUX, Inc.
The Bergquist Company
Thermoking Technology International Co.
TNO
Tons Lightology Inc.
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TSMC
TÜV Rheinland Intercert Kft.
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USAI Lighting
Vexica Technology Limited
Vimar S.p.A
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Walsin Lihwa Corporation
Wangs Alliance Corporation
Wellypower Optronics Corporation
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Willy Kreutz GmbH & Co. KG
Wooree Lighting Holdings Co., Ltd.
Wuxi Machinery&Equipment Import& Export Co., Ltd.
XAL GmbH
Xenerqi Limited
Xiamen Hi-Light Lighting Co., Ltd.
Yah Juang Enterprise Ltd.
Yuyang Dnu Co., Ltd.
Zhejiang Jingri Lighting Technology Co., Ltd.
Zhejiang Setec Lighting Co., Ltd.
Zhongshan Yishen Electrical Appliance Co., Ltd.

*Correct at time of publication. Visit our website for most recent version.