

رؤية VISION

2030

المملكة العربية السعودية  
KINGDOM OF SAUDI ARABIA



SHOMO'O DUBAI

مصنع شموع دبي

Shomo'o Dubai Factory



LED



الهيئة السعودية للمواصفات والمقاييس والجودة  
Saudi Standards, Metrology and Quality Org.



وزارة التجارة والاستثمار  
Ministry of Commerce and Investment

ترشيد  
TARSHID

الشركة الوطنية لخدمات كفاءة الطاقة  
The National Energy Services Company



الجمارك السعودية  
SAUDI CUSTOMS



وزارة الطاقة والصناعة والثروة المعدنية



سابر  
saber





# IECEE

الهيئة السعودية للمواصفات والمقاييس والجودة  
Saudi Standards, Metrology and Quality Org.

## شهادة اعتراف بشهادة (IECEE) Recognition Certificate of (IECEE) Certificate الرقم: 20190013473

بناء على شهادة الاختبار وتقرير الاختبار الموضحة بياناتها أدناه، وكون الهيئة السعودية للمواصفات والمقاييس والجودة هي جهاز منح الشهادات الوطني وعضو مشارك في الهيئة الدولية لتقويم المطابقة ومنح الشهادات للأجهزة والمكونات الكهروإلكترونية (IECEE)، فقد تم منح هذه الشهادة اعترافاً بأن المنتج الموضح بياناته أدناه مطابق للمواصفات القياسية والفروقات الوطنية ذات العلاقة.

According to the test certificate and test report that their information is mentioned below, and as Saudi Standards, Metrology and Quality Organization (SASO) is the national certification body and a participant member in IEC System of Conformity Assessment Schemes for Electro-technical Equipment and Components (IECEE). Therefore, this certificate is granted as a recognition that the below mentioned product is conformed to the related national standards and differences.

Company name:	ZHONGSHAN KARUNER LIGHTING FACTORY	اسم الشركة المصنعة:
Technical requirements \ Standard references:	saso 2902 : 2018	المطلبات الفنية/القياسية:
The issuing body of test certificate:	TÜV Rheinland	جهة إصدار شهادة الاختبار:
DE 2-025604	رقم شهادة الاختبار: CB test certificate No.	رقم تقرير الاختبار: Test report No.

### بيانات المنتج Product Information

Product name:	Lighting and its parts (required SLS Certificate)	اسم المنتج:
Technology name:	LED	اسم التقنية:
Trade mark name:	SHOMO'O DUBAI	اسم العلامة التجارية:
Additional information:	SHOMO'O DUBAI TRADING ESTABLISHMENT	معلومات إضافية:

Expiry date: 20/08/2020 تاريخ الانتهاء

لا تستعمل هذه الشهادة إلا مع هذا المنتج فقط دون أدنى مسؤولية على الهيئة في ذلك  
This certificate is used only for this product without any responsibility on the side of SASO towards others rights



www.saso.gov.sa

This is an electronic certificate and does not require stamp and signature.

Visit SASO website (www.saso.gov.sa) to verify this certification.

Any changes or modification on this certificate will affect its validity.

P.O.Box 3437 Riyadh 11471 KSA

Tel: 920009085 Fax: +966114520086

تخضع هذه الشهادة خلال مدة سريانها للأنظمة واللوائح ذات العلاقة في المملكة العربية السعودية وأي تعديلات تصدرها الهيئة.  
هذه الشهادة صادرة إلكترونياً ولا تحتاج إلى ختم وتوقيع.  
للتأكد من صحة هذه الشهادة يرجى زيارة موقعنا على الإنترنت  
www.saso.gov.sa  
أو الاتصال أو التغير إلى هذه الشهادة بالهاتف:  
من الرياض 920009085 المملكة العربية السعودية  
هاتف: +966114520086

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الهيئة السعودية للمواصفات والمقاييس والجودة  
Saudi Standards, Metrology and Quality Org.

### ملحق الشهادة

### Appendix

Company Name	ZHONGSHAN KARUNER LIGHTING FACTORY	اسم الشركة
Trade Mark Name	LED	اسم العلامة التجارية
20/08/2020	تاريخ انتهاء الشهادة Certificate Expiration date	20190013473
		رقم الشهادة Certificate Number :

رقم التسلسل Serial No	رقم الطراز Model Number	رقم شهادة كفاءة الطاقة Energy Efficiency Certificate Number
1	GA-L004D-200W	LP2071904619
2	GA-L004C-150W	LP2071904586
3	GA-M004-200W	LP2071904622



# 200W LED STREET LIGHT

فانوس انارة الشوارع لد قدرة 200 وات

## المميزات Features

\*Housing: the airflow design and beautiful shape the heat could be quickly taken out by the airflow . fan aluminum with fast heat dissipation . light weight with only 1/3 the die-casting one which could effectively save the freight cost and installation cost .

\* جسم الفانوس : تصميم وشكل جميل لتدفق الهواء و الحرارة يمكن أن تؤخذ بسرعة من تدفق الهواء مع مروحة من الالومنيوم لتبديد الحرارة ووزن خفيف يحافظ ويوفر بشكل فعال من تكلفة الشحن والتركيب .

\* Driver: Constant current driver high pf high efficiency perfect protecting ability great quality and long life span.

\* المحول ( الترنس ) : ثابت حالي عالي الكفاءة قدرة حماية مثالية ذا جودة عالية وعمر افتراضى طويل

\* Led : Philips led chip , high light efficiency , high CRI ,low thermal resistance , low attenuation and long Life span

\* نوع لد : شرائح لد من نوع فيليبس كفاءة ضوء عالية ومقاومة حرارية منخفضة وتخفيف منخفض وعمر افتراضى طويل

\* IP65 protection : waterproof and dustproof

\* حماية الاي بي 65 : حماية ضد الماء وضد الغبار



## المواصفات Specifications

Led street light		لد انارة الشوارع
MODEL الموديل	GA-M004-200W	
Power القدرة	200 w	وات 200
Lamp's flux تدفق اللومن	28000-30000 lm	لومن 30000-28000
Color Temp لون الاضاءة	4000k -6500k	كلفن 6500 -4000
LED QTY عدد عدسات اللد	4MAX 50W	4 شرائح قدرة الشريحة الواحدة 50 وات
Gross Weight (1pcs) الوزن الصافى ( عدد 1)	5.1kg	5.1 كيلو جرام
Dimensions الابعاد	750*300*85 mm	
Carton size حجم الكرتون	780*340*150 mm	
Operating voltage جهد التشغيل	AC 100-240 V/ 50/60 HZ	
Luminous efficiency كفاءة اللومن	140-150 lm / w	من 140 الى 150 لومن للوات
Emission Angle زاوية الانبعاثات	60*120° ±5°	

Average Illuminance (8M high) متوسط اللمعان ( ارتفاع 8 متر )	39L x± 2Lx 39L x± 2Lx
Center Illuminance مركز اللمعان	63L x± 2Lx
Operating Ambient temp درجة حرارة التشغيل	من 30 الى 80 درجة حرارة -30° c – 80° c
Operating Humidity نطاق الرطوبة للتشغيل	≤85 % RH
Maximum area affected by wind أقصى مساحة لتأثير الرياح	0.315m <sup>2</sup>
Material المواد المصنوع منها جسم القانوس	Aluminum alloy الالومنيوم المصبوب
LED TYPE نوع اللد	PHILIPS فيليبس
CRI مؤشر تجسيد اللون	RA> 80 أكثر من 80
IP GRADE درجة الحماية	IP 65 65درجة حماية
Warranty الضمان	5 سنة 5years
Wire الاسلاك	Heat resistant wire أسلاك مقاومة للحرارة
Certifications الشهادات	SASO ,IEC test report, CE,R oHS
Manufacturer المصنع	Zhongshan karuner Lighting Factory
Cable diameter قطر الكابل	3*0.75mm <sup>2</sup>
Power box size حجم صندوق الطاقة	295*185*80mm
Fixed lamp pole screw size مقاس مسامير التثبيت	10*30mm
Maximum installation height الحد الاقصى للتركيب	8-15M من 8 الى 15 متر

## Application الاستخدام

Widely used in highway Lighting, road Lighting, factory Lighting, plaza lighting, supermarket Lighting, garden lighting, ggymnastic Lighting landscape or architectural Lighting, and more.

يستخدم على نطاق واسع فى اناارة الطرق السريعة واناارة المصانع واناارة المولات واناارة السوبر ماركت واناارة الساحات واناارة المراكز الرياضية واناارة الحدائق واناارة المناظر الطبيعية والمزيد

## Quality Assurance ضمان الجودة

Quality assurance is based on right storage , transportation , installation , using and maintenance of the products.

يعتمد ضمان الجودة على التخزين المناسب والنقل والتركيب واستخدام وصيانة المنتجات

Failure of the products resulted from artificial damage or the use out of requirement not covered under warranty .

تعطل المنتجات الناتج عن الضرر الصناعى او سوء الاستخدام خارج نطاق المتطلبات والمواصفات يكون غير مشمول بالضمان

Two years warranty, during te warranty period, the company will select the appropriate warranty service according to the actual situation, including maintenance, replacement of parts or replacement of te product

ضمان لمدة عامين وخلال مدة الضمان يتم اختيار خدمة الضمان المناسبة وفقا للوضع الفعلى بما فى ذلك الصيانة أو استبدال قطع الغيار او استبدال المنتج بالكامل .

## Notice ملاحظات

- Remove power from circuit prior to installation
- قم بإزالة الطاقة من الدائرة قبل التثبيت
- Do not touch led street ligt when in use
- لا تلمس مصابيح اناارة الشوارع اللد اثناء التشغيل
- Do not stare directly at led street ligt when in use
- لا تنظر مباشرة الى اضاءة مصابيح الشارع اثناء الاستخدام
- Bypass ballast, capacitor and igniter prior to led street ligt installation
- تجاوز الكابستر والاجنيتير اثناء تثبيت مصابيح اضاءة الشوارع الليد .
- Be sure fixture bracket can support weight of led street light
- تأكد من أن قاعدة التركيب الرئيسية للمصباح يمكنها تحمل الوزن الخاص بمصباح اضاءة الشوارع لد



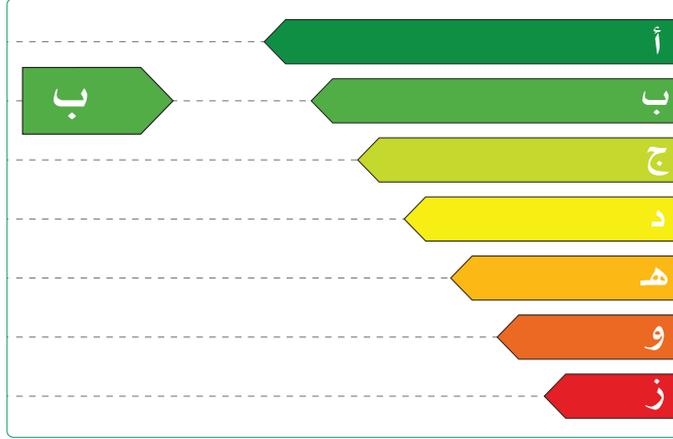
الهيئة السعودية للمواصفات والمقاييس والجودة  
Saudi Standards, Metrology and Quality Org.

بطاقة كفاءة الطاقة  
ENERGY EFFICIENCY LABEL



LIGHTING

الإضاءة



BRAND NAME العلامة التجارية

SHOMO'O DUBAI

MADE IN بلد الصنع

China



MODEL NUMBER رقم الطراز

GA-M004-200W

LIGHTING TYPE نوع الإضاءة

Luminaires

E04622/2019

رقم التسجيل

REGISTRATION NO

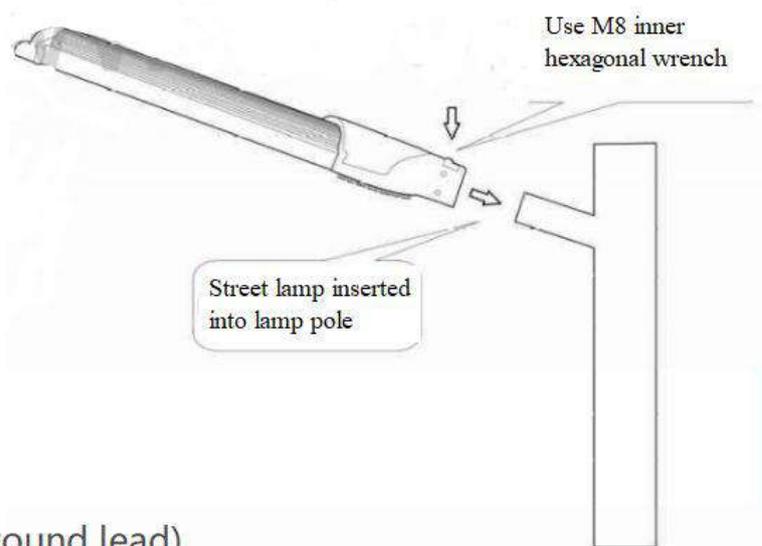
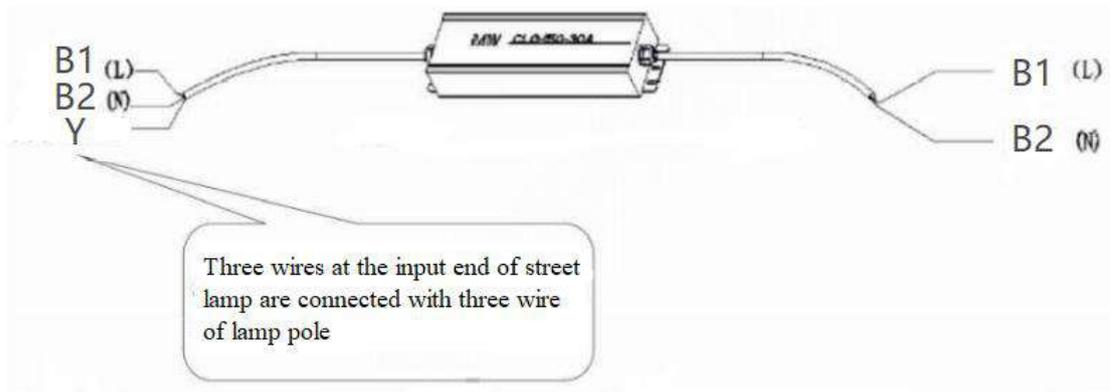
STANDARD REFERENCE NO SASO 2902:2018

الرقم المرجعي للمواصفة

إزالة أو تغطية أو العبث بهذه البطاقة قبل البيع يجعلك عرضة للمسؤولية النظامية  
Removing, covering or altering this label before sale can subject you to legal liability

# Installation Diagram

## طريقة التثبيت



Wire color:

B1: brown

B2: blue

Y: yellow (ground lead)



Ref. Certif. No.

DE 2-025604

IEC SYSTEM FOR MUTUAL RECOGNITION OF TEST CERTIFICATES FOR ELECTRICAL EQUIPMENT (IECEE) CB SCHEME

CB TEST CERTIFICATE

Product

LED Street Light

Name and address of the applicant

NANJING GBETTER MECHANICAL & ELECTRICAL CO.,LTD  
43-1003.NO.4 BLOCK,  
2ND BAIRUN ROAD,PUKOU DISTRICT., NANJING, JIANGSU, China

Name and address of the manufacturer

ZHONGSHAN KARUNER LIGHTING FACTORY  
THE SOUTH NO.2,  
NO.11 TONGXING ROAD, CAOSAN, JIAFUWEI INDUSTRIAL ZONE,  
GUZHEN TOWN, 528421 ZHONGSHAN CITY, China

Name and address of the factory

ZHONGSHAN KARUNER LIGHTING FACTORY  
THE SOUTH NO.2,  
NO.11 TONGXING ROAD, CAOSAN, JIAFUWEI INDUSTRIAL ZONE,  
GUZHEN TOWN, 528421 ZHONGSHAN CITY, China

Ratings and principal characteristics

AC 100-240V, 50/60Hz, Class I, IP65, ta 45°C  
1)100W, 2)150W, 3)200W, 4)250W

Trademark (if any)

Graphical trademark of GB

Customer's Testing Facility (CTF) Stage used

N/A

Model / Type Ref.

1)GA-M002-100W, GA-L004B-100W  
2)GA-M003-150W, GA-L004C-150W  
3)GA-M004-200W, GA-L004D-200W 4)GA-M005-250W

Additional information (if necessary may also be reported on page 2)

For model differences, refer to the test report.

A sample of the product was tested and found to be in conformity with

IEC 60598-2-3:2002+A1  
IEC 60598-1:2014+A1  
See Test Report for National Differences

As shown in the Test Report Ref. No. which forms part of this Certificate

50195012 001

This CB Test Certificate is issued by the National Certification Body



TÜV Rheinland LGA Products GmbH  
Tillystraße 2 · 90431 Nürnberg, Germany  
Phone + 49 221 806-1371  
Fax + 49 221 806-3935  
Mail: cert-validity@de.tuv.com  
Web: www.tuv.com



Date: 26.07.2019

Signature:

Eileen Feng

**Business Stream Products  
Certification Department**



TÜV Rheinland LGA Products GmbH · 90431 Nürnberg

**NANJING GBETTER MECHANICAL  
& ELECTRICAL CO., LTD**  
43-1003.NO.4 BLOCK.  
NANJING. JIANGSU  
CHINA

Contact

Tel. +49 911 655-5225  
Mail [service@de.tuv.com](mailto:service@de.tuv.com)

Date July 26, 2019

**Application for** : **CB-Zertifikat**  
Certificate No. : DE 02025604  
Device : Outdoor Lamp  
LED Street Light  
Type : see Certificate  
Test requirement : IEC 60598-2-3:2002+A1  
IEC 60598-1:2014+A1  
See Test Report for National Differences

Dear Madame or Sir,

The submitted sample of the product has been tested and in this configuration found to be in accordance with the above mentioned requirements.  
Enclosed please find the certificate No. DE 02025604.

Kind regards

Certification body

Eileen Feng

Test sample: no, documentation available

TÜV Rheinland  
LGA Products GmbH

Tillystraße 2  
90431 Nürnberg

Tel. +49 911 655-5225  
Fax +49 911 655-5226  
Mail [service@de.tuv.com](mailto:service@de.tuv.com)  
Web [www.tuv.com/safety](http://www.tuv.com/safety)

Board of Management

Dipl.-Ing.  
Jörg Mähler, Spokesman

Dipl.-Kfm.  
Dr. Jörg Schlösser

Chairman of the  
Supervisory Board

Dipl.-Ing.  
Ralf Scheller

Nuremberg HRB 26013  
VAT No.: DE 811835490

## Road Lighting

**200w**

At relatively low initial cost, the highly efficient LED based luminaire offers significant cost savings compared with conventional street lighting, ensuring full payback within a short period of time available in a choice of lumen packages, it allows point to point replacement of outdated conventional light sources and luminaires, The compact, slim luminaire is made of high quality materials and being a LED solution, it requires little maintenance.

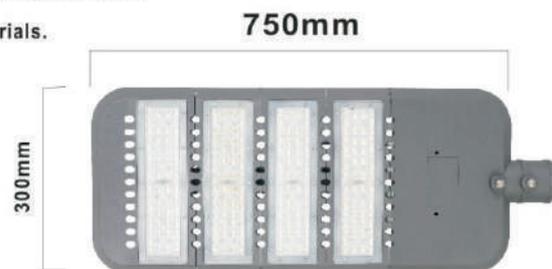


### Features

- Compact and slim luminaire made from high quality materials.
- Bulk Packaging-reduced cost and waste materials.
- High durability design.
- IES Typs I II Optice viewngAnge
- 5 years warranty.

### Dimension

**75×30×8.5 cm**



# Certificate For Energy Efficiency Label



الهيئة السعودية للمواصفات والمقاييس والجودة  
Saudi Standards, Metrology and Quality Org.

**The Saudi Standards, Metrology and Quality Org. (SASO)**

has certified : **ZHONGSHAN KARUNER LIGHTING FACTORY**

to use the energy efficiency label According to SASO 2902:2018, for the following product:-

The Product	Model's number	Brand name	Classification	Licence number
Lights Part 2	GA-M004-200W	SHOMO'O DUBAI	B	LP2071904622

\* Expiry Date: **1441-12-02 AH, 23-Jul-2020 AD**

This certificate is subject during its validation to the related Rules & Regulations of the Kingdom of Saudi Arabia, and any Instructions or Amendments issued by SASO.



Application No: E04622/2019



# CERTIFICATE



This is to Certify that the  
Quality Management System  
of

**SHOMOO DUBAI TRADING EST**

**8136 MOHAMED BIN DRAID, AL SULAIN 4651, ZIP 14267, KSA.**

has been found to comply with

**ISO 9001:2015**

This certificate is applicable to the following scope

**Supply of LED Street Lights, HDG / Painted Steel Lighting Poles, Fiberglass Lighting Poles, Aluminum Poles, Flag Poles, High Mast, Traffic Signal Poles, Antenna Poles & Towers, Steel Structural Products and Anchor Bolts**

**:: Certificate No :: I-QSC201903087**

Date of initial registration	03, March 2019
Surveillance audit on or before	03, February 2020
Certificate expiry	02, March 2020
Recertification Due	02, March 2021

Authorized Signatory

**BQC Assessment Private Limited**

Website : [www.bqccert.com](http://www.bqccert.com), E-mail : [info@bqccert.com](mailto:info@bqccert.com)

**Accredited by International Accreditation Service**

The validity of this certificate can be verified at [www.bqccert.com](http://www.bqccert.com) or through [info@bqccert.com](mailto:info@bqccert.com). This certificate is the property of BQC Assessment Pvt Ltd, and must be returned on request. Accreditation details are available with IAS, (International Accreditation Services) Inc. USA at [www.iasonline.org](http://www.iasonline.org)

# Certificate

For

## Energy Efficiency Label



الهيئة السعودية للمواصفات والمقاييس والجودة  
Saudi Standards, Metrology and Quality Org.

### The Saudi Standards, Metrology and Quality Org. (SASO)

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to use the energy efficiency label According to SASO 2902:2018, for the following product:-

The Product	Model's number	Brand name	Classification	Licence number
Lights Part 2	GA-M004-200W	SHOMO'O DUBAI	B	LP2071904622

\* Expiry Date: **1441-12-02 AH, 23-Jul-2020 AD**

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الهيئة السعودية للمواصفات والمقاييس والجودة  
Saudi Standards, Metrology and Quality Org.



Application No: E04622/2019



<b>TEST REPORT</b>	
<b>SASO-2902:2018</b>	
<b>ENERGY EFFICIENCY, FUNCTIONALITY AND LABELING</b>	
<b>REQUIREMENTS FOR LIGHTING PRODUCTS PART 2</b>	
Report reference No.:	LCS180602020BS100
Tested by.....:	Seth Cai (Project Engineer)
Check by.....:	Ian Luo (Director)
Approved by.....:	Jesse Liu (Manager)
Date of issue.....:	May 20, 2019
Contents.....:	18 pages
<b>Testing laboratory</b>	
Name.....:	Shenzhen Southern LCS Compliance Testing Laboratory Ltd.
Address.....:	B Area, 1-2F, Building B, Zhongyu Green High-tech Industrial Park, Wenge Road, Heshuikou, Gongming Street, Guangming New District, Shenzhen, China
Testing location.....:	As above
<b>Client</b>	
Name.....:	SHOMO'O DUBAI TRADING ESTABLISHMENT
Address.....:	RIYADH SULY ESTANBOOL ROAD DISTRICT SAUDI ARABIA
<b>Manufacturer</b>	
Name.....:	ZHONGSHAN KARUNER LIGHTING FACTORY
Address.....:	THE SOUTH NO.2. NO.11.TONGXING RODA.CAOSAN JIAFUWEI INDUSTRIAL ZONE.GUZHEN TOWN.ZHONGSHAN CITY
<b>Test specification</b>	
Standard.....:	SASO-2902:2018 ENERGY EFFICIENCY, FUNCTIONALITY AND LABELING REQUIREMENTS FOR LIGHTING PRODUCTS PART 2
Test procedure.....:	SASO-2902:2018 ENERGY EFFICIENCY, FUNCTIONALITY AND LABELING REQUIREMENTS FOR LIGHTING PRODUCTS PART 2
Non-standard test method...:	N/A





<b>Test item Description</b> .....	LED Street Light
Trademark .....	
Model and/or type reference.....	GA-M004-200W
Rating(s)(V/Hz).....	AC 220V, 50/60Hz, 200W
<b>Test case verdicts</b>	
Test case does not apply to the test object :	N(N/A)
Test item does meet the requirement .....	P(Pass)
Test item does not meet the requirement ...:	F(Fail)
<b>Testing</b>	
Date of receipt of test item .....	April 23, 2019
Date(s) of performance of test.....	0H: April 23, 2019 - April 26, 2019
<b>Test item particulars:</b>	
<b>Lamp type:</b>	
- Indirect	<input type="checkbox"/>
- Direct	<input checked="" type="checkbox"/>
<b>Techonology:</b>	
- Lamp	<input type="checkbox"/>
- Luminaires	<input checked="" type="checkbox"/>
- Ballsts and Control Gears	<input type="checkbox"/>
-Use types for luminaires	General (artificial) lighting
<b>Control gear:</b>	
- Integrated	<input checked="" type="checkbox"/>
- External	<input type="checkbox"/>
<b>Use of lamp:</b>	
- Indoor	<input type="checkbox"/>
- Outdoor	<input checked="" type="checkbox"/>
- Industry	<input type="checkbox"/>
<b>Envelope transparency:</b>	
- Clear lamp	<input type="checkbox"/>
- Non-clear lamp	<input checked="" type="checkbox"/>
<b>Dimmable lamp:</b>	<input type="checkbox"/>
<b>Lamps with anti-glare shield:</b>	<input type="checkbox"/>
<b>Lamp cap installed:</b>	N/A
<b>Declared data:</b>	

TRF No. SAS0-2902:2018

Shenzhen Southern LCS compliance testing laboratory LTD.

Add: B Area, 1-2F, Building B, Zhongyu Green High-tech Industrial Park, Wenge Road, Heshuikou, Gongming Street, Guangming New District, Shenzhen, China

Tel: +(86) 0755-29871520 | Fax: +(86) 0755-2987 1521 | E-mail: webmaster@lcs-cert.com | http:// www.lcs-cert.com



Rated voltage .....(V): AC 220V  
Rated lamp power .....(W): 200W  
Rated useful luminous flux.....(lm): 22000lm  
Rated Ra .....: 70  
Rated Beam angle.....(° ): 125°  
Rated CCT .....(K): 4000K  
Rated Energy Efficacy rating.....: Class B  
Rated EEI.....: 0.124  
Rated life time .....(h): 50000h

**Attachments:**

The test report includes: Attachment 1(S) of product photos

**General remarks**

The test results presented in this report relate only to the object tested.  
This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.  
"(see Enclosure #)" refers to additional information appended to the report.  
"(see appended table)" refers to a table appended to the report.  
Throughout this report a comma (point) is used as the decimal separator.  
This report is a partial test report. Only tested the initial value of products.

**Remarks**

N/A

**TRF No. SAS0-2902:2018**



### Summary of test results

Power(W).....	:	198.58
Corrected power Pcor (W).....	:	198.58
Total Luminous Flux $\Phi$ (lm).....	:	24702.18
Useful luminous flux $\Phi_{use}$ (lm).....	:	21466.3
Reference power Pref (W).....	:	1575.84
Lamp survival factor at 6000h (%).....	:	TBD
Lamp maintenance at 6000h (%).....	:	TBD
Number of switching cycles before failure.....	:	TBD
Starting time (s).....	:	0.124
Lamp warm-up time to 95 % $\Phi$ (s).....	:	N/A
Premature failure rated at 1000h(%).....	:	TBD
Lamp displacement factor.....	:	0.9817
Color rendering index(%).....	:	72.8
Color Temp(K).....	:	3976
Efficacy (lm/W).....	:	124.39
Annual energy consumption (kWh/yr).....	:	198.58
Energy Efficiency Index (EEI).....	:	0.126
Energy efficiency rating.....	:	<input type="checkbox"/> A <input checked="" type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E <input type="checkbox"/> F <input type="checkbox"/> G

TRF No. SAS0-2902:2018

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## Measurement conditions

### 1、 Lamp Pre-Conditioning

The compact fluorescent lamps were pre-conditioned for 100 hours (mounted in base-up position), before the initial lumen measurement.

No pre-conditioning for LED lamps before the initial lumen measurement.

### 2、 Light Output Measurements

Total light output (luminous flux) was measured using a 2 meters integrating sphere spectral lamp measurement system. Temperature was measured at a position inside the sphere shielded from direct light. Relative humidity of 65% was measured at a position in the testing laboratory.

Spectral radiant flux measurements were done by using spectroradiometer attached to the detector port of the integrating sphere. The sample was operated at 220V AC 60Hz in normal operation. The sample was allowed to stabilise before measurements were made. The integrating sphere spectroradiometer system is calibrated by the reference/standard lamps which are traceable to National Institute of Metrology P.R. CHINA. Lamp efficacy (lumens per watt) for each lamp model was then calculated based on the luminous flux result. Electrical measurements, including voltage, power and power factor, were measured with YOKOGAWA Digital Power Meter, model WT310.

### 3、 Light distribution measurements

Light Distribution was measured using a GO-R5000 Type-C Full-field Speed Goniophotometer.

Temperature 25°C and relative humidity of 60% was measured at a position in the testing laboratory. The lamp rotates only around the fixed vertical axle in the prescribed burning position. The lamp and mirror permit the measurement of luminous intensity at the direction of any horizontal or vertical angle without tilting the lamp. The lamp was allowed to stabilize before measurements were made.

### 4、 Equipment List

Instrument	Equipment ID	Model	Calibration Date	Calibration Due Date
Full-field Speed Goniophotometer	SLCS-S-112	GO-R5000	2018/08/14	2019/08/13
Digital Power Meter	SLCS-S-103	PF2010	2018/08/14	2019/08/13
AC Testing Power Source	SLCS-S-115	DPS1060	2018/08/14	2019/08/13
Total Spectral Radiant Flux Standard Lamp	SLCS-S-143	D908S	2018/08/22	2019/08/21
2m Integrating Sphere System	SLCS-S-038	SPR-3000	2018/08/14	2019/08/13
Digital Power Meter	SLCS-S-058	WT310	2018/08/14	2019/08/13
AC Testing Power Source	SLCS-S-111	APW-105N	2018/08/14	2019/08/13
Standard Lamp	SLCS-S-118	S11010017	2018/08/22	2019/08/21
Power Meter	SLCS-S-060	PF9800	2018/08/14	2019/08/13
Flicker Photometer	SLCS-S-119	FP-210	2018/08/14	2019/08/13

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SASO-2902:2018			
Clause	Requirement - Test	Result - Remark	Verdict
<b>4</b>	<b>Requirements for non-directional/directional lamps, control gears and luminaires</b>		<b>P</b>
4.1	Energy efficiency requirements		P
	non-directional lamps, comply with the Annex C		N
	directional lamps, comply with the Annex E		P
	For Incandescent, Halogen, and CFLi with luminous flux above or equal to 12000 lumens the tests and criteria described in SASO 2870 apply.		N
	For LED lamps, tests and criteria described in SASO 2870 apply.		N
	Ballasts and control gears, comply with the Annex H		N
	Luminaires, comply with the Annex M		P
4.2	Functionality requirements		P
	non-directional lamps, comply with the Annex D		N
	directional lamps, comply with the Annex F		P
	Luminaires comply with the Annex D, F and M		P
4.3	Marking requirements		P
	Instruction manuals supplied with products and available on website shall be: - Cautionary and/or any safety warnings for the direct user or consumer shall be in the Arabic and English language. The use of international accepted pictograms is permitted instead of verbally expressed language. - And available on a Website (English only is permitted)		P
	directional lamps, non-directional lamps and luminaires, comply with the Annex G		P
	ballasts / control gears, comply with the Annex H		N
	“Special purpose” products (Annex B.1) do not need to comply with the marking requirements specified in Annex G. Instead, the following information shall be clearly and prominently indicated on their packaging and in all forms of product information accompanying the lamp when it is placed on the market: a. Their intended purpose b. That they are not suitable for household room illumination		N
4.4	Energy efficiency label		P
	Lamps and integrated luminaires in the scope of this standard shall have a label printed directly on the individual packaging of the product.		P
	Products listed in Annex B.1 and ballasts/control gears are excluded from the energy labelling requirements.		N
	Products listed in Annex B.2 shall have a label printed or put as a sticker directly on the individual packaging of the product.		N

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SASO-2902:2018															
Clause	Requirement - Test	Result - Remark	Verdict												
4.5	Hazardous chemicals: Substance restrictions for lamps and control gears		P												
	Products specified in Annex A and Annex B.1 and B.2 shall comply with the maximum hazardous substances limits according to Annex J.		P												
<b>5</b>	<b>Registration requirements</b>		P												
5.1	General		P												
	Product registration is mandatory, and reference shall be made to the separate SASO registration forms and requirements.		P												
	The product's information shall be submitted through the registration system electronically via SASO website.		P												
	Labels will be automatically published by SASO website after the final registration of a product.		P												
5.2	Type of documents needed for registration under the scope of this standard		P												
	To confirm the claims of the applicant, the following types of documents are required (see Table 2). Test report or evidences of the claimed properties can be established for a family of product, the definition of which is under the responsibility of the manufacturer. <i>Table 2: Type of documents required</i>		P												
	<table border="1"> <thead> <tr> <th>Type of test</th> <th>Type of document</th> </tr> </thead> <tbody> <tr> <td>Energy Efficiency</td> <td> <ul style="list-style-type: none"> <li>For lamps: test report for each model</li> <li>For luminaires: factory test report for a representative model of the family, including a family specification overview</li> <li>For control gear: test report</li> </ul> </td> </tr> <tr> <td>Functionality (Ra, color temperature, and other aspects)</td> <td> <ul style="list-style-type: none"> <li>For lamps: test report for a representative model of the family, including a family specification overview</li> <li>For luminaires: factory test report for a representative model of the family, including a family specification overview</li> </ul> </td> </tr> <tr> <td>Endurance (Lamps survival factor, lumen maintenance, switching On/off)</td> <td> <ul style="list-style-type: none"> <li>For lamps: test report for a representative model of the family, including a family specification overview</li> </ul> </td> </tr> <tr> <td></td> <td> <ul style="list-style-type: none"> <li>For luminaires: factory report for a representative model of the family, including a family specification overview</li> </ul> </td> </tr> <tr> <td>Environment (Hazardous substances)</td> <td>Test report or self-declaration for a representative model of the family, including a family specification overview</td> </tr> </tbody> </table>	Type of test	Type of document	Energy Efficiency	<ul style="list-style-type: none"> <li>For lamps: test report for each model</li> <li>For luminaires: factory test report for a representative model of the family, including a family specification overview</li> <li>For control gear: test report</li> </ul>	Functionality (Ra, color temperature, and other aspects)	<ul style="list-style-type: none"> <li>For lamps: test report for a representative model of the family, including a family specification overview</li> <li>For luminaires: factory test report for a representative model of the family, including a family specification overview</li> </ul>	Endurance (Lamps survival factor, lumen maintenance, switching On/off)	<ul style="list-style-type: none"> <li>For lamps: test report for a representative model of the family, including a family specification overview</li> </ul>		<ul style="list-style-type: none"> <li>For luminaires: factory report for a representative model of the family, including a family specification overview</li> </ul>	Environment (Hazardous substances)	Test report or self-declaration for a representative model of the family, including a family specification overview		
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Environment (Hazardous substances)	Test report or self-declaration for a representative model of the family, including a family specification overview														
	Evidences attached to the registration shall comply with the above definition of the family the product belongs to.		N												
	For luminaires, the functionality and endurance requirements can be supported by a factory test report.		P												

Annex C	Energy efficiency requirements for non-direction lamps		N
C1	Indirect lamps, comply with the Annex C according to Table 5		N
	The useful luminous flux ( $\Phi_{use}$ ) is defined in accordance with Table 4		N
	Corrected Power ( $P_{cor}$ )		N
	Reference Power ( $P_{ref}$ ) $\Phi < 1300 \text{ lm}$ ( $P_{ref} = 0,88 \sqrt{\Phi} + 0,049 \Phi$ )		N

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Clause	Requirement - Test	Result - Remark	Verdict																								
	$\Phi \geq 1300 \text{ lm}$ (Pref= 0,07341 $\Phi$ )																										
C2	Maximum Energy Efficiency Index (EEI) within the limit according to table 5 <b>Table 5: Maximum Energy Efficiency Index (EEI)</b> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th rowspan="2">Lamps types</th> <th colspan="4">Date of enforcement : 6 months after publication in the Official Gazette</th> </tr> <tr> <th>CFLni</th> <th>LFL Other fluorescent</th> <th>LED</th> <th>High Intensity Discharge (HID)</th> </tr> </thead> <tbody> <tr> <td>Maximum Values</td> <td>0.24</td> <td>0.24</td> <td>0.24</td> <td>0.50</td> </tr> </tbody> </table>	Lamps types	Date of enforcement : 6 months after publication in the Official Gazette				CFLni	LFL Other fluorescent	LED	High Intensity Discharge (HID)	Maximum Values	0.24	0.24	0.24	0.50		N										
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	CFLni	LFL Other fluorescent	LED	High Intensity Discharge (HID)																							
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C3	Energy efficiency classes for non - directional lamps according to table 6 <b>Table 6: Energy efficiency classes for non-directional lamps</b> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Energy efficiency index (EEI)</th> <th>Energy efficiency class (Arabic)</th> <th>Equivalent energy efficiency class (English)</th> </tr> </thead> <tbody> <tr> <td><math>EEI \leq 0.11</math></td> <td>أ</td> <td>A</td> </tr> <tr> <td><math>0.11 &lt; EEI \leq 0.13</math></td> <td>ب</td> <td>B</td> </tr> <tr> <td><math>0.13 &lt; EEI \leq 0.18</math></td> <td>ج</td> <td>C</td> </tr> <tr> <td><math>0.18 &lt; EEI \leq 0.24</math></td> <td>د</td> <td>D</td> </tr> <tr> <td><math>0.24 &lt; EEI \leq 0.50</math></td> <td>هـ</td> <td>E</td> </tr> <tr> <td><math>0.50 &lt; EEI \leq 0.95</math></td> <td>و</td> <td>F</td> </tr> <tr> <td><math>0.95 &lt; EEI \leq 1.75</math></td> <td>ز</td> <td>G</td> </tr> </tbody> </table> <p><i>Note: For labelling purposes, the Arabic letters shall be used. The equivalent English version is only provided for informational purposes</i></p>	Energy efficiency index (EEI)	Energy efficiency class (Arabic)	Equivalent energy efficiency class (English)	$EEI \leq 0.11$	أ	A	$0.11 < EEI \leq 0.13$	ب	B	$0.13 < EEI \leq 0.18$	ج	C	$0.18 < EEI \leq 0.24$	د	D	$0.24 < EEI \leq 0.50$	هـ	E	$0.50 < EEI \leq 0.95$	و	F	$0.95 < EEI \leq 1.75$	ز	G		N
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C4	Annual energy consumption(kWh/yr) $E_y$		N																								

Annex D	Functionality and endurance requirements for non-directional lamps and luminaires		N
D1	Functionality and endurance requirements for non - directional fluorescent lamps		N
Table 7	Lamp lumen maintenance: factors for without integrated ballast single and double capped fluorescent lamps		N
Table 8	Lamp lumen maintenance - Deduction percentages for fluorescent lamp lumen maintenance requirements		N
Table 9	Lamp survival factors for single and double capped fluorescent lamps		N
Table 10	Functionality and endurance requirements for non-directional compact fluorescent lamps operated on external control gear (CFLni)		N
	Lamp survival factor: Limit: $\geq 0.70$ (at 6000h)		N
	Lumen maintenance at 2000h: Limit: $\geq 83\%$		N
	Lumen maintenance at 6000h: Limit: $\geq 70\%$		N
	Lamp warm-up time to 60% $\Phi$ : Limit: <40s , or		N
	Lamp warm-up time to 60% $\Phi$ : Limit: < 100s (for lamps containing mercury in amalgam form)		N

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Clause	Requirement - Test	Result - Remark	Verdict
	Premature failure rate: Limit: $\leq 5.0\%$ ( at 1000h)		N
	Color rendering (Ra) $\geq 80$		N
	Color rendering (Ra) $\geq 65$ if the lamp is intended for outdoor or industrial applications		N
D2	Functionality and endurance requirements for metal halide lamps and Highpressure sodium		N
Table 11	$P \leq 75$ W LLMF and LSF measured at 12,000 burning hours		N
	$P > 75$ W LLMF and LSF measured at 16,000 burning hours		N
Table 12	Functionality and endurance requirements for metal halide lamps		N
D3	Functionality and endurance requirements for non - directional LED lamps and luminaires		N
Table 13	Lamp survival factor at 6000 hours: Limit $\geq 0.9$		N
	Lumen maintenance at 6000 hours: Limit: $\geq 0.8$		N
	Number of switching cycles before failure: $\geq$ half the lamp lifetime expressed in hours		N
	Number of switching cycles before failure: $\geq 15000$ if lamp rated life $\geq 30000$ h		N
	Starting time: Limit: $< 0.5$ s		N
	Lamp warm-up time (tWarm) to 95 % $\Phi$ , Limit: $< 2$ s		N
	Premature failure rate: Limit: $\leq 5.0\%$ (at 1000h)		N
	Color rendering (Ra): Limit: $\geq 80$		N
	Color rendering (Ra) $\geq 65$ if the lamp is intended for outdoor or industrial applications		N
	Colour consistency -Six-step MacAdam ellipse or less.		N
	Lamp displacement factor: $P \leq 2$ W: no requirement		N
	Lamp displacement factor: Limit: $\geq 0.4$ for $2W < P \leq 5W$		N
	Lamp displacement factor: Limit: $\geq 0.7$ for $5W < P \leq 25W$		N
	Lamp displacement factor: Limit: $\geq 0.9$ for $P > 25W$		N

Annex E	Energy efficiency requirements for direction lamps		N
E1	Direction lamps, comply with the Annex E according to Table 17		N
	Corrected Power (Pcor),without external control gear		N
Table 14	Corrected Power (Pcor),Power Correction if the model requires external control gear		N
Table 15	Definition of useful luminous flux		N
	Directional lamps with a beam angle $\geq 90^\circ$ other than filament lamps and carrying a warning on their packaging that they are not suitable for accent lighting: Rated luminous flux in a $120^\circ$ cone ( $\Phi 120^\circ$ )		N

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SASO-2902:2018																											
Clause	Requirement - Test	Result - Remark	Verdict																								
	Other directional lamps: rated luminous flux in a 90° cone ( $\Phi$ 90°)		N																								
	Reference Power (Pref) $\Phi < 1300 \text{ lm}$ (Pref= 0,88 $\sqrt{\Phi} + 0,049 \Phi$ ) $\Phi \geq 1300 \text{ lm}$ (Pref= 0,07341 $\Phi$ )		N																								
E2	Maximum Energy Efficiency Index (EEI) within the limit according to table 16 <b>Table 16: Maximum energy efficiency index (EEI)</b> <table border="1" style="margin: 10px auto;"> <thead> <tr> <th>Lamp type</th> <th>CFLni</th> <th>LFL</th> <th>LED</th> <th>High Intensity Discharge (HID)</th> </tr> </thead> <tbody> <tr> <td>Maximum EEI</td> <td>0.24</td> <td>0.24</td> <td>0.24</td> <td>0.50</td> </tr> </tbody> </table>	Lamp type	CFLni	LFL	LED	High Intensity Discharge (HID)	Maximum EEI	0.24	0.24	0.24	0.50		N														
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E3	Energy efficiency classes according to table 17 <b>Table 17: Energy efficiency classes for directional lamps</b> <table border="1" style="margin: 10px auto;"> <thead> <tr> <th>Energy efficiency index (EEI)</th> <th>Energy efficiency class (Arabic)</th> <th>Equivalent energy efficiency class (English)</th> </tr> </thead> <tbody> <tr> <td><math>EEI \leq 0.11</math></td> <td>أ</td> <td>A</td> </tr> <tr> <td><math>0.11 &lt; EEI \leq 0.13</math></td> <td>ب</td> <td>B</td> </tr> <tr> <td><math>0.13 &lt; EEI \leq 0.18</math></td> <td>ج</td> <td>C</td> </tr> <tr> <td><math>0.18 &lt; EEI \leq 0.24</math></td> <td>د</td> <td>D</td> </tr> <tr> <td><math>0.24 &lt; EEI \leq 0.50</math></td> <td>هـ</td> <td>E</td> </tr> <tr> <td><math>0.50 &lt; EEI \leq 0.95</math></td> <td>و</td> <td>F</td> </tr> <tr> <td><math>0.95 &lt; EEI \leq 1.75</math></td> <td>ز</td> <td>G</td> </tr> </tbody> </table> <p><small>Note: For labelling purposes, the Arabic letters shall be used. The equivalent English version is only provided for informational purposes</small></p>	Energy efficiency index (EEI)	Energy efficiency class (Arabic)	Equivalent energy efficiency class (English)	$EEI \leq 0.11$	أ	A	$0.11 < EEI \leq 0.13$	ب	B	$0.13 < EEI \leq 0.18$	ج	C	$0.18 < EEI \leq 0.24$	د	D	$0.24 < EEI \leq 0.50$	هـ	E	$0.50 < EEI \leq 0.95$	و	F	$0.95 < EEI \leq 1.75$	ز	G		N
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E4	Annual energy consumption(kWh/yr) Ey		N																								

Annex F	Functionality requirements for directional lamps and integrated luminaires		P
Table 18	Functionality and endurance requirements for directional LED lamps and integrated luminaires		P
	Lamp survival factor at 6000 hours: Limit $\geq 0.9$	TBD	P
	Lumen maintenance at 6000 hours: Limit: $\geq 0.8$	TBD	P
	Number of switching cycles before failure: $\geq$ half the lamp lifetime expressed in hours		N
	Number of switching cycles before failure: $\geq 15000$ if lamp rated life $\geq 30000\text{h}$	TBD	P
	Starting time: Limit: $< 0.5\text{s}$	0.124	P
	Premature failure rate: Limit: $\leq 5.0\%$ (at 1000h)		P
	Color rendering (Ra): Limit: $\geq 80$		N
	Color rendering (Ra) $\geq 65$ if the lamp is intended for outdoor or industrial applications	72.8	P
	Colour consistency -Six-step MacAdam ellipse or less.	2.5	P

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Clause	Requirement - Test	Result - Remark	Verdict
	Lamp displacement factor: $P \leq 2W$ : no requirement		N
	Lamp displacement factor: Limit: $> 0.4$ for $2W < P \leq 5W$		N
	Lamp displacement factor: Limit: $> 0.7$ for $5W < P \leq 25W$		N
	Lamp displacement factor: Limit: $> 0.9$ for Power $> 25W$	0.9817	P

Annex G	Marking requirements for non-directional and directional lamps		N
G1	For lamps other than high-intensity discharge lamps, the following shall be printed on the bulb with non-removable ink:		N
	Brand name		N
	Input voltage		N
	Nominal power		N
	Country of origin		N
G2	Information to be visibly displayed to end - users, prior to their purchase, on the packaging and on free access websites		N
	The information in paragraphs (a) to (y) below shall be displayed on free-access websites and in any other form the manufacturer deems appropriate.		N
	The information in paragraphs (a) to (p) below shall be visibly displayed on the packaging if the product is intended to be displayed to the end-users.		N
	The information does not need to use the exact wording on the list below. It may be displayed in the form of graphs, drawings or symbols rather than text.		N
	Brand name		N
	Model number		N
	Input voltage		N
	Country of origin		N
	Lamp type (indirect)		N
	Country of origin		N
	Rated voltage and rated frequency		N
	Rated useful luminous flux		N
	Efficacy (lumen/Watt)		N
	Rated power		N
	Rated beam angle in degrees (only for directional lamps)		N
	Lamp displacement factor (only for LED lamps with integrated control gear)		N
	Rated life time of the lamp in hours		N
	Rated Color temperature, as a value in Kelvins, expressed graphically or in words		N

**TRF No. SASO-2902:2018**

Shenzhen Southern LCS compliance testing laboratory LTD.

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SASO-2902:2018			
Clause	Requirement - Test	Result - Remark	Verdict
	Number of switching cycles before premature failure (only for LED lamps or if claimed by the manufacturer for other type of lamps)		N
	Color rendering index (Ra)		N
	Stating all hazardous material contained in the lamp/luminaire, as relevant		N
	Statement referring to a Website		N
	- on how to clean lamp debris in case of accidental lamp breakage and disposal of lamp at the end of life, when relevant;		N
	- About actual values of the hazardous content, when relevant		N
	A warning if the lamp cannot be dimmed or can be dimmed only on specific dimmers; in the latter case, a list of compatible dimmers shall be also provided on the manufacturer's website		N
	Following information are optional:		N
	Lamp type: directional or non-directional		N
	Color consistency (only for LED lamps)		N
	Lumen maintenance factor at the end of the nominal life		N
	Warm-up time up to 60 % of the full light output (may be indicated as 'instant full light' if less than 1second), when relevant		N
	If designed for optimum use in non-standard conditions (such as ambient temperature $T_a \neq 25 \text{ }^\circ\text{C}$ or specific thermal management is necessary), provide information on those conditions		N
	Rated peak intensity in candela (cd), when available		N
	An equivalence claim involving the power of a replaced lamp type may be displayed only if the lamp type is listed in Part 1 - Table 13.		N
	For LED lamps, if intended for use in outdoor or industrial applications, an indication to this effect		N
	Lamp dimensions in millimeters (length and largest diameter)		N
	Actual values of all hazardous material contained in the lamp/luminaire		N

Annex H	Requirement on ballast for fluorescent lamps without integrated ballast and ballast for high intensity discharge, halogen and LED lamps		N
H1	Ballast energy performance requirements		N
H1.1	Ballast for all types of lamps		N
	The no-load power of a lamp control gear intended for use between the mains and the switch for turning the lamp load on/off shall not exceed 1.00W.		N

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SASO-2902:2018			
Clause	Requirement - Test	Result - Remark	Verdict
	For lamp control gear with output power (P) over 250 W, the no-load power limits shall be multiplied by P/250 W.		N
	The standby power of a lamp control gear shall not exceed 1.00 W.		N
H1.2	Additional requirement for control gear for halogen and LED lamps		N
	The efficiency of control gear shall be at least 0,91 at 100 % load.		N
H1.3	Additional requirement for ballasts for high intensity discharge lamps		N
Table 19	Minimum efficiency for ballasts for high intensity discharge lamps		N
H1.4	Additional requirement for ballasts for fluorescent lamps		N
Table 20	The minimum energy efficiency index class shall be B2 for ballasts covered by table 20		N
	A3 for the ballasts covered by table 21		N
	A1 for dimmable ballasts covered by table 22		N
	At the dimming position corresponding to 25 % of the lumen output of the operated lamp, the input power (Pin) of the lamp-ballast circuit shall not exceed: $P_{in} < 50 \% PL_{rated} / \eta_{ballast}$		N
	The power consumption of the fluorescent lamp ballasts shall not exceed 100 W		N
Table 21	Energy efficiency index requirements for non-dimmable ballasts for fluorescent lamps not included in Table 20		N
Table 22	Energy efficiency index requirements for dimmable ballasts for fluorescent lamps		N
H2	Product information requirements on ballasts		N
	Manufacturers of ballasts shall provide at least the following information on free-access websites and in other forms they deem appropriate for each of their ballast models.		N
	For ballasts for fluorescents lamps, an energy efficiency index (EEI) class shall be provided		N
	The classes for nondimmable ballasts are (in descending order of efficiency) A2 BAT, A2, A3, B1, B2		N
	For dimmable ballasts A1 BAT and A1.		N

Annex I	Energy label for lamps and integrated luminaires		<b>P</b>
I1	Determining the energy efficiency class		P
	The energy efficiency class for each product shall be determined as outlined in Table 6 in Annex C (non-directional lamps)		N
	as outlined in Table 15 in Annex E (directional lamps) or in Table 37 in Annex M for integrated luminaires.		P
I2	Design and placement of the label		P

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SASO-2902:2018			
Clause	Requirement - Test	Result - Remark	Verdict
	The label shall be printed directly on the packaging of the product.		P
	The size of the label shall comply with figure 1 (43 mm wide and 75 mm high)		P
	if the size of the packaging does not fit with the dimension of Label in figure 1, then design and dimension of Label shall match with Label as presented in figure 2 (43 mm wide and 45 mm high).		P
	If the packaging is too small to take the label according figure 2, the label complying with figure 1 shall be printed on the outer packaging.		P
I3	Information and values contained on the label		P

Annex J	Hazardous chemicals: Substance restrictions for lamps & control gears		<b>P</b>
Table 24	Maximum content limits of hazardous substances		P
Table 25	Lamps exempted from exemptions listed in Table 22		P
Table 26	Maximum mercury content		P

Annex K	Tests methods for lamps and control gears		<b>N</b>
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Annex L	Measurement of the mercury content for fluorescent lamps		<b>N</b>
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Annex M	Energy efficiency for (integrated) luminaires		<b>P</b>
M1	Types of luminaires, table 34		P
M2	Minimum Efficacy for luminaires, table 35		P
	$P_{rated} < 15W, \geq 65 \text{ Lumen/Watt}$		N
	$P_{rated} \geq 15W, \geq 70 \text{ Lumen/Watt}$	124.39	P
M3	Energy Efficiency Index for luminaires (EEI)		P
	Corrected Power ( $P_{cor}$ ), without external control gear	198.58	P
	Corrected Power ( $P_{cor}$ ), with external control gear:		N
Table 36	$P_{rated} \leq 6W, P_{cor} = P_{rated} \times 1.17$		N
	$6W < P_{rated} \leq 15W, P_{cor} = P_{rated} \times 1.03$		N
	$15W < P_{rated}, P_{cor} = P_{rated} \times 0.98$		N
	Useful luminous flux	21466.3	P
	Reference Power ( $P_{ref}$ ) $\Phi < 1300 \text{ lm} (P_{ref} = 0,88 \sqrt{\Phi} + 0,049 \Phi)$	1575.84	P

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SASO-2902:2018																											
Clause	Requirement - Test	Result - Remark	Verdict																								
	$\Phi \geq 1300 \text{ lm}$ (Pref= 0,07341 $\Phi$ )																										
M4	Classification of Energy Efficiency Index for (integrated) luminaires (EEI)	0.126	P																								
Table 37	Energy efficiency classes for luminaires <i>Table 37: Energy efficiency classes for luminaires</i> <table border="1"> <thead> <tr> <th>Energy efficiency index (EEI)</th> <th>Energy efficiency class (Arabic)</th> <th>Equivalent energy efficiency class (English)</th> </tr> </thead> <tbody> <tr> <td><math>EEI \leq 0.11</math></td> <td>أ</td> <td>A</td> </tr> <tr> <td><math>0.11 &lt; EEI \leq 0.13</math></td> <td>ب</td> <td>B</td> </tr> <tr> <td><math>0.13 &lt; EEI \leq 0.18</math></td> <td>ج</td> <td>C</td> </tr> <tr> <td><math>0.18 &lt; EEI \leq 0.24</math></td> <td>د</td> <td>D</td> </tr> <tr> <td><math>0.24 &lt; EEI \leq 0.50</math></td> <td>هـ</td> <td>E</td> </tr> <tr> <td><math>0.50 &lt; EEI \leq 0.95</math></td> <td>و</td> <td>F</td> </tr> <tr> <td><math>0.95 &lt; EEI \leq 1.75</math></td> <td>ز</td> <td>G</td> </tr> </tbody> </table> <p><i>Note: For labelling purposes, the Arabic letters shall be used. The equivalent English version is only provided for informational purposes</i></p>	Energy efficiency index (EEI)	Energy efficiency class (Arabic)	Equivalent energy efficiency class (English)	$EEI \leq 0.11$	أ	A	$0.11 < EEI \leq 0.13$	ب	B	$0.13 < EEI \leq 0.18$	ج	C	$0.18 < EEI \leq 0.24$	د	D	$0.24 < EEI \leq 0.50$	هـ	E	$0.50 < EEI \leq 0.95$	و	F	$0.95 < EEI \leq 1.75$	ز	G	B	P
Energy efficiency index (EEI)	Energy efficiency class (Arabic)	Equivalent energy efficiency class (English)																									
$EEI \leq 0.11$	أ	A																									
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$0.18 < EEI \leq 0.24$	د	D																									
$0.24 < EEI \leq 0.50$	هـ	E																									
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**Appendix-Test Data Sheet****Functionality requirements for directional integrated luminaires:****Annex E, Table 18 for directional integrated luminaires**

Sample No.	Starting time (s)	Switching Cycle	Premature Failure Rate 1000h	Power (W)	Power Factor	Luminous Flux $\Phi$ total (lm)	Luminous Flux $\Phi$ use (lm)	Efficacy (lm/W)	Color Temp (CCT)	Color rendering (Ra)	SDCM	Luminous flux (lm) After 6000h	Lumen Maintenance at 6000h (%)	Survival factor at 6000h
1	0.124	TBD	TBD	199.06	0.9835	24958.4	21690.0	125.38	3949	73.3	2.3	TBD	TBD	TBD
2	0.121	TBD	TBD	198.65	0.9843	24664.1	21433.1	124.16	3961	71.8	2.8	TBD	TBD	TBD
3	0.128	TBD	TBD	198.76	0.9817	24685.3	21451.5	124.20	3984	73.6	3.1	TBD	TBD	TBD
4	0.122	TBD	TBD	197.50	0.9794	24660.5	21429.9	124.86	3937	72.8	2.1	TBD	TBD	TBD
5	0.123	TBD	TBD	198.15	0.978	24598.7	21376.3	124.14	3957	72.2	1.9	TBD	TBD	TBD
6	0.125	TBD	TBD	197.46	0.9799	24659.1	21428.8	124.88	4004	73.8	2.7	TBD	TBD	TBD
7	0.121	TBD	TBD	198.71	0.9843	24784.4	21537.6	124.73	4013	73.5	2.4	TBD	TBD	TBD
8	0.126	TBD	TBD	199.25	0.9807	24610.1	21386.2	123.51	4005	72.6	2.1	TBD	TBD	TBD
9	0.124	TBD	TBD	199.12	0.9793	24657.8	21427.6	123.83	3994	71.9	3.0	TBD	TBD	TBD
10	0.125	TBD	TBD	199.15	0.9863	24743.4	21502.0	124.25	3954	72.8	2.5	TBD	TBD	TBD
Avg.	0.124	TBD	TBD	198.581	0.9817	24702.18	21466.3	124.39	3976	72.8	2.5	TBD	TBD	TBD

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**ATTACHMENT 1(S)**

Photos of GA-M004-200W



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**Revision History**

Revision	Issue Date	Revision Content	Revised By
V1.1	2019/5/20	Modify the Client 、 Trademark	Seth Cai

**Remark: This report is based on the report No. LCS180601061BS. This report is invalid without the original report.**

----- End of test report-----

**TRF No. SAS0-2902:2018**

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IEC SYSTEM FOR MUTUAL RECOGNITION OF TEST CERTIFICATES FOR ELECTRICAL EQUIPMENT  
(IECEE) CB SCHEME

## CB TEST CERTIFICATE

Product	LED Street Light
Name and address of the applicant	NANJING GBETTER MECHANICAL & ELECTRICAL CO.,LTD 43-1003.NO.4 BLOCK, 2ND BAIRUN ROAD,PUKOU DISTRICT., NANJING. JIANGSU, China
Name and address of the manufacturer	ZHONGSHAN KARUNER LIGHTING FACTORY THE SOUTH NO.2, NO.11 TONGXING ROAD, CAOSAN, JIAFUWEI INDUSTRIAL ZONE, GUZHEN TOWN, 528421 ZHONGSHAN CITY, China
Name and address of the factory	ZHONGSHAN KARUNER LIGHTING FACTORY THE SOUTH NO.2, NO.11 TONGXING ROAD, CAOSAN, JIAFUWEI INDUSTRIAL ZONE, GUZHEN TOWN, 528421 ZHONGSHAN CITY, China
Ratings and principal characteristics	AC 100-240V, 50/60Hz, Class I, IP65, ta 45°C 1)100W, 2)150W, 3)200W, 4)250W
Trademark (if any)	Graphical trademark of GB
Customer's Testing Facility (CTF) Stage used	N/A
Model / Type Ref.	1)GA-M002-100W, GA-L004B-100W 2)GA-M003-150W, GA-L004C-150W 3)GA-M004-200W, GA-L004D-200W 4)GA-M005-250W
Additional information (if necessary may also be reported on page 2)	For model differences, refer to the test report.
A sample of the product was tested and found to be in conformity with	IEC 60598-2-3:2002+A1 IEC 60598-1:2014+A1 See Test Report for National Differences
As shown in the Test Report Ref. No. which forms part of this Certificate	50195012 001

This CB Test Certificate is issued by the National Certification Body



TÜV Rheinland LGA Products GmbH  
Tillystraße 2 · 90431 Nürnberg, Germany  
Phone + 49 221 806-1371  
Fax + 49 221 806-3935  
Mail: cert-validity@de.tuv.com  
Web: www.tuv.com



Date: 26.07.2019

Signature:

Eileen Feng

**Business Stream Products**  
**Certification Department**

TÜV Rheinland LGA Products GmbH · 90431 Nürnberg

**NANJING GBETTER MECHANICAL  
&ELECTRICAL CO.,LTD**  
43-1003.NO.4 BLOCK.  
NANJING. JIANGSU  
CHINA

Contact

Tel. +49 911 655-5225  
Mail [service@de.tuv.com](mailto:service@de.tuv.com)

Date July 26, 2018

**Application for** : **CB-Zertifikat**  
**Certificate No.** : **DE 02025604**  
**Device** : **Outdoor Lamp**  
LED Street Light  
**Type** : see Certificate  
**Test requirement** : IEC 60598-2-3:2002+A1  
IEC 60598-1:2014+A1  
See Test Report for National Differences

Dear Madame or Sir,

The submitted sample of the product has been tested and in this configuration found to be in accordance with the above mentioned requirements.  
Enclosed please find the certificate No. DE 02025604.

Kind regards

Certification body



Eileen Feng

Test sample: no, documentation available

TÜV Rheinland  
LGA Products GmbH

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90431 Nürnberg

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VAT No.: DE 811835490



Test Report issued under the responsibility of:



**TEST REPORT**  
**IEC 60598-2-3**  
**Luminaires**  
**Part 2: Particular requirements**  
**Section 3: Luminaires for road and street lighting**

**Report Number** ..... : 50195012 001  
**Date of issue** ..... : 2019.07.26  
**Total number of pages** ..... : 43 pages (not including attachments)

**Name of Testing Laboratory preparing the Report** ..... : TÜV Rheinland (GuangDong) Ltd.

**Applicant's name** ..... : NANJING GBETTER MECHANICAL & ELECTRICAL CO., LTD  
**Address** ..... : 43-1003.NO.4 BLOCK. 2ND BAIRUN ROAD, PUKOU DISTRICT., NANJING. JIANGSU, China

**Test specification:**

**Standard** ..... : IEC 60598-2-3:2002, AMD1:2011 used in conjunction with IEC 60598-1:2014, AMD1:2017  
**Test procedure** ..... : CB Scheme  
**Non-standard test method** ..... : N/A

**Test Report Form No.** ..... : IEC60598\_2\_3L  
**Test Report Form(s) Originator** .... : Intertek Semko AB  
**Master TRF** ..... : Dated 2018-03-09

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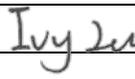
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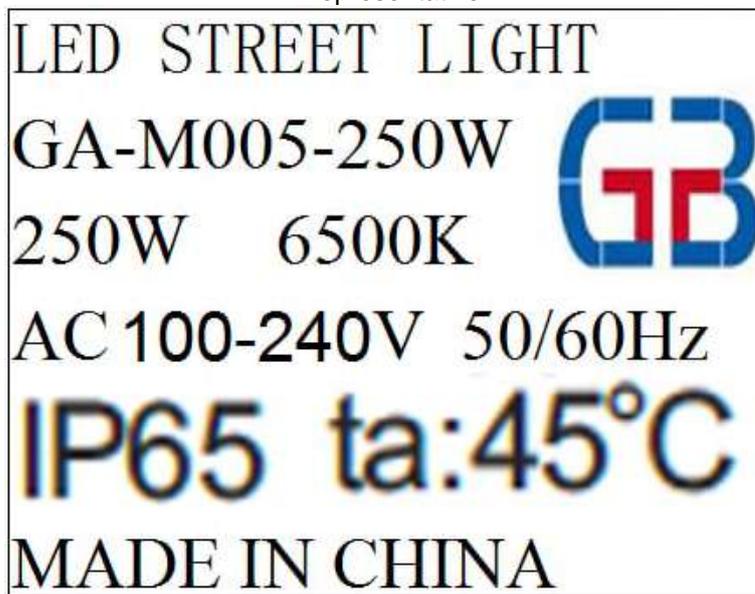
<b>Test item description .....</b>	LED Street Light	
<b>Trade Mark .....</b>		
<b>Manufacturer .....</b>	ZHONGSHAN KARUNER LIGHTING FACTORY THE SOUTH NO.2, NO.11 TONGXING ROAD, CAOSAN, JIAFUWEI INDUSTRIAL ZONE, GUZHEN TOWN, 528421 ZHONGSHAN CITY, China	
<b>Model/Type reference.....</b>	GA-M002-100W, GA-M003-150W, GA-M004-200W, GA-M005- 250W, GA-L004B-100W, GA-L004C-150W, GA-L004D-200W	
<b>Ratings.....</b>	AC 100-240V, 50/60Hz, Class I, IP65, ta 45°C	
<b>Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):</b>		
<input checked="" type="checkbox"/>	<b>CB Testing Laboratory:</b>	<b>TÜV Rheinland (GuangDong) Ltd.</b>
<b>Testing location/ address .....</b>	No.199 Kezhu Road, Guangzhou Science City, Guangzhou 510663, Guangdong Province P.R. China	
<b>Tested by (name, function, signature) .....</b>	Ivy Lu	
<b>Approved by (name, function, signature) ..</b>	Mars Yan	
<input type="checkbox"/>	<b>Testing procedure: CTF Stage 1:</b>	
<b>Testing location/ address .....</b>		
<b>Tested by (name, function, signature) .....</b>		
<b>Approved by (name, function, signature) ..</b>		
<input type="checkbox"/>	<b>Testing procedure: CTF Stage 2:</b>	
<b>Testing location/ address .....</b>		
<b>Tested by (name + signature).....</b>		
<b>Witnessed by (name, function, signature) . :</b>		
<b>Approved by (name, function, signature) .. :</b>		
<input type="checkbox"/>	<b>Testing procedure: CTF Stage 3:</b>	
<input type="checkbox"/>	<b>Testing procedure: CTF Stage 4:</b>	
<b>Testing location/ address .....</b>		
<b>Tested by (name, function, signature) .....</b>		
<b>Witnessed by (name, function, signature) . :</b>		
<b>Approved by (name, function, signature) .. :</b>		
<b>Supervised by (name, function, signature) :</b>		

<p><b>List of Attachments (including a total number of pages in each attachment):</b></p> <ol style="list-style-type: none"> <li>1. The test report consists 43 pages (not including attachments).</li> <li>2. Attachment 1: European group differences and National differences of EN 60598-2-3:2003+A1:2011 and EN 60598-1:2015+A1. (1 page)</li> <li>3. Attachment 2: SASO deviation. (1 page)</li> <li>4. Attachment 3: Additional requirements of IEC 62031:2018 and EN 62031:2008+A1+A2. (1 page)</li> <li>5. Attachment 4: Blue light hazard to light sources and luminaires of IEC/TR 62778:2014. (2 pages)</li> <li>6. Attachment 5: Photo documentation. (13 pages)</li> </ol>	
<p><b>Summary of testing:</b></p>	
<p><b>Tests performed (name of test and test clause):</b></p> <p>Unless other specified, full tests were performed on models GA-M005-250W, GA-L004D-200W.</p>	<p><b>Testing location:</b></p> <p><b>TÜV Rheinland (GuangDong) Ltd.</b> No.199 Kezhu Road, GZ Science City, Guangzhou 510663, P.R. China</p>
<p><b>Summary of compliance with National Differences:</b></p> <p><b>List of countries addressed</b></p> <p>EU Group Differences, SA</p> <p>SA=Saudi Arabia</p> <ul style="list-style-type: none"> <li>– European Group Differences <ul style="list-style-type: none"> <li>The products fulfil the requirements of EN 60598-2-3:2003+A1:2011 and EN 60598-1:2015+A1:2018</li> </ul> </li> <li>– Saudi Arabia differences</li> </ul> <p>The products fulfil the requirements of SASO-IEC-60598-1 (release year: 2010) and SASO-GSO-IEC-60598-2-3 (release year: 2014)</p>	

**Copy of marking plate:**

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.

Representative



Location: Attached on the external surface



Location: Attached on the supply cord

“Terminal block not included. Installation may require advice from a qualified person.”

Location: Contained in the package

**Remark:**

1. The marking for the other models are identical as above except the model number and rated parameters.
2. The height of letters and numerals shall not be less than 2mm.
3. The height of graphical symbols shall not be less than 5mm.
4. Label material: PET film.

<b>Test item particulars</b> .....:	
<b>Classification of installation and use</b> .....: Class I; For outdoor use	
<b>Supply Connection</b> .....: Connecting leads (tails) .....:	
<b>Possible test case verdicts:</b>	
- test case does not apply to the test object.....: N/A	
- test object does meet the requirement.....: P (Pass)	
- test object does not meet the requirement.....: F (Fail)	
<b>Testing</b> .....:	
<b>Date of receipt of test item</b> .....: 2019.06.04	
<b>Date (s) of performance of tests</b> .....: 2019.06.04 to 2019.07.26	
<b>General remarks:</b>	
"(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report.	
Throughout this report a <input type="checkbox"/> comma / <input checked="" type="checkbox"/> point is used as the decimal separator.	
Clause numbers between brackets refer to clauses in IEC 60598-1	
<b>Manufacturer's Declaration per sub-clause 4.2.5 of IEC 60598-1:</b>	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided .....	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> Not applicable
<b>When differences exist; they shall be identified in the General product information section.</b>	
<b>Name and address of factory (ies)</b> ..... : ZHONGSHAN KARUNER LIGHTING FACTORY THE SOUTH NO.2, NO.11 TONGXING ROAD, CAOSAN, JIAFUWEI INDUSTRIAL ZONE, GUZHEN TOWN, 528421 ZHONGSHAN CITY, China	
<b>General product information:</b>	
1. Products covered in this report are Class I LED street light for outdoor use.	
2. All models are divide into 2 series, each series have the same construction except LED driver / LED module quantity and size. Series 1: GA-M002-100W, GA-M003-150W, GA-M004-200W, GA-M005-250W. (plastic cover) Series 2: GA-L004B-100W, GA-L004C-150W, GA-L004D-200W. (glass cover)	
3. Ratings: AC 100-240V, 50/60Hz, Class I, IP65, ta 45°C. For more details see model list as below table.	

## Model list

Series	Model No	Picture	Rated wattage	LED driver	LED module	Size	Weight	Mounting height
1	GA-M002-100W		100W	HG-RZ50W1500-WP (2pcs)	2pcs (SMD3030, 5C11B+1)	545*300*85mm	3.2kg	8-15m
	GA-M003-150W		150W	HG-RZ50W1500-WP (3pcs)	3pcs (SMD3030, 5C11B+1)	645*300*85mm	4.1kg	8-15m
	GA-M004-200W		200W	HG-RZ50W1500-WP (4pcs)	4pcs (SMD3030, 5C11B+1)	750*300*85mm	5.1kg	8-15m
	GA-M005-250W		250W	HG-RZ50W1500-WP (5pcs)	5pcs (SMD3030, 5C11B+1)	855*300*85mm	5.5kg	8-15m

2	GA-L004B-100W		100W	HG-RZ50W1500-WP (2pcs)	2pcs (COB)	720*270*80mm	3.3kg	8-15m
	GA-L004C-150W		150W	HG-RZ50W1500-WP (3pcs)	3pcs (COB)	860*330*80mm	4.1kg	8-15m
	GA-L004D-200W		200W	HG-RZ50W1500-WP (4pcs)	4pcs (COB)	950*330*80mm	5.5kg	8-15m

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
<b>3.2 (0)</b>	<b>GENERAL TEST REQUIREMENTS</b>		—
3.2 (0.3)	More sections applicable..... :	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Section/s:	—
3.2 (0.5)	Components	(see Annex 1)	—
<b>3.2 (0.7)</b>	<b>Information for luminaire design in light sources standards</b>		—
3.2 (0.7.2)	Light source safety standard .....	IEC/EN 62031, IEC/TR 62778	—
	Luminaire design in the light source safety standard		—

<b>3.4 (2)</b>	<b>CLASSIFICATION OF LUMINAIRES</b>		—
3.4 (2.2)	Type of protection .....	Class I	—
3.4 (2.3)	Degree of protection..... :	IP65	—
3.4 (2.4)	Luminaire suitable for direct mounting on normally flammable surfaces .....	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	—
3.4 (2.5)	Luminaire for normal use .....	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	—
	Luminaire for rough service .....	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
3.4 (-)	Modes of installation of road or street lighting		—
	a) on a pipe	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	—
	b) on a mast arm	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
	c) on a post top	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
	d) on span or suspension wires	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
	e) on a wall	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—

<b>3.5 (3)</b>	<b>MARKING</b>		P
3.5 (3.2)	Mandatory markings		P
	Position of the marking		P
	Format of symbols/text		P
3.5 (3.3)	Additional information		P
	Language of instructions	English	P
3.5 (3.3.1)	Combination luminaires		N/A
3.5 (3.3.2)	Nominal frequency in Hz	50/60Hz	P
3.5 (3.3.3)	Operating temperature		N/A
3.5 (3.3.5)	Wiring diagram		N/A
3.5 (3.3.6)	Special conditions		N/A
3.5 (3.3.7)	Metal halide lamp luminaire – warning		N/A

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
3.5 (3.3.8)	Limitation for semi-luminaires		N/A
3.5 (3.3.9)	Power factor and supply current		N/A
3.5 (3.3.10)	Suitability for use indoors		N/A
3.5 (3.3.11)	Luminaires with remote control		N/A
3.5 (3.3.12)	Clip-mounted luminaire – warning		N/A
3.5 (3.3.13)	Specifications of protective shields		N/A
3.5 (3.3.14)	Symbol for nature of supply		N/A
3.5 (3.3.15)	Rated current of socket outlet		N/A
3.5 (3.3.16)	Rough service luminaire		N/A
3.5 (3.3.17)	Mounting instruction for type Y, type Z and some type X attachments	Type Y	P
3.5 (3.3.18)	Non-ordinary luminaires with PVC cable		N/A
3.5 (3.3.19)	Protective conductor current in instruction if applicable		N/A
3.5 (3.3.20)	Provided with information if not intended to be mounted within arm's reach		N/A
3.5 (3.3.21)	Non-replaceable and non-user replaceable light sources information provided	Non-user replaceable light sources	P
3.5 (3.3.22)	Controllable luminaires, classification of insulation provided		N/A
3.5 (3.3.23)	Luminaire without controlgear provided with necessary information for selection of appropriate component		N/A
3.5 (3.3.24)	If not supplied with terminal block, information on the packaging		P
3.5 (3.4)	Test with water		P
	Test with hexane		P
	Legible after test		P
	Label attached		P
3.5 (-)	Additional information in instruction leaflet		P
	a) Design attitude		P
	b) Weight		P
	c) Overall dimensions		P
	d) Maximum projected area if applicable		P
	e) Cross-sectional area of wires if applicable		N/A
	f) Suitability for indoors use		N/A
	g) Dimensions of the compartment		N/A

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	h) Torque setting to be applied to bolts or screws		P
	i) Maximum mounting height		P
<b>3.6 (4)</b>	<b>CONSTRUCTION</b>		P
3.6 (4.2)	Components replaceable without difficulty		N/A
3.6 (4.3)	Wireways smooth and free from sharp edges		P
<b>3.6 (4.4)</b>	<b>Lampholders</b>		N/A
3.6 (4.4.1)	Integral lampholder		N/A
3.6 (4.4.2)	Wiring connection		N/A
3.6 (4.4.3)	Lampholder for end-to-end mounting		N/A
3.6 (4.4.4)	Positioning		N/A
	- pressure test (N) .....		—
	After test the lampholder comply with relevant standard sheets and show no damage		N/A
	After test on single-capped lampholder the lampholder have not moved from its position and show no permanent deformation		N/A
	- bending test (N) .....		—
	After test the lampholder have not moved from its position and show no permanent deformation		N/A
3.6 (4.4.5)	Peak pulse voltage		N/A
3.6 (4.4.6)	Centre contact		N/A
3.6 (4.4.7)	Parts in rough service luminaires resistant to tracking		N/A
3.6 (4.4.8)	Lamp connectors		N/A
3.6 (4.4.9)	Caps and bases correctly used		N/A
3.6 (4.4.10)	Light source for lampholder or connection according IEC 60061 not connected another way		N/A
<b>3.6 (4.5)</b>	<b>Starter holders</b>		N/A
	Starter holder in luminaires other than class II		N/A
	Starter holder class II construction		N/A
<b>3.6 (4.6)</b>	<b>Terminal blocks</b>		P
	Tails		P
	Unsecured blocks		P
<b>3.6 (4.7)</b>	<b>Terminals and supply connections</b>		P
3.6 (4.7.1)	Contact to metal parts		N/A
3.6 (4.7.2)	Test 8 mm live conductor		N/A

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	Test 8 mm earth conductor		N/A
3.6 (4.7.3)	Terminals for supply conductors		P
3.6 (4.7.3.1)	Welded method and material		N/A
	- stranded or solid conductor		N/A
	- spot welding		N/A
	- welding between wires		N/A
	- Type Z attachment		N/A
	- mechanical test according to 15.6.2		N/A
	- electrical test according to 15.6.3		N/A
	- heat test according to 15.6.3.2.3 and 15.6.3.2.4		N/A
3.6 (4.7.4)	Terminals other than supply connection		P
3.6 (4.7.5)	Heat-resistant wiring/sleeves		N/A
3.6 (4.7.6)	Multi-pole plug		N/A
	- test at 30 N		N/A
<b>3.6 (4.8)</b>	<b>Switches</b>		N/A
	- adequate rating		N/A
	- adequate fixing		N/A
	- polarized supply		N/A
	- compliance with IEC 61058-1 for electronic switches		N/A
<b>3.6 (4.9)</b>	<b>Insulating lining and sleeves</b>		N/A
3.6 (4.9.1)	Retainment		N/A
	Method of fixing .....		N/A
3.6 (4.9.2)	Insulated linings and sleeves:		N/A
	Resistant to a temperature > 20 °C to the wire temperature or		N/A
	a) & c) Insulation resistance and electric strength		N/A
	b) Ageing test. Temperature (°C) .....		N/A
<b>3.6 (4.10)</b>	<b>Double or reinforced insulation</b>		N/A
3.6 (4.10.1)	No contact, mounting surface – accessible metal parts – wiring of basic insulation		N/A
	Safe installation fixed luminaires		N/A
	Capacitors and switches		N/A
	Interference suppression capacitors according to IEC 60384-14		N/A

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
3.6 (4.10.2)	Assembly gaps:		N/A
	- not coincidental		N/A
	- no straight access with test probe		N/A
3.6 (4.10.3)	Retention of insulation:		N/A
	- fixed		N/A
	- unable to be replaced; luminaire inoperative		N/A
	- sleeves retained in position		N/A
	- lining in lampholder		N/A
3.6 (4.10.4)	Protective impedance device		N/A
	Double or reinforced insulation bridged by appropriate and at least two resistors or two Y2 capacitors or one Y1 capacitor		N/A
	Y1 or Y2 capacitors comply with IEC 60384-14		N/A
	Resistors comply with test (a) in 14.1 of IEC 60065		N/A
<b>3.6 (4.11)</b>	<b>Electrical connections and current-carrying parts</b>		P
3.6 (4.11.1)	Contact pressure		P
3.6 (4.11.2)	Screws:		N/A
	- self-tapping screws		N/A
	- thread-cutting screws		N/A
3.6 (4.11.3)	Screw locking:		P
	- spring washer		P
	- rivets		N/A
3.6 (4.11.4)	Material of current-carrying parts		P
3.6 (4.11.5)	No contact to wood or mounting surface		P
3.6 (4.11.6)	Electro-mechanical contact systems	DC connector	P
<b>3.6 (4.12)</b>	<b>Screws and connections (mechanical) and glands</b>		P
3.6 (4.12.1)	Screws not made of soft metal		P
	Screws of insulating material		N/A

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	Torque test: torque (Nm); part..... :	For GA-M005-250W: 1). Fixed metal enclosure: M4, 1.2Nm. 2). Fixed earthing wire: M3, 0.5Nm. 3). Fixed metal bracket: M8, 8.0Nm. 4). Fixed plastic cover: M3, 0.5Nm.	P
	Torque test: torque (Nm); part..... :	For GA-L004D-200W: 1). Fixed metal enclosure: M4, 1.2Nm. 2). Fixed earthing wire: M3, 0.5Nm. 3). Fixed glass cover: M4, 1.2Nm.	P
	Torque test: torque (Nm); part..... :		N/A
3.6 (4.12.2)	Screws with diameter < 3 mm screwed into metal		N/A
3.6 (4.12.4)	Locked connections:		N/A
	- fixed arms; torque (Nm) .....		N/A
	- lampholder; torque (Nm) .....		N/A
	- push-button switches; torque 0,8 Nm .....		N/A
3.6 (4.12.5)	Screwed glands; force (Nm)..... :	Plastic gland (I): 2.5Nm Plastic gland (II): 2.5Nm Metal gland: 6.25Nm	P
<b>3.6 (4.13)</b>	<b>Mechanical strength</b>		P
3.6 (4.13.1)	Impact tests:		P
	- fragile parts; energy (Nm) .....	Plastic cover: 0.5Nm. Glass cover: 0.5Nm. Metal enclosure: 0.7Nm.	P
	- other parts; energy (Nm)..... :		P
	1) live parts		P
	2) linings		N/A
	3) protection		P
	4) covers		P
3.6 (4.13.2)	Metal parts have adequate mechanical strength		P
3.6 (4.13.3)	Straight test finger	30N	P
3.6 (4.13.4)	Rough service luminaires		N/A

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	- IP54 or higher		N/A
	a) fixed		N/A
	b) hand-held		N/A
	c) delivered with a stand		N/A
	d) for temporary installations and suitable for mounting on a stand		N/A
3.6 (4.13.6)	Tumbling barrel		N/A
<b>3.6 (4.14)</b>	<b>Suspensions, fixings and means of adjusting</b>		<b>P</b>
3.6 (4.14.1)	Mechanical load:		<b>P</b>
	A) four times the weight	For GA-M005-250W: 4x5.5kg=22.0kg. For GA-L004D-200W: 4x5.5kg=22.0kg.	<b>P</b>
	B) torque 2,5 Nm		N/A
	C) bracket arm; bending moment (Nm)..... :		N/A
	D) load track-mounted luminaires		N/A
	E) clip-mounted luminaires, glass-shelve. Thickness (mm) .....		N/A
	Metal rod. diameter (mm) .....		N/A
	Fixed luminaire or independent control gear without fixing devices		N/A
3.6 (4.14.2)	Load to flexible cables		N/A
	Mass (kg) .....		—
	Stress in conductors (N/mm <sup>2</sup> ) .....		N/A
	Mass (kg) of semi-luminaire .....		N/A
	Bending moment (Nm) of semi-luminaire .....		N/A
3.6 (4.14.3)	Adjusting devices:		N/A
	- flexing test; number of cycles..... :		N/A
	- strands broken .....		N/A
	- electric strength test afterwards		N/A
3.6 (4.14.4)	Telescopic tubes: cords not fixed to tube; no strain on conductors		N/A
3.6 (4.14.5)	Guide pulleys		N/A
3.6 (4.14.6)	Strain on socket-outlets		N/A
<b>3.6 (4.15)</b>	<b>Flammable materials</b>		<b>P</b>
	- glow-wire test 650°C .....	See Test Table 3.15 (13.3.2)	<b>P</b>

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	- spacing $\geq 30$ mm		N/A
	- screen withstanding test of 13.3.1		N/A
	- screen dimensions		N/A
	- no fiercely burning material		P
	- thermal protection		N/A
	- electronic circuits exempted		N/A
3.6 (4.15.2)	Luminaires made of thermoplastic material with lamp control gear		N/A
	a) construction		N/A
	b) temperature sensing control		N/A
	c) surface temperature		N/A
<b>3.6 (4.16)</b>	<b>Luminaires for mounting on normally flammable surfaces</b>		P
	No lamp control gear ..... : (compliance with Section 12)		N/A
	Provided with adaptor for a track meet the requirements for direct mounting on normally flammable surfaces		N/A
3.6 (4.16.1)	Lamp control gear spacing:		N/A
	- spacing 35 mm		N/A
	- spacing 10 mm		N/A
3.6 (4.16.2)	Thermal protection:		N/A
	- in lamp control gear		N/A
	- external		N/A
	- fixed position		N/A
	- temperature marked lamp control gear		N/A
3.6 (4.16.3)	Design to satisfy the test of 12.6	(see clause 12.6)	N/A
<b>3.6 (4.17)</b>	<b>Drain holes</b>		P
	Clearance at least 5 mm		P
<b>3.6 (4.18)</b>	<b>Resistance to corrosion</b>		P
3.6 (4.18.1)	- rust-resistance		P
3.6 (4.18.2)	- season cracking in copper		P
3.6 (4.18.3)	- corrosion of aluminium		P
3.6 (4.19)	Igniters compatible with ballast		N/A
3.6 (4.20)	Rough service vibration		N/A
<b>3.6 (4.21)</b>	<b>Protective shield</b>		N/A
3.6 (4.21.1)	Shield fitted if tungsten halogen lamps or metal halide lamps		N/A

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	Shield of glass if tungsten halogen lamps		N/A
3.6 (4.21.2)	Particles from a shattering lamp not impair safety		N/A
3.6 (4.21.3)	No direct path		N/A
3.6 (4.21.4)	Impact test on shield		N/A
	Glow-wire test on lamp compartment..... :	See Test Table 3.15 (13.3.2)	N/A
3.6 (4.22)	Attachments to lamps not cause overheating or damage		N/A
3.6 (4.23)	Semi-luminaires comply Class II		N/A
<b>3.6 (4.24)</b>	<b>Photobiological hazards</b>		P
3.6 (4.24.1)	No excessive UV radiation if tungsten halogen lamps and metal halide lamps (Annex P)		N/A
3.6 (4.24.2)	Retinal blue light hazard		P
	Class of risk group assessed according to IEC/TR 62778 .....	RG1 unlimited	—
	Luminaires with $E_{thr}$ :		N/A
	a) Fixed luminaires		N/A
	- distance x m, borderline between RG1 and RG2 .. :		N/A
	- marking and instruction according 3.2.23		N/A
	b) Portable and handheld luminaires		N/A
	- marking according 3.2.23 if RG1 exceeded at 200 mm according to IEC/TR 62778		N/A
	Portable luminaires for children IEC 60598-2-10 and Mains socket outlet nightlights IEC 60598-2-12 not exceed RG1 at 200 mm according to IEC/62778		N/A
<b>3.6 (4.25)</b>	<b>Mechanical hazard</b>		P
	No sharp point or edges		P
<b>3.6 (4.26)</b>	<b>Short-circuit protection</b>		N/A
3.6 (4.26.1)	Adequate means of uninsulated accessible SELV parts		N/A
3.6 (4.26.2)	Short-circuit test with test chain according 4.26.3		N/A
	Test chain not melt through		N/A
	Test sample not exceed values of Table 12.1 and 12.2		N/A
<b>3.6 (4.27)</b>	<b>Terminal blocks with integrated screwless earthing contacts</b>		N/A
	Test according Annex V		N/A
	Pull test of terminal fixing (20 N)		N/A
	After test, resistance < 0,05 $\Omega$		N/A

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	Pull test of mechanical connection (50 N)		N/A
	After test, resistance < 0,05 $\Omega$		N/A
	Voltage drop test, resistance < 0,05 $\Omega$		N/A
<b>3.6 (4.28)</b>	<b>Fixing of thermal sensing control</b>		N/A
	Not plug-in or easily replaceable type		N/A
	Reliably kept in position		N/A
	No adhesive fixing if UV radiations from a lamp can degrade the fixing		N/A
	Not outside the luminaire enclosure		N/A
	Test of adhesive fixing:		N/A
	Max. temperature on adhesive material ( $^{\circ}\text{C}$ ) ..... :		—
	100 cycles between t min and t max		N/A
	Temperature sensing control still in position		N/A
<b>3.6 (4.29)</b>	<b>Luminaires with non-replaceable light source</b>		N/A
	Not possible to replace light source		N/A
	Live part not accessible after parts have been opened by hand or tools		N/A
<b>3.6 (4.30)</b>	<b>Luminaires with non-user replaceable light source</b>		N/A
	If protective cover provide protection against electric shock and marked with “caution, electric shock risk” symbol:		N/A
	Minimum two fixing means		N/A
<b>3.6 (4.31)</b>	<b>Insulation between circuits</b>		P
	Circuits insulated from LV supply fulfil requirements according 4.31.1 – 4.31.3		P
	Controllable luminaires requiring same level of insulation for all components, the insulation between control terminals and LV supply fulfil requirements according 4.31.1 – 4.31.3		N/A
<b>3.6 (4.31.1)</b>	<b>SELV circuits</b>		P
	Used SELV source		P
	Voltage $\leq$ ELV		P
	Insulating of SELV circuits from LV supply		P
	Insulating of SELV circuits from other non SELV circuits		N/A
	Insulating of SELV circuits from FELV		N/A
	Insulating of SELV circuits from other SELV circuits		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	SELV circuits insulated from accessible parts according Table X.1		P
	Plugs not able to enter socket-outlets of other voltage systems		N/A
	Socket outlets does not admit plugs of other voltage systems		N/A
	Plugs and socket-outlets does not have protective conductor contact		N/A
3.6 (4.31.2)	FELV circuits		N/A
	Used FELV source		N/A
	Voltage $\leq$ ELV		N/A
	Insulating of FELV circuits from LV supply		N/A
	FELV circuits insulated from accessible parts according Table X.1		N/A
	Plugs not able to enter socket-outlets of other voltage systems		N/A
	Socket outlets does not admit plugs of other voltage systems		N/A
	Socket-outlets does not have protective conductor contact		N/A
3.6 (4.31.3)	Other circuits		P
	Other circuits insulated from accessible parts according Table X.1		P
	Class II construction with equipotential bonding for protection against indirect contacts with live parts:		N/A
	- conductive parts are connected together		N/A
	- test according 7.2.3		N/A
	- conductive part not cause an electric shock in case of an insulation fault		N/A
	- equipotential bonding in master/slave applications		N/A
	- master luminaire provided with terminal for accessible conductive parts of slave luminaires		N/A
	- slave luminaire constructed as class I		N/A
3.6 (4.32)	<b>Overvoltage protective devices</b>		N/A
	Comply with IEC 61643-11		N/A
	External to controlgear and connected to earth:		N/A
	- only in fixed luminaires		N/A
	- only connected to protective earth		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
3.6.1 (-)	At least IP X3 or X5 respectively. IP .....	IP65	P
	Column-integrated luminaires:		N/A
	- parts below 2,5 m. IP .....		N/A
	- parts above 2,5 m. IP .....		N/A
3.6.2 (-)	Suspension on span wires		N/A
3.6.3 (-)	Means for attaching the luminaire or external parts to its support appropriate to the weight		N/A
3.6.3.1 (-)	Static load test		P
	- drag coefficient.....	1.2	P
	- loaded area (m <sup>2</sup> ).....	For GA-M005-250W: 0.257m <sup>2</sup> For GA-L004D-200W: 0.314m <sup>2</sup>	P
	- used load (N).....	For GA-M005-250W: 426N For GA-L004D-200W: 520N	P
	- measured deformation (cm/m) .....	For GA-M005-250W: <1cm/m. For GA-L004D-200W: <1cm/m.	P
	- no rotation		P
3.6.4 (-)	Adjustable lampholders		N/A
3.6.5 (-)	Luminaires installed above 5 m, glass covers shall be:		P
	a) glass that fractures into small pieces (test according to 3.6.5.1), or		N/A
	b) glass having a high impact shock resistance (test according to 3.6.5.2), or		P
	c) protected by any means to retain glass fragments		N/A
	For tunnel luminaires 3.6.5.1 apply		N/A
	Method of protection declared by the manufacturer		N/A
3.6.5.1 (-)	Protection by the use of glass that fractures into small pieces		N/A
	- number of particles is more than 40.....		N/A
3.6.5.2 (-)	Protection by the use of high impact resistant glass		P
3.6.5.2.1 (-)	Glass covers have high mechanical strength		P
	Test according IEC 62262 with test apparatus according IEC 60068-2-75 with impact energy of 5J on preconditioned sample		P
3.6.5.2.2 (-)	Glass covers not break into large pieces		P
	- test according 3.6.5.1, number of particles is more than 20 .....	>25	P
3.6.6 (-)	Connection compartment of column-integrated luminaire		N/A
	- provides adequate space		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- means for attachment		N/A
	- means for attachment of metal corrosion-resistant		N/A
3.6.7 (-)	Compliance with ISO standard or other .....		N/A
3.6.8 (-)	Doors of column-integrated luminaires:		N/A
	- corrosion-resistant		N/A
	- opening only possible for an authorized person		N/A
	- impact test 5 Nm		N/A
	- sample show no damage		N/A
3.6.9 (-)	Column-integrated luminaire:		N/A
	- dimension of the cable entry slot (mm) .....		N/A
	- cable path from the slot to the connection compartment (mm) .....		N/A
	- cable path free from obstruction that might cause abrasion of the cable		N/A

<b>3.7 (11)</b>	<b>CREEPAGE DISTANCES AND CLEARANCES</b>		P
3.7 (11.2.1)	Impulse withstand category (Normal category II)	Category II <input checked="" type="checkbox"/> Category III <input type="checkbox"/>	—
	Category III according Annex U		N/A
	Protected against pollution, reduced creepage and clearance according Annex P of IEC 61347-1		N/A
3.7 (11.2.2)	Creepage distances for frequency up to 30 kHz	See Test Table 3.7 (11.2) I	P
	Creepage distances for frequency over 30 kHz:		N/A
	- Controlgear marked with $\hat{U}_{OUT}$ and $f_{OUT}$ according IEC 61347-1, clause 7.1, item w	See Test Table 3.7 (11.2) II	N/A
	- Requirements according IEC 60664-4 for controlgear not covered by IEC 61347	See Test Table 3.7 (11.2) II	N/A
3.7 (11.2.3)	Clearances for frequency up to 30 kHz	See Test Table 3.7 (11.2) I	P
	Clearances distances for frequency over 30 kHz:		N/A
	- Controlgear marked with $U_P$	See Test Table 3.7 (11.2) II	N/A
	- Requirements according IEC 60664-4 for controlgear not covered by IEC 61347	See Test Table 3.7 (11.2) II	N/A

<b>3.8 (7)</b>	<b>PROVISION FOR EARTHING</b>		P
3.8 (7.2.1 + 7.2.3)	Accessible metal parts		P
	Metal parts in contact with supporting surface		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Resistance < 0,5 $\Omega$ ..... :	Max. 0.01 $\Omega$	P
	Self-tapping screws used		N/A
	Thread-forming screws		N/A
	Thread-forming screw used in a groove		N/A
	Earth makes contact first		P
	Terminal blocks with integrated screwless earthing contacts tested according Annex V		N/A
	Protective earthing of the luminaire not via built-in control gear		N/A
3.8 (7.2.2 + 7.2.3)	Earth continuity in joints, etc.		P
3.8 (7.2.4)	Locking of clamping means		P
	Compliance with 4.7.3		P
	Terminal blocks with integrated screwless earthing contacts tested according Annex V		N/A
3.8 (7.2.5)	Earth terminal integral part of connector socket		N/A
3.8 (7.2.6)	Earth terminal adjacent to mains terminals		P
3.8 (7.2.7)	Electrolytic corrosion of the earth terminal		P
3.8 (7.2.8)	Material of earth terminal		P
	Contact surface bare metal		P
3.8 (7.2.10)	Class II luminaire for looping-in		N/A
	Double or reinforced insulation to functional earth		N/A
3.8 (7.2.11)	Earthing core coloured green-yellow		P
	Length of earth conductor		P
3.8.1 (-)	Attachment prevented from rotation		N/A
<b>3.9 (14)</b>	<b>SCREW TERMINALS</b>		N/A
	Separately approved; component list	(see Annex 1)	N/A
	Part of the luminaire	(see Annex 3)	N/A
<b>3.9 (15)</b>	<b>SCREWLESS TERMINALS AND ELECTRICAL CONNECTIONS</b>		P
	Separately approved; component list..... :	(see Annex 1)	P
	Part of the luminaire .....	(see Annex 4)	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
<b>3.10 (5)</b>	<b>EXTERNAL AND INTERNAL WIRING</b>		P
<b>3.10 (5.2)</b>	<b>Supply connection and external wiring</b>		P
3.10 (5.2.1)	Means of connection .....	Connecting leads (tails)	P
	Outdoor luminaire has not PVC insulated external wiring if not class III or SELV $\leq 25$ V a.c./60 V d.c. or protected from outdoor environment		P
3.10 (5.2.2)	Type of cable .....	See annex 1	P
	Nominal cross-sectional area (mm <sup>2</sup> ) .....	See annex 1	P
	Cables equal to IEC 60227 or IEC 60245		P
3.10 (5.2.3)	Type of attachment, X, Y or Z	Type Y	P
3.10 (5.2.5)	Type Z not connected to screws		N/A
3.10 (5.2.6)	Cable entries:		P
	- suitable for introduction		P
	- adequate degree of protection		P
3.10 (5.2.7)	Cable entries through rigid material have rounded edges		P
3.10 (5.2.8)	Insulating bushings:		N/A
	- suitably fixed		N/A
	- material in bushings		N/A
	- material not likely to deteriorate		N/A
	- tubes or guards made of insulating material		N/A
3.10 (5.2.9)	Locking of screwed bushings		N/A
3.10 (5.2.10)	Cord anchorage:		P
	- covering protected from abrasion		P
	- clear how to be effective		P
	- no mechanical or thermal stress		P
	- no tying of cables into knots etc.		P
	- insulating material or lining		P
3.10 (5.2.10.1)	Cord anchorage for type X attachment:		N/A
	a) at least one part fixed		N/A
	b) types of cable		N/A
	c) no damaging of the cable		N/A
	d) whole cable can be mounted		N/A
	e) no touching of clamping screws		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	f) metal screw not directly on cable		N/A
	g) replacement without special tool		N/A
	Glands not used as anchorage		N/A
	Labyrinth type anchorages		N/A
3.10 (5.2.10.2)	Adequate cord anchorage for type Y and type Z attachment	Type Y	P
3.10 (5.2.10.3)	Tests:		P
	- impossible to push cable; unsafe		P
	- pull test: 25 times; pull (N) ..... :	60N	P
	- torque test: torque (Nm) ..... :	0.25Nm	P
	- displacement $\leq 2$ mm	Max.1.5mm	P
	- no movement of conductors		P
	- no damage of cable or cord		P
	- function independent of electrical connection		P
3.10 (5.2.11)	External wiring passing into luminaire		N/A
3.10 (5.2.12)	Looping-in terminals		N/A
3.10 (5.2.13)	Wire ends not tinned		N/A
	Wire ends tinned: no cold flow		P
3.10 (5.2.14)	Mains plug same protection		N/A
	Class III luminaire plug		N/A
	No unsafe compatibility		N/A
3.10 (5.2.16)	Appliance inlets (IEC 60320)		N/A
	Installation couplers (IEC 61535)		N/A
	Other appliance inlet or connector according relevant IEC standard		N/A
3.10 (5.2.17)	No standardized interconnecting cables properly assembled		N/A
3.10 (5.2.18)	Used plug in accordance with		N/A
	- IEC 60083		N/A
	- other standard		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
<b>3.10 (5.3)</b>	<b>Internal wiring</b>		P
3.10 (5.3.1)	Internal wiring of suitable size and type		P
	Through wiring		N/A
	- not delivered/ mounting instruction		N/A
	- factory assembled		N/A
	- socket outlet loaded (A) .....		N/A
	- temperatures .....	(see Annex 2)	N/A
	Green-yellow for earth only		P
3.10 (5.3.1.1)	Internal wiring connected directly to fixed wiring		P
	Cross-sectional area (mm <sup>2</sup> ).....	See annex 1	P
	Insulation thickness (mm) .....		P
	Extra insulation added where necessary		N/A
3.10 (5.3.1.2)	Internal wiring connected to fixed wiring via internal current-limiting device		P
	Cross-sectional area (mm <sup>2</sup> ).....	See annex 1	P
3.10 (5.3.1.3)	Double or reinforced insulation for class II		N/A
3.10 (5.3.1.4)	Conductors without insulation		N/A
3.10 (5.3.1.5)	SELV current-carrying parts		P
3.10 (5.3.1.6)	Insulation thickness other than PVC or rubber		N/A
3.10 (5.3.2)	Sharp edges etc.		P
	No moving parts of switches etc.		N/A
	Joints, raising/lowering devices		N/A
	Telescopic tubes etc.		N/A
	No twisting over 360°		P
3.10 (5.3.3)	Insulating bushings:		N/A
	- suitable fixed		N/A
	- material in bushings		N/A
	- material not likely to deteriorate		N/A
	- cables with protective sheath		N/A
3.10 (5.3.4)	Joints and junctions effectively insulated		N/A
3.10 (5.3.5)	Strain on internal wiring		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
3.10 (5.3.6)	Wire carriers		N/A
3.10 (5.3.7)	Wire ends not tinned		N/A
	Wire ends tinned: no cold flow		P
<b>3.10 (5.4)</b>	<b>Test to determine suitability of conductors having a reduced cross-sectional area</b>		N/A
	Under test the temperature of the luminaire wiring insulation not exceed the limits stated in Table 12.2	(see Annex 2)	N/A
	No damage to luminaire wiring after test		N/A
3.10.1 (-)	Cord anchorage if applicable		P
	- pull test: 25 times; pull (N) .....	60N	P
	- torque test: torque (Nm) .....	0.25Nm	P

<b>3.11 (8)</b>	<b>PROTECTION AGAINST ELECTRIC SHOCK</b>		P
3.11 (8.2.1)	Live parts not accessible		P
	Basic insulated parts not used on the outer surface without appropriate protection		P
	Basic insulated parts not accessible with standard test finger on portable, settable and adjustable luminaires		N/A
	Basic insulated parts not accessible with Ø 50 mm probe from outside, other types of luminaires		P
	Lamp and starterholders in portable and adjustable luminaires comply with double or reinforced insulation requirements		N/A
	Basic insulation only accessible under lamp or starter replacement		N/A
	Protection in any position		P
	Double-ended tungsten filament lamp		N/A
	Insulation lacquer not reliable		N/A
	Double-ended high-pressure discharge lamp		N/A
	Relevant warning according to 3.2.18 fitted to the luminaire		N/A
3.11 (8.2.2)	Portable luminaire adjusted in most unfavourable position		N/A
3.11 (8.2.3.a)	Class II luminaire:		N/A
	- basic insulated metal parts not accessible during starter or lamp replacement		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- basic insulation not accessible other than during starter or lamp replacement		N/A
	- glass protective shields not used as supplementary insulation		N/A
3.11 (8.2.3.b)	BC lampholder of metal in class I luminaires shall be earthed		N/A
3.11 (8.2.3.c)	SELV circuits with exposed current carrying parts:		N/A
	Ordinary luminaire:		N/A
	- voltage under load (V)..... :		N/A
	- no-load voltage (V)..... :		N/A
	- touch current if applicable (mA) .....		N/A
	One conductive part insulated if required		N/A
	Other than ordinary luminaire:		N/A
	- nominal voltage (V) .....		N/A
	Class III luminaire only for connection to SELV		N/A
	Class III luminaire not provided with means for protective earthing		N/A
3.11 (8.2.4)	Portable luminaire has protection independent of supporting surface		N/A
3.11 (8.2.5)	Compliance with the standard test finger or relevant probe		N/A
3.11 (8.2.6)	Covers reliably secured		P
3.11 (8.2.7)	Luminaire other than below with capacitor > 0,5 $\mu$ F not exceed 50 V 1 min after disconnection	Max.4.0V	P
	Portable luminaire with capacitor > 0,1 $\mu$ F (0.25) not exceed 34 V 1 s after disconnection		N/A
	Other luminaires with capacitor > 0,1 $\mu$ F (0.25) with plug and track adaptors not exceed 60 V 5 s after disconnection		N/A

<b>3.12 (12)</b>	<b>ENDURANCE TEST AND THERMAL TEST</b>		P
3.12.2 (-)	If IP > IP 20 relevant test of (12.4), (12.5) and (12.6) after (9.2) before (9.3) specified in 3.13		—
<b>3.12 (12.2)</b>	<b>Selection of lamps and ballasts</b>		—
	Lamp used according Annex B	(Lamp used see Annex 2)	—
	Controlgear if separate and not supplied	(Controlgear used see Annex 2)	—
<b>3.12 (12.3)</b>	<b>Endurance test</b>		P

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Clause	Requirement + Test	Result - Remark	Verdict
	a) mounting-position .....	As normal use	—
	b) test temperature (°C) .....	55°C	—
	c) total duration (h) .....	240h	—
	d) supply voltage (V) .....	264V	—
	d) if not equipped with controlgear, constant voltage/current (V) or (A) .....		—
	e) luminaire ceases to operate		—
3.12 (12.3.2)	After endurance test:		P
	- no part unserviceable		P
	- luminaire not unsafe		P
	- no damage to track system		N/A
	- marking legible		P
	- no cracks, deformation etc.		P
<b>3.12 (12.4)</b>	<b>Thermal test (normal operation)</b>	(see Annex 2)	P
<b>3.12 (12.5)</b>	<b>Thermal test (abnormal operation)</b>	(see Annex 2)	P
<b>3.12 (12.6)</b>	<b>Thermal test (failed lamp control gear condition):</b>		N/A
3.12 (12.6.1)	Through wiring or looping-in wiring loaded by a current of (A) .....		—
	- case of abnormal conditions .....		—
	- electronic lamp control gear		N/A
	- measured winding temperature (°C): at 1,1 Un .....		—
	- measured mounting surface temperature (°C) at 1,1 Un .....		N/A
	- calculated mounting surface temperature (°C) .....		N/A
	- track-mounted luminaires		N/A
3.12 (12.6.2)	Temperature sensing control		N/A
	- case of abnormal conditions .....		—
	- thermal link		N/A
	- manual reset cut-out		N/A
	- auto reset cut-out		N/A
	- measured mounting surface temperature (°C) .....		N/A
	- track-mounted luminaires		N/A
<b>3.12 (12.7)</b>	<b>Thermal test (failed lamp control gear in plastic luminaires):</b>		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
3.12 (12.7.1)	Luminaire without temperature sensing control		N/A
3.12 (12.7.1.1)	Luminaire with fluorescent lamp $\leq 70W$		N/A
	Test method 12.7.1.1 or Annex W .....		—
	Test according to 12.7.1.1:		N/A
	- case of abnormal conditions .....		—
	- Ballast failure at supply voltage (V) .....		—
	- Components retained in place after the test		N/A
	- Test with standard test finger after the test		N/A
	Test according to Annex W:		N/A
	- case of abnormal conditions .....		—
	- measured winding temperature ( $^{\circ}C$ ): at 1,1 Un .....		—
	- measured temperature of fixing point/exposed part ( $^{\circ}C$ ): at 1,1 Un .....		—
	- calculated temperature of fixing point/exposed part ( $^{\circ}C$ ) .....		—
	Ball-pressure test .....	See Test Table 3.15 (13.2.1)	N/A
3.12 (12.7.1.2)	Luminaire with discharge lamp, fluorescent lamp $> 70W$ , transformer $> 10 VA$		N/A
	- case of abnormal conditions .....		—
	- measured winding temperature ( $^{\circ}C$ ): at 1,1 Un .....		—
	- measured temperature of fixing point/exposed part ( $^{\circ}C$ ): at 1,1 Un .....		—
	- calculated temperature of fixing point/exposed part ( $^{\circ}C$ ) .....		—
	Ball-pressure test .....	See Test Table 3.15 (13.2.1)	N/A
3.12 (12.7.1.3)	Luminaire with short circuit proof transformers $\leq 10 VA$		N/A
	- case of abnormal conditions .....		—
	- Components retained in place after the test		N/A
	- Test with standard test finger after the test		N/A
3.12 (12.7.2)	Luminaire with temperature sensing control		N/A
	- thermal link .....	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
	- manual reset cut-out .....	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
	- auto reset cut-out .....	Yes <input type="checkbox"/> No <input type="checkbox"/>	—

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Clause	Requirement + Test	Result - Remark	Verdict
	- case of abnormal conditions .....		—
	- highest measured temperature of fixing point/ exposed part (°C): .....		—
	Ball-pressure test: .....	See Test Table 3.15 (13.2.1)	N/A
3.12.1 (-)	Temperature reduction if for outdoor use only		P
3.12.2 (-)	(See above)		—
3.12.3 (-)	Glass covers used within the thermal limits declared by the glass manufacturer		P

<b>3.13 (9)</b>	<b>RESISTANCE TO DUST AND MOISTURE</b>		<b>P</b>
3.13.1 (-)	If IP > IP 20 the order of tests as specified in clause 3.12		P
3.13 (9.2)	Tests for ingress of dust, solid objects and moisture:		P
	- classification according to IP .....	IP65	—
	- mounting position during test .....	As normal use	—
	- fixing screws tightened; torque (Nm) .....	For GA-M005-250W: 1). Fixed metal enclosure: 0.8Nm. 2). Fixed plastic cover: 0.33Nm. For GA-L004D-200W: 1). Fixed metal enclosure: M4, 1.2Nm. 2). Fixed glass cover: M4, 0.8Nm.	—
	- tests according to clauses.....	Cl. 9.2.2 & Cl. 9.2.6	—
	- electric strength test afterwards		P
	a) no deposit in dust-proof luminaire		N/A
	b) no talcum in dust-tight luminaire		P
	c) no trace of water on current-carrying parts or on insulation where it could become a hazard		P
	c.1) For luminaires without drain holes – no water entry	For GA-L004D-200W	P
	c.2) For luminaires with drain holes – no hazardous water entry	For GA-M005-250W	P
	d) no water in watertight or pressure watertight luminaire		N/A
	e) no contact with live parts (IP 2X)		N/A
	e) no entry into enclosure (IP 3X and IP 4X)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	e) no contact with live parts through drain holes and ventilation slots (IP3X and IP4X)		N/A
	f) no trace of water on part of lamp requiring protection from splashing water		P
	g) no damage of protective shield or glass envelope		P
3.13 (9.3)	Humidity test 48 h	25°C, 95%RH	P
<b>3.14 (10)</b>	<b>INSULATION RESISTANCE AND ELECTRIC STRENGTH</b>		<b>P</b>
3.14 (10.2.1)	Insulation resistance test		P
	Cable or cord covered by metal foil or replaced by a metal rod of mm Ø .....	--	—
	Insulation resistance (MΩ) .....	--	—
	SELV		P
	- between current-carrying parts of different polarity :	--	N/A
	- between current-carrying parts and mounting surface..... :	>100MΩ	P
	- between current-carrying parts and metal parts of the luminaire .....	>100MΩ	P
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts..... :	>100MΩ	P
	- Insulation bushings as described in Section 5 .....	--	N/A
	Other than SELV		P
	- between live parts of different polarity .....	--	N/A
	- between live parts and mounting surface .....	>100MΩ	P
	- between live parts and metal parts .....	>100MΩ	P
	- between live parts of different polarity through action of a switch .....	--	N/A
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts..... :	>100MΩ	P
	- Insulation bushings as described in Section 5 .....	--	N/A
3.14 (10.2.2)	Electric strength test		P
	Dummy lamp		N/A
	Luminaires with ignitors after 24 h test		N/A
	Luminaires with manual ignitors		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Test voltage (V) .....	--	P
	SELV		P
	- between current-carrying parts of different polarity :	--	N/A
	- between current-carrying parts and mounting surface..... :	500V	P
	- between current-carrying parts and metal parts of the luminaire..... :	500V	P
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts..... :	500V	P
	- Insulation bushings as described in Section 5 .....	--	N/A
	Other than SELV		P
	- between live parts of different polarity .....	--	N/A
	- between live parts and mounting surface .....	1480V	P
	- between live parts and metal parts .....	1480V	P
	- between live parts of different polarity through action of a switch..... :	--	N/A
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts..... :	1480V	P
	- Insulation bushings as described in Section 5 .....	--	N/A
3.14 (10.3)	Touch current or protective conductor current (mA):	Protective conductor current: Max. 0.06mA (limit: 3.5mA)	P

<b>3.15 (13)</b>	<b>RESISTANCE TO HEAT, FIRE AND TRACKING</b>		P
3.15 (13.2.1)	Ball-pressure test .....	See Test Table 3.15 (13.2.1)	P
3.15 (13.3.1)	Needle-flame test (10 s)..... :	See Test Table 3.15 (13.3.1)	P
3.15 (13.3.2)	Glow-wire test (650°C) .....	See Test Table 3.15 (13.3.2)	P
3.15 (13.4)	Proof tracking test (IEC 60112)..... :	See Test Table 3.15 (13.4)	N/A

<b>3.7 (11.2)</b>	<b>TABLE I: Creepage distances and clearances</b>				P		
	<b>Minimum distances (mm) for a.c. up to 30 kHz sinusoidal voltages</b>				P		
	<b>Applicable part of IEC 60598-1 Table 11.1.A*, 11.1.B* and 11.2*</b>				P		
	Insulation type **	Measured clearance	Required		Measured creepage	Required	
			clearance	*Table		creepage	*Table

IEC 60598-2-3							
Clause	Requirement + Test				Result - Remark		Verdict
Distance 1:	B	3.0	1.5	11.1B	3.0	2.5	11.1A
Working voltage (V) .....					240V		—
PTI .....					< 600 <input checked="" type="checkbox"/> ≥ 600 <input type="checkbox"/>		—
Pulse voltage or $U_P$ if applicable (kV) .....					--		—
Supplementary information: Between live parts of different polarities.							
Distance 2:	B	3.0	1.5	11.1B	3.0	2.5	11.1A
Working voltage (V) .....					240V		—
PTI .....					< 600 <input checked="" type="checkbox"/> ≥ 600 <input type="checkbox"/>		—
Pulse voltage or $U_P$ if applicable (kV) .....					--		—
Supplementary information: Between live parts and accessible metal parts.							
Distance 3:	B	Not required	0.2	11.1B	Not required	1.2	11.1A
Working voltage (V) .....					LED driver output: SELV, < 60VDC.		—
PTI .....					< 600 <input checked="" type="checkbox"/> ≥ 600 <input type="checkbox"/>		—
Pulse voltage or $U_P$ if applicable (kV) .....					--		—
Supplementary information: Between current carrying parts of different polarities. Between current carrying parts and accessible parts.							

\*\* Insulation type: B – Basic; S – Supplementary; R – Reinforced. See also IEC 60598-1 Annex M.

3.7 (11.2)	TABLE II: Creepage distances and clearances						N/A
Minimum distances (mm) for a.c. higher than 30 kHz sinusoidal voltages							
Applicable part of IEC 61347-1 Table 7 and 8* or IEC 60664-4 Table 1 and 2							
Distances	Insulation type **	Measured clearance	Required		Measured creepage	Required	
			clearance	*Table		creepage	*Table
Distance 1:							
Working voltage (V) .....							—
Frequency if applicable (kHz) .....							—
PTI .....					< 600 <input type="checkbox"/> ≥ 600 <input type="checkbox"/>		—
Peak value of the working voltage $\hat{U}_{out}$ if applicable (kV) .....							—
Supplementary information:							
Distance 2:							
Working voltage (V) .....							—

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
Frequency if applicable (kHz) .....			—
PTI .....		< 600 <input type="checkbox"/> ≥ 600 <input type="checkbox"/>	—
Peak value of the working voltage $\hat{U}_{out}$ if applicable (kV) .....			—
Supplementary information:			
Distance 3:			
Working voltage (V) .....			—
Frequency if applicable (kHz) .....			—
PTI .....		< 600 <input type="checkbox"/> ≥ 600 <input type="checkbox"/>	—
Peak value of the working voltage $\hat{U}_{out}$ if applicable (kV) .....			—
Supplementary information:			

\*\* Insulation type: B – Basic; S – Supplementary; R – Reinforced.

3.15 (13.2.1)	TABLE: Ball Pressure Test of Thermoplastics			P
Allowed impression diameter (mm) .....		2.0		—
Object/ Part No./ Material	Manufacturer/ trademark	Test temperature (°C)	Impression diameter (mm)	
Closed-end connector	See Annex 1	125	1.5	
Plastic cover	See Annex 1	110	1.6	
Supplementary information:				

3.15 (13.3.1)	TABLE: Needle-flame test (IEC 60695-11-5)				P
Object/ Part No./ Material	Manufacturer/ trademark	Duration of application of test flame (ta); (s)	Ignition of specified layer Yes/No	Duration of burning (tb) (s)	Verdict
Closed-end connector	See Annex 1	10	No	0	P
DC connector	See Annex 1	10	No	0	P
Supplementary information:					

IEC 60598-2-3				
Clause	Requirement + Test	Result - Remark		Verdict
<b>3.15 (13.3.2)</b>	<b>TABLE: Glow-wire test (IEC 60695-2-11)</b>			<b>P</b>
<b>Glow wire temperature .....</b>		650°C		—
Object/ Part No./ Material	Manufacturer/ trademark	Ignition of specified layer Yes/No	Duration of burning (tb) (s)	Verdict
Plastic cover	See Annex 1	No	0	P
Waterproof gasket	See Annex 1	No	0	P
Plastic bracket	See Annex 1	No	0	P
Supplementary information:				

<b>3.15 (13.4)</b>	<b>TABLE: Proof tracking test (IEC 60112)</b>			<b>N/A</b>
<b>Test voltage PTI .....</b>		175 V		—
Object/ Part No./ Material	Manufacturer/ trademark	Withstand 50 drops without failure on three places or on three specimens		Verdict
Supplementary information:				

IEC 60598-2-3						
Clause	Requirement + Test			Result - Remark		Verdict
<b>ANNEX 1</b>	<b>TABLE: Critical components information</b>					P
Object / part No.	Code	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity <sup>1)</sup>
<b>For series 1</b>						
Supply cord	B	Zhongsan Guzhen Hongli Cable & Appliance Factory	H05RN-F	3x1.0mm <sup>2</sup>	EN 50525-2-21	VDE 40015521
Plastic gland (I)	C	Dongguan de zhi hermetic technique co., Ltd	PG11	Cable range: Φ4-7, IP65	IEC/EN 50262	TUV SUD N8A 14 09 87842 002
Closed-end connector	B,C	HEAVY POWER CO LTD	CE5	300V, 105°C	--	Tested with applicant & UL E113650
Earthing wire	B,C	ZHONGSHAN GUZHEN HONGLI CABLE & APPLIANCE FACTORY	1015	18AWG, 105°C	--	Tested with applicant & UL 248639
LED driver	B	Hooger Electronics Technology Co., Ltd.	HG-RZ50W1500-WP	Input: 100-277VAC, 50/60Hz, Max.0.65A; output: 24-35V, 1.5A, Max. 50W, Max. 46VDC; Class I; IP65; ta 45°C, tc 90°C, Independent, SELV.	IEC/EN 61347-2-13 IEC/EN 61347-1	TUV RH DE 2-025563
DC connector	B,C	SHENZHEN LILUTONG ELECTRONIC TECHNOLOGY CO LTD	LLT-M18	250V, 15A	--	Tested with applicant & UL 470166
Metal gland	C	Dong Guan De Zhi Hermetic Technique Co., Ltd	M12	Cable range: Φ3-5.3, IP65	--	Tested with applicant
Plastic gland (II)	C	Dongguan de zhi hermetic technique co., Ltd	PG7	Cable range: Φ3-5.3, IP65	--	Tested with applicant
Lead wire of LED module	B	Zhejiang Jinniu Cable Co., Ltd	H05RN-F	2x0.75mm <sup>2</sup>	EN 50525-2-21	VDE 40028195
LED module PCB	B,C	ZHONGSHAN CAKEE PCB CO LTD	NST-06	Metal base, 130°C, V-0, min.2.0mm thickness.	--	Tested with applicant & UL E205740

IEC 60598-2-3						
Clause	Requirement + Test			Result - Remark		Verdict
LED (SMD3030)	C	Lumileds	LUXEON 3030 2D	VF: 5.8-6.6V @IF=120mA; Size: 3.0x3.0x0.66mm; CCT: 4000-6500K.	--	Tested with applicant
Waterproof gasket	C	Zhongshan Hongxing Silica Gel Co., Ltd	--	Silicone rubber	--	Tested with applicant
Plastic cover	C	Jiangsu Jinyaming Lighting Appliance Co., Ltd.	--	PC, min.2.0mm thickness	--	Tested with applicant
<b>For series 2</b>						
Supply cord	B	Zhongshan Guzhen Hongli Cable & Appliance Factory	H05RN-F	3x1.0mm <sup>2</sup>	EN 50525-2-21	VDE 40015521
Plastic gland	C	Dongguan de zhi hermetic technique co., Ltd	PG11	Cable range: Φ4-7	IEC/EN 50262	TUV SUD N8A 14 09 87842 002
Waterproof gasket (used for metal enclosure)	C	Zhongshan Ruilai Lighting Factory	--	Silicone rubber	--	Tested with applicant
Closed-end connector	B,C	HEAVY POWER CO LTD	CE2, CE5	300V, 105°C	--	Tested with applicant & UL E113650
Earthing wire	B,C	ZHONGSHAN GUZHEN HONGLI CABLE & APPLIANCE FACTORY	1015	18AWG, 105°C	--	Tested with applicant & UL 248639
LED driver	B	Hooger Electronics Technology Co., Ltd.	HG-RZ50W1500-WP	Input: 100-277VAC, 50/60Hz, Max.0.65A; output: 24-35V, 1.5A, Max. 50W, Max. 46VDC; Class I; IP65; ta 45°C, tc 90°C, Independent, SELV.	IEC/EN 61347-2-13 IEC/EN 61347-1	TUV RH DE 2-025563
Lead wire of LED	B	Guangdong Haerkn New Energy Co., Ltd.	H05S-K	0.75mm <sup>2</sup> , 180°C	EN 50525-2-41	VDE 40026436

IEC 60598-2-3						
Clause	Requirement + Test			Result - Remark	Verdict	
LED (COB)	C	Shen Zhen Yu Hua Technology Co.,Ltd	YH-2836-50W-F24 C10X10	VF: 30-31V @IF=1500mA; Size: 36x28mm; CCT: 4000-6000K.	--	Tested with applicant
Plastic bracket of LED	C	Shen Zhen Yu Hua Technology Co.,Ltd	--	PPA	--	Tested with applicant
Waterproof gasket (used for glass cover)	C	Zhongshan Hongxing Silica Gel Co., Ltd	--	Silicone rubber	--	Tested with applicant
Glass cover	C	Zhejiang Yongqiang Glass Products Co., Ltd	--	High borosilicate glass, size: 108*86*38mm, max. temperature: 800°C, $\Delta t$ : 200°C.	--	Tested with applicant
<p>Supplementary information:</p> <p>1) Provided evidence ensures the agreed level of compliance. See OD-CB2039.</p> <p>The codes above have the following meaning:</p> <p>A - The component is replaceable with another one, also certified, with equivalent characteristics</p> <p>B - The component is replaceable if authorised by the test house</p> <p>C - Integrated component tested together with the appliance</p> <p>D - Alternative component</p>						

IEC 60598-2-3								
Clause	Requirement + Test				Result - Remark			Verdict
<b>ANNEX 2</b>	<b>TABLE: Thermal tests of Section 12</b>							<b>P</b>
	Type reference .....	GA-M005-250W					---	
	Lamp used.....	Integral LED module					---	
	Lamp control gear used.....	HG-RZ50W1500-WP (5pcs)					---	
	Mounting position of luminaire .....	As normal use					---	
	Supply wattage (W) .....	--					---	
	Supply current (A) .....	--					---	
	Temperatures in test 1 - 4 below are corrected for $t_a$ (°C) .....	45°C					---	
	- abnormal operating mode .....	a). Short-circuit one LED module b). Open-circuit one LED module					---	
1.12 (12.4)	- test 1: rated voltage .....	--					---	
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage or 1,1 times constant voltage/current .....	1). 1.06x100V=106V I: 2.46A, P: 260W, PF:0.998 2). 1.06x240V=254.4V I: 1.00A, P: 248W, PF:0.973					---	
	- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage .....	--					---	
	Through wiring or looping-in wiring loaded by a current of A during the test .....	--					---	
1.12 (12.5)	- test 4: 1,1 times rated voltage or 1,05 times rated wattage or 1,1 times constant voltage/current .....	1.1x240V=260V a). I: 0.875A, P: 205W, PF: 0.972. b). I: 0.875A, P: 205W, PF: 0.972.					---	
<b>Temperature measurements (°C)</b>								
Part	Ambient	Cl. 12.4 – normal					Cl. 12.5 – abnormal	
		test 1	test 2		test 3	limit	test 4	limit
			1)	2)				
Supply cord (clamped by plastic gland)	45	--	72.8	64.6	--	75	--	--
Closed-end connector	45	--	78.4	67.2	--	Ref.	--	--
Input wire of LED driver	45	--	77.5	68.1	--	90	--	--
Tc of LED driver	45	--	79.9	70.4	--	90	--	--
Output wire of LED driver	45	--	87.0	74.2	--	90	--	--

IEC 60598-2-3								
Clause	Requirement + Test				Result - Remark			Verdict
DC connector	45	--	82.7	70.7	--	Ref.	--	--
Lead wire of LED module	45	--	86.1	82.8	--	90	--	--
LED module PCB	45	--	87.0	83.9	--	Ref.	--	--
LED surface	45	--	88.3	85.2	--	Ref.	--	--
Internal surface of plastic cover	45	--	84.7	81.7	--	Ref.	--	--
Waterproof gasket of plastic cover	45	--	80.2	77.2	--	Ref.	--	--
External surface of plastic cover	45	--	55.1	53.9	--	Ref.	--	--
Mounting surface	45	--	51.5	51.1	--	90	--	--
Supplementary information: During the abnormal operation a) & b), all the temperatures are the same as the normal operation.								

	Type reference .....	GA-L004D-200W	---
	Lamp used.....	Integral LED module	---
	Lamp control gear used.....	HG-RZ50W1500-WP (4pcs)	---
	Mounting position of luminaire .....	As normal use	---
	Supply wattage (W) .....	--	---
	Supply current (A) .....	--	---
	Temperatures in test 1 - 4 below are corrected for ta (°C) .....	45°C	---
	- abnormal operating mode .....	a). Short-circuit one LED. b). Open-circuit one LED.	---
1.12 (12.4)	- test 1: rated voltage .....	--	---
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage or 1,1 times constant voltage/current .....	1). 1.06x100V=106V I: 1.968A, P: 205W, PF:0.980 2). 1.06x240V=254.4V I: 0.816A, P: 200W, PF:0.965	---
	- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage .....	--	---
	Through wiring or looping-in wiring loaded by a current of A during the test .....	--	---
1.12 (12.5)	- test 4: 1,1 times rated voltage or 1,05 times rated wattage or 1,1 times constant voltage/current .....	1.1x240V=260V a). I: 0.603A, P: 152W, PF: 0.954. b). I: 0.603A, P: 152W, PF: 0.954.	---

IEC 60598-2-3								
Clause	Requirement + Test	Result - Remark					Verdict	
Temperature measurements (°C)								
Part	Ambient	Cl. 12.4 – normal					Cl. 12.5 – abnormal	
		test 1	test 2		test 3	limit	test 4	limit
			1)	2)				
Supply cord (clamped by plastic gland)	45	--	65.8	60.2	--	75	--	--
Closed-end connector (I)	45	--	64.7	60.0	--	Ref.	--	--
Input wire of LED driver	45	--	65.1	59.6	--	90	--	--
Tc of LED driver	45	--	73.9	66.3	--	90	--	--
Output wire of LED driver	45	--	79.4	71.9	--	90	--	--
Closed-end connector (II)	45	--	79.5	57.3	--	Ref.	--	--
Waterproof gasket of metal enclosure	45	--	61.5	58.2	--	Ref.	--	--
Lead wire of LED module	45	--	91.9	89.2	--	180	--	--
LED module PCB	45	--	89.3	86.9	--	Ref.	--	--
LED surface	45	--	93.4	90.9	--	Ref.	--	--
Internal surface of glass cover	45	--	81.8	79.4	--	Ref.	--	--
Waterproof gasket of glass cover	45	--	71.8	53.7	--	Ref.	--	--
External surface of glass cover	45	--	72.2	69.1	--	Ref.	--	--
Mounting surface	45	--	53.0	55.2	--	90	--	--
Supplementary information: During the abnormal operation a) & b), all the temperatures are the same as the normal operation.								

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
<b>ANNEX 3</b>	<b>Screw terminals (part of the luminaire)</b>		N/A
<b>(14)</b>	<b>SCREW TERMINALS</b>		N/A
(14.2)	Type of terminal..... :		—
	Rated current (A)..... :		—
(14.3.2.1)	One or more conductors		N/A
(14.3.2.2)	Special preparation		N/A
(14.3.2.3)	Terminal size		N/A
	Cross-sectional area (mm <sup>2</sup> )..... :		—
(14.3.3)	Conductor space (mm)..... :		N/A
(14.4)	Mechanical tests		N/A
(14.4.1)	Minimum distance		N/A
(14.4.2)	Cannot slip out		N/A
(14.4.3)	Special preparation		N/A
(14.4.4)	Nominal diameter of thread (metric ISO thread) ..... :	M	N/A
	External wiring		N/A
	No soft metal		N/A
(14.4.5)	Corrosion		N/A
(14.4.6)	Nominal diameter of thread (mm) ..... :		N/A
	Torque (Nm) ..... :		N/A
(14.4.7)	Between metal surfaces		N/A
	Lug terminal		N/A
	Mantle terminal		N/A
	Pull test; pull (N) ..... :		N/A
(14.4.8)	Without undue damage		N/A

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
<b>ANNEX 4</b>	<b>Screwless terminals (part of the luminaire)</b>		N/A
<b>(15)</b>	<b>SCREWLESS TERMINALS</b>		N/A
(15.2)	Type of terminal..... :		—
	Rated current (A)..... :		—
(15.3.1)	Material		N/A
(15.3.2)	Clamping		N/A
(15.3.3)	Stop		N/A
(15.3.4)	Unprepared conductors		N/A
(15.3.5)	Pressure on insulating material		N/A
(15.3.6)	Clear connection method		N/A
(15.3.7)	Clamping independently		N/A
(15.3.8)	Fixed in position		N/A
(15.3.10)	Conductor size		N/A
	Type of conductor		N/A
(15.5)	Terminals and connections for internal wiring		N/A
(15.5.1)	Mechanical tests		N/A
(15.5.1.1.1)	Pull test spring-type terminals (4 N, 4 samples) .....		N/A
(15.5.1.1.2)	Pull test pin or tab terminals (4 N, 4 samples) .....		N/A
	Insertion force not exceeding 50 N		N/A
(15.5.1.2)	Permanent connections: pull-off test (20 N)		N/A
(15.5.2)	Electrical tests		N/A
	Voltage drop (mV) after 1 h (4 samples)..... :		N/A
	Voltage drop of two inseparable joints		N/A
	Number of cycles:		—
	Voltage drop (mV) after 10th alt. 25th cycle (4 samples)..... :		N/A
	Voltage drop (mV) after 50th alt. 100th cycle (4 samples)..... :		N/A
	After ageing, voltage drop (mV) after 10th alt. 25th cycle (4 samples) .....		N/A
	After ageing, voltage drop (mV) after 50th alt. 100th cycle (4 samples) .....		N/A
(15.6)	Terminals and connections for external wiring		N/A
(15.6.1)	Conductors		N/A
	Terminal size and rating		N/A

IEC 60598-2-3											
Clause	Requirement + Test									Result - Remark	Verdict
15.6.2	Mechanical tests										N/A
(15.6.2.1)	Pull test spring-type terminals or welded connections (4 samples); pull (N) .....										N/A
(15.6.2.2)	Pull test pin or tab terminals (4 samples); pull (N) .....										N/A
(15.6.3)	Electrical tests										N/A
	Tests according 15.6.3.1 + 15.6.3.2 in IEC 60598-1										N/A
<b>(15.6.3.1)</b> <b>(15.6.3.2)</b>	<b>TABLE: Contact resistance test / Heating tests</b>										N/A
	Voltage drop (mV) after 1 h										—
terminal	1	2	3	4	5	6	7	8	9	10	
voltage drop (mV)											
	Voltage drop of two inseparable joints										
	Voltage drop after 10th alt. 25th cycle										
	Max. allowed voltage drop (mV) .....										—
terminal	1	2	3	4	5	6	7	8	9	10	
voltage drop (mV)											
	Voltage drop after 50th alt. 100th cycle										
	Max. allowed voltage drop (mV) .....										—
terminal	1	2	3	4	5	6	7	8	9	10	
voltage drop (mV)											
	Continued ageing: voltage drop after 10th alt. 25th cycle										
	Max. allowed voltage drop (mV) .....										—
terminal	1	2	3	4	5	6	7	8	9	10	
voltage drop (mV)											
	Continued ageing: voltage drop after 50th alt. 100th cycle										
	Max. allowed voltage drop (mV) .....										—
terminal	1	2	3	4	5	6	7	8	9	10	
voltage drop (mV)											
Supplementary information:											

IEC 60598-2-3_Attachment 1			
Clause	Requirement + Test	Result - Remark	Verdict
<b>ATTACHMENT TO TEST REPORT</b> <b>IEC 60598-2-3</b> <b>EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES</b> Luminaires Part 2: Particular requirements Section 3: Luminaires for road and street lighting			
<b>Differences according to</b> .....: EN 60598-2-3:2003, AMD1:2011 used in conjunction with EN 60598-1:2015, AMD1:2018			
<b>Annex Form No.</b> .... : EU_GD_IEC60598_2_3L <b>Annex Form Originator</b> ..... : Intertek Semko AB <b>Master Annex Form</b> ..... : 2018-12-07			
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	<b>CENELEC COMMON MODIFICATIONS (EN)</b>		<b>P</b>
<b>3.6 (4)</b>	<b>CONSTRUCTION</b>		<b>P</b>
3.6 (4.11.6)	Electro-mechanical contact systems		P
<b>3.10 (5)</b>	<b>EXTERNAL AND INTERNAL WIRING</b>		<b>P</b>
3.10 (5.2.2)	Cables equal to EN 50525		P
	Replace table 5.1 – Supply cord		P
<b>3.12 (12)</b>	<b>ENDURANCE TESTS AND THERMAL TESTS</b>		<b>N/A</b>
3.12 (12.4.2c)	Thermal test (normal operation) see footnote c to table 12.2 relating to unsleeved fixed wiring		N/A
<b>ZB</b>	<b>ANNEX ZB, SPECIAL NATIONAL CONDITIONS (EN)</b>		<b>N/A</b>
(3.3)	DK: power supply cords of class I luminaires with label		N/A
(4.5.1)	DK: socket-outlets		N/A
(5.2.1)	CY, DK, FI, GB: type of plug		N/A
<b>ZC</b>	<b>ANNEX ZC, NATIONAL DEVIATIONS (EN)</b>		<b>N/A</b>
(4 & 5)	FR: Shuttered socket-outlets 10/16A		N/A
	FR: Safety requirements for high buildings <i>(Decree of 30 December 2011 on safety regulations for the construction of high-rise buildings and their protection against fire and panic risks; Section VIII; Article GH 48, Lighting)</i>  Glow-wire test for outer parts of luminaires:		N/A
	- 850°C for luminaires in stairways and horizontal travel paths		N/A
	- 650°C for indoor luminaires		N/A
	GB: Requirements according to United Kingdom Building Regulation		N/A

IEC 60598-2-3_Attachment 2			
Clause	Requirement + Test	Result - Remark	Verdict
	<b>Saudi Arabia deviation</b>		<b>P</b>
1	MAINS VOLTAGE 127 or 220 V or 380V	100-240V	P
2	MAINS FREQUENCY 60 Hz	50/60Hz	P
3	INSTRUCTION MANUAL Language of instruction manual according to applicable IEC/SASO standard. (i.e. Manuals will be in the official language of the country where the product is intended to be sold -Arabic)	English and Arabic	P
4	PLUGS Plugs fitted to the supply cords shall have a configuration in accordance with SASO standard 2203/2003 or 2204/2003 (Refer to CD-479 for more information)		N/A
5	COUNTRY OF ORIGIN All appliances shall be marked with Country of Origin (MoCI Royal Decree No. M/5, CD-444R3)	MADE IN CHINA	P
6	CLASSIFICATION MARK For all class I construction equipment. Earthing symbol should be near to earthing connection and on non removable part. For all class II construction appliances, marked  . For class III construction appliances, marked  , in particular luminaires operating at less than 42.4V ac peak and 42.4 V dc.		P

IEC 60598-2-3_Attachment 3			
Clause	Requirement + Test	Result - Remark	Verdict
	<b>LED modules for general lighting – Safety specifications IEC 62031:2018 and EN 62031:2008+A1:2013+A2:2015</b>		<b>P</b>
<b>12 (14)</b>	<b>FAULT CONDITIONS</b>		<b>P</b>
- (14.1)	When operated under fault conditions the controlgear:		P
	- does not emit flames or molten material		P
	- does not produce flammable gases		P
	- protection against accidental contact not impaired		P
	Thermally protected controlgear does not exceed the marked temperature value		N/A
	Fault conditions: capacitors, resistors or inductors without proof of compliance with relevant specifications have been short-circuited or disconnected		N/A
- (14.2)	Short-circuit of creepage distances and clearances if less than specified in clause 16 in Part 1 (after any reduction in 14.2 - 14.5)		N/A
- (14.3)	Short-circuit or interruption of semiconductor devices		P
- (14.4)	Short-circuit across insulation consisting of lacquer, enamel or textile		N/A
- (14.5)	Short-circuit across electrolytic capacitors		N/A
	Short-circuit or interruption of SPDs		N/A
- (14.6)	After the tests has been carried out on three samples:		P
	The insulation resistance $\geq 1 \text{ M}\Omega$ .....	>100M $\Omega$	P
	No flammable gases		P
	No accessible parts have become live		P
	During the tests, a five-layer tissue paper, where the test specimen is wrapped, does not ignite		P
- (14.7)	Relevant fault condition tests with high-power a.c. supply and in turn to a d.c. supply		—
<b>12.2</b>	<b>Overpower condition</b>		<b>P</b>
	Module withstands overpower condition >15 min.	For LED module of models GA-M005-250W, GA-L004D-200W.	P
	Module with automatic protective device or power limiter, test performed 15 min. at limit.		N/A
	No fire, smoke or flammable gas is produced		P
	Molten material does not ignite tissue paper, spread below the module		P

IEC 60598-2-3_Attachment 4			
Clause	Requirement + Test	Result - Remark	Verdict

	<b>Blue light hazard to light sources and luminaires of IEC/TR 62778: 2014</b>		<b>P</b>
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**Model: GA-M005-250W (6500K)****Conditions**

1. Tests performed at AC 240V, 50Hz.
2. Ambient temperature: 25°C, Humidity: 55%.
3. Measurement distance: 0.20m.
4. Angular subtense of apparent source: 72.08mrad.

**Lamp classification group: RG1 unlimited**

Test Results		
Symbol	Units	Results
Lb (11mrad)	W•m-2•sr-1	7.980E+03
Lb (100mrad)	W•m-2•sr-1	2.795E+02
L (11mrad)	cd•m-2	7.748E+06
Ethr	lx	--
dmin	m	--

**Model: GA-L004D-200W (6000K)****Conditions**

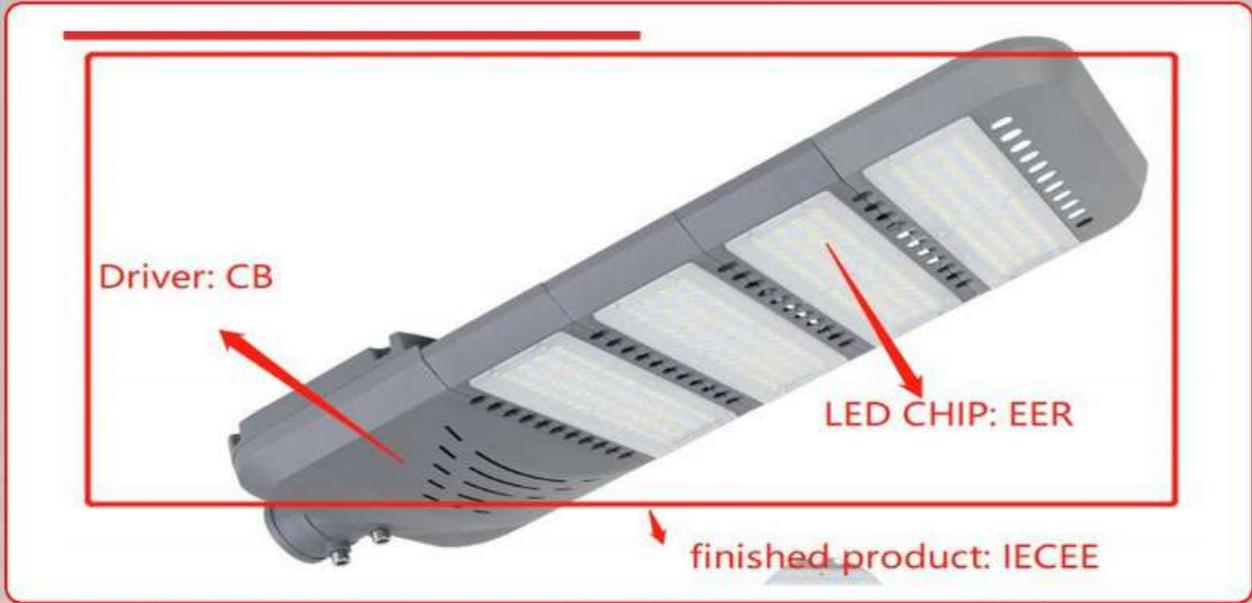
1. Tests performed at AC 240V, 50Hz.
2. Ambient temperature: 25°C, Humidity: 55%.
3. Measurement distance: 0.20m.
4. Angular subtense of apparent source: 77.45mrad.

**Lamp classification group: RG1 unlimited**

Test Results		
Symbol	Units	Results
Lb (11mrad)	W•m-2•sr-1	5.471E+03
Lb (100mrad)	W•m-2•sr-1	2.880E+03
L (11mrad)	cd•m-2	6.097E+06
Ethr	lx	--

IEC 60598-2-3_Attachment 4			
Clause	Requirement + Test	Result - Remark	Verdict
	dmin	m	--

=== End of Report ===

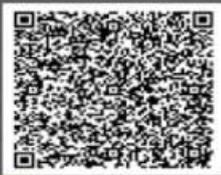


<b>IECEE</b>	<b>50000 H</b>	<b>TYV</b>	<b>Philips</b>
<b>cb</b>	<b>IP 66</b>	<b>140 L-M</b>	<b>LG</b>
<b>EER</b>	<b>IK 10</b>	<b>SASO</b>	<b>Hoger</b>



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