TEST REPORT

COMPULSORY SPECIFICATION FOR ENERGY EFFICIENCY AND FUNCTIONAL PERFORMANCE REQUIREMENTS OF GENERAL SERVICE LAMPS (GSLs) -VC 9109

Self-ballasted LED lamps for general lighting services with supply voltages > 50 V - Performance requirements- IEC 62612

Report Reference No. ……..……:	AOC250808028ER
Compiled by (print+ signature)…….:	Bill Hu
Approved by (print+ signature)……:	Robin Liu
Date of issue……...:	2025-09-25

Lab Supervisor

Testing Laboratory.....:	Shenzhen AOCE Electronic Technology Service Co., Ltd
Address……:	Room 202, 2nd Floor, No.12th Building of Xinhe Tongfuyu Industrial Park, Fuhai Street, Baoan District, Shenzhen, Guangdong, China
Testing location/address……...:	Same as above
Applicant's name.....:	Major Tech (Pty) Ltd
Address……:	T9 Industrial Village, 7 Sam Green Rd, Elandsfontein, South Africa
Manufacturer name……..:	Jiangxi Lepeng Electric Appliance Co., LTD.
Address……:	Changjiang Electronic Information Industry Park Changjiang District 333000 Jingdezhen City, Jiangxi Province
Test Object……..:	LED BULBS
Trade Mark……..:	MAJOR-TECH
Model / Type reference……:	LH3C-D5W
Rated voltage (V)……..……:	220-240 V~
Rated frequency (Hz)…..……:	50/60 Hz
Rated Power (W).....:	4.5 W
Rated luminous (lm).....:	425 lm
Rated color temperature (CCT).....:	3000K
Rated color tendering (CRI).....:	80
Rated life (h).....:	25000
Test specification:	
Standard .....:	COMPULSORY SPECIFICATION FOR ENERGY EFFICIENCY AND FUNCTIONAL PERFORMANCE REQUIREMENTS OF GENERAL SERVICE LAMPS (GSLs) -VC 9109 Self-ballasted LED lamps for general lighting services with supply voltages > 50 V - Performance requirements- IEC 62612
Test procedure ..... :	Test report
Non-standard test method.....:	N/A
Test Report Form No......:	IECEE TRF No. VC 9109
Test Report Form(s) Originator .....:	AOCE
Master TRF.....:	2019-11-30

Summary of Testing:	
Tests performed (name of test and test clause):	**Testing location:**
The sample(s) tested complies with the requirements of VC 9109 When determining the test conclusion. The Measurement Uncertainty of test has be enconsidered.	Shenzhen AOCE Electronic Technology Service Co., Ltd Room 202, 2nd Floor, No.12th Building of Xinhe Tongfuyu Industrial Park, Fuhai Street, Baoan District, Shenzhen, Guangdong, China

Normative References:

Standard reference	Describe
IEC / SANS 62612	Self-ballasted LED lamps for general lighting services with supply voltages > 50 V - Performance requirements
CIE S 025/E:2015	Test Method for LED Lamps, LED Luminaires and LED Modules
IEC 63103:2020	Lighting equipment - Non-active mode power measurement
CIE 13.3	Method of Measuring and Specifying Colour Rendering Properties of Light Sources
CIE 84:1989	Measurement of Luminous Flux (1st Edition).
IEC TR 61547-1:2020	Equipment for general lighting purposes - EMC immunity requirements -Part 1: Objective light flickermeter and voltage fluctuation immunity test method
IEC TR 63158:2018	Equipment for general lighting purposes - Objective test method for stroboscopic effects of lighting equipment

Copy of Marking Plate:

N/A

Type of light source:	
Product type.....:	☒ Light source ☐ Separate control gears
Lighting technology used……:	☒ LED ☐ OLED ☐ Other
Non-directional or directional……:	☒ DLS (Directional) ☐ NDLS (Non-directional)
Use of lamp……:	☒ Indoor ☐ Outdoor ☐ Industry
Light source cap-type (or other electric interface)…..:	GU10
Mains or non-mains……...:	☒ MLS (mains light source) ☐ NMLS (non-mains light source)
Connected light source (CLS)……:	☐ Yes ☒ No
Colour-tuneable light source……..:	☐ Yes ☒ No
Envelope……:	☐ Yes ☒ No
High luminance light source……:	☐ Yes ☒ No
Anti-glare shield……:	☐ Yes ☒ No
Dimmable……..:	☐ Yes ☒ only with specific dimmers ☐ No
Product parameters	
Parameter……..……..……:	220-240 V~, 50/60 Hz, 4.5 W
Energy consumption in on-mode (KWh/1000h)……..:	4.5
Energy efficiency class……:	*See table 7*
Beam angle correspondence……:	*See table 3*
Correlated colour temperature (K)……:	*See table 2*
On-mode power (W)……:	*See table 1*
Standby power (W)..……...:	*See table 1*
Networked standby power for CLS (W)……:	*See table 1*
Colour rendering index……:	*See table 2*
Colour rendering index range (Minimum)……:	*See table 2*
Colour rendering index range (Maximum)……:	*See table 2*
Claim of equivalent power……:	☐ Yes ☒ No
Equivalent power (W)……..:	/
Chromaticity coordinate (x)……:	*See table 2*
Chromaticity coordinate (y)……:	*See table 2*
PARAMETERS FOR DIRECTIONAL LIGHT SOURCES	
Peak luminous intensity (cd)……..:	*See table 3*
Beam angle (degrees)……:	*See table 3*
Beam angle range (Minimum) (degrees)……:	*See table 3*
Beam angle range (Maximum) (degrees)……:	*See table 3*
PARAMETERS FOR LED AND OLED LIGHT SOURCES	
R9 Colour rendering index……:	*See table 2*
Survival factor……..:	*See table 3*
Lumen maintenance factor……:	*See table 3*
PARAMETERS FOR LED AND OLED MAINS LIGHT SOURCES	

Displacement factor……:	*See table 1*
Colour consistency in McAdam ellipses……..:	*See table 2*
Claims that an LED light source replaces a fluorescent light source without integrated ballast of a particular wattage……:	☐ Yes ☒ N.A
Replacement claim (W)……..:	/
Flicker metric (W)……:	*See table 4*
Stroboscopic effect metric (W)……..:	*See table 4*
Outer dimensions (Millimetre)……..……:	Ø50×H54
Spectral power distribution in the range 250 nm to 800 nm, at full-load……..:	*See table 5*
Possible Test Case Verdicts:	
Test case does not apply to the test object……:	N/A (Not Applicable)
Test object does meet the requirement……..……:	P (Pass)
Test object does not meet the requirement……:	F (Fail)
Name and address of factory……:	Jiangxi Lepeng Electric Appliance Co., LTD. Changjiang Electronic Information Industry Park Changjiang District 333000 Jingdezhen City, Jiangxi Province
Testing:	
Ambient temperature of tested ..... :	25.0 ℃
Test inputs..... :	230 V~
Sample size for tested ..... :	10 pcs
Date of receipt of test item……..…..:	2024-12-16
Date (s) of performance of tests……:	2024-12-16 to 2025-08-12
General Remarks:	
Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or use in part without prior written consent from Shenzhen AOCE Electronic Technology Service Co., Ltd	
Note:	
N/A	

VC 9109			
Clause	Requirement + Test	Result – Remark	Verdict
4	EFFICIENCY REQUIREMENTS		-
a)	GSLs shall comply with the luminous efficacy requirements in Table 1 or Table 2, as relevant:		P
	Table 1: Minimum luminous efficacy, phase 1 **Product Type** | **Phase 1 Minimum luminous efficacy (lm/W)** General Service Lamp | 90		P
	Table 2: Minimum luminous efficacy, phase 2 **Product Type** | **Phase 2 Minimum luminous efficacy (lm/W)** General Service Lamp | 105		P
b)	Depending on the lamp characteristics, the minimum luminous efficacy values may be decreased by the following correction factors (C):		P
	Table 3: Correction factors **Lamp Characteristics** | **C** Luminous flux Φ (lm) below 400 lm | -10% Directional lamps | -15% Colour-tuneable lamps (CTL) | -10% Connected LED Lamps – rated luminous flux Φ (lm): | 60 lm ≤ Φ ≤ 300 lm | -15% 300 lm < Φ ≤ 650 lm | -10% 650 lm < Φ ≤ 1200 lm | -7.5% 1200 lm < Φ ≤ 2000 lm | -5.0% 2000 lm < Φ ≤ 3300 lm | -2.5%	Directional lamps	P
4.2	Displacement Factor		P
	Lamp displacement factor (Df) with integrated control gear and integrated luminaires: ☐ P ≤ 2W: no requirement ☒ 2W < P ≤ 5W: Df > 0.4 ☐ 5W < P ≤ 10W: Df > 0.7 ☐ P > 10W: Df > 0.9	See test sheet	P
4.2.1	Standby Power for connected lamps		N/A
	Standby power for lamps shall not exceed 0.5 W.		N/A
	Networked standby power for Connected LED Lamps shall not exceed 0.5 W.		N/A
	The allowable values for Standby power and networked standby power shall not be added together.		N/A
4.3	Functional Performance Requirements		P
	Colour Rendering Index (CRI) CRI ≥80	See test sheet	P

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Clause	Requirement + Test	Result – Remark	Verdict
	Lumen Maintenance Factor (for LED and OLED): $X_{LMF,MIN}\% = 100 \times e^{\frac{(3000 \times \ln(0.7))}{L_{70}}}$	See test sheet	P
	Survival factor: No less than 90% of sample units should be operational following endurance testing according	See test sheet	P
	Short term flicker indicator ($P_{st}LM$): ≤1.0 at full load and a sinusoidal input voltage	See test sheet	P
	Short term flicker indicator (SVM): ≤0.4 at full load and a sinusoidal input voltage	See test sheet	P
	Colour consistency: Variation of x,y chromaticity coordinates within a five -step Standard Deviation of Colour Matching (SDCM) or less.	See test sheet	P
4.4	Product Information Requirements		P
4.4.1	Lamp information		P
	a) Rated power in Watts (mandatory).		P
	b) Rated operating voltage (mandatory).		P
	c) Trade name or brand name (mandatory).		P
	d) Rated initial luminous flux in lumens (mandatory).		P
	e) Rated correlated colour temperature (CCT) in Kelvin (K) (mandatory).		P
	f) Beam angle (mandatory for directional lamps).		P
4.4.2	Packaging information		P
	a) Rated power in Watts (mandatory).		P
	b) Rated operating voltage (mandatory).		P
	c) Rated initial luminous flux in lumens (mandatory).		P
	d) Rated efficacy in lumens per Watt (lm/W) (mandatory).		P
	e) Rated lifetime in hours and L70B50 if longer (mandatory)		P
	f) Rated correlated colour temperature (CCT) in Kelvin (K) combined with a sliding scale: (mandatory).		P
	g) Beam angle (mandatory for directional lamps).		P
	h) Statement on Dimmability. Clearly state whether dimmable or not dimmable. If yes, then information on dimmer compatibility, or web link to this information. (mandatory).		P

VC 9109			
Clause	Requirement + Test	Result – Remark	Verdict
	i) For general service lamps which are, according to paragraph 1.2, exempted from the requirements of paragraph 3, the intended purpose shall be stated on all forms of packaging, product information and advertisement, together with a clear indication in large font on the front of the package that the Lamp is NOT Intended for General Illumination Purposes. (mandatory).		P
	j) Base type (mandatory).		P
	k) Efficiency label compliant with the current version of the Department of Energy guideline for energy efficiency label compliance in South Africa: A Guide for Energy Efficiency Labelling (mandatory).		P
	l) Incandescent equivalency claim (optional).		N/A
	m) Manufacturers are not required to provide an incandescent equivalency claim (i.e. "This lamp is as bright as a 60W incandescent" or "10W = 60W "). However, if they do, then the equivalency shall be based on the table below which depicts the minimum initial luminous flux that is required to claim a specific incandescent lamp wattage equivalency: **Table 6: Incandescent wattage equivalencies for LED lamps** Incandescent Wattage Equivalency [W] / Minimum Initial Luminous Flux [lm] Non-directional Lamps 15 – 150 25 – 250 40 – 500 60 – 800 75 – 1000 100 – 1500 150 – 2500 200 – 3500		N/A
	Voltage surge and dip immunity claim (optional). Manufacturers are not required to provide a voltage surge and dip immunity claim (e.g. "Withstands Power Surge ", "Power Surge Protected "). However, if they do, then the claim shall meet the EMC immunity requirements for equipment for general lighting purposes as set out in IEC 61547 for conditions in South Africa.		N/A
ANNEX B	**NDURANCE TEST METHOD AND SEQUENCE**		**P**
B1	Ambient conditions and test setup:		P
B1.1	The switching cycles are to be conducted in a room with an ambient temperature of 25 ± 10 °C and an average air velocity of less than 0,2 m/s.		P

VC 9109			
Clause	Requirement + Test	Result – Remark	Verdict
B1.2	The switching cycles on the sample shall be conducted in free air in a vertical base-up position. However, if a manufacturer or importer has declared the light source suitable for use in a specific orientation only, then the sample shall be mounted in that orientation.		P
B1.3	The applied voltage during the switching cycles shall have a tolerance within 2 %. The total harmonic content of the supply voltage shall not exceed 3 %. Standards provide guidance on the supply voltage source.		P
B2	Provisional Endurance Test Method		P
B2.1	Initial flux measurement: measure the luminous flux of the light source prior to starting the endurance test switching cycle.		P
B2.2	Switching cycles: operate the light source for 1 200 cycles of repeated, continuous switching cycles without interruption. One complete switching cycle consists of 150 minutes of the light source switched ON at full power followed by 30 minutes of the light source switched OFF. The hours of operation recorded (i.e. 3 000 hours) include only the periods of the switching cycle when the light source was switched ON, i.e. the total test time is 3 600 hours.		P
B2.3	Final flux measurement: at the end of the 1 200 switching cycles, note if any light sources have failed (see 'Survival factor' in Annex IV, Table 6 of this Regulation) and measure the luminous flux of the light sources that have not failed.		P
B2.4	For each of the units in the sample which have not failed, divide the measured final flux by the measured initial flux. Average the resulting values over all the units that did not fail to compute the determined value for the lumen maintenance factor XLMF %.		P

Test data sheet

Table 1

Model No.: LH3C-D5W

Sample No.	Pon(W)	No-load power P_{no}(W)	Standby power P_{sb}(W)	Networked standby power P_{net}(W)	Displacement factor
S01	4.30	N/A	N/A	N/A	0.93
S02	4.38	N/A	N/A	N/A	0.92
S03	4.31	N/A	N/A	N/A	0.92
S04	4.36	N/A	N/A	N/A	0.92
S05	4.40	N/A	N/A	N/A	0.92
S06	4.31	N/A	N/A	N/A	0.91
S07	4.43	N/A	N/A	N/A	0.91
S08	4.31	N/A	N/A	N/A	0.92
S09	4.34	N/A	N/A	N/A	0.92
S10	4.33	N/A	N/A	N/A	0.91
Average value	4.35	N/A	N/A	N/A	0.92

Table 2

Model No.: LH3C-D5W

Sample No.	Chromaticity Coordinates		CCT(K)	CRI	SDCM	R9
	x	y				
S01	0.4330	0.4026	3033	82.2	4.2	4
S02	0.4361	0.4046	3075	82.5	3.0	5
S03	0.4343	0.4030	3063	82.3	3.5	5
S04	0.4365	0.4046	3066	82.1	2.8	4
S05	0.4339	0.4038	3078	82.3	4.1	4
S06	0.4348	0.4022	3061	82.4	3.0	4
S07	0.4335	0.4018	2987	82.2	3.7	5
S08	0.4352	0.4034	2990	82.0	3.1	5
S09	0.4356	0.4030	2959	82.3	2.7	5
S10	0.4348	0.4046	2928	82.3	3.8	5
Average value	0.4348	0.4034	3024	82.3	3.4	5

Test data sheet

Table 3

Model No.: LH3C-D5W

Sample No.	Useful luminous flux Φuse (lm) at 0h	Useful luminous flux Φ use (lm) at 3600h	Lumen maintenance factor	Survival factor	Beam angle(°)	Peak luminous intensity (cd)
S01	441.5	428.1	96.96%	100%	40.7	795.4
S02	449.0	434.3	96.73%	100%	41.5	820.6
S03	452.5	436.9	96.55%	100%	40.9	790.5
S04	446.4	428.4	95.97%	100%	40.6	802.3
S05	443.4	426.1	96.11%	100%	41.1	796.0
S06	444.6	429.2	96.55%	100%	41.5	789.7
S07	444.9	427.5	96.07%	100%	40.7	798.4
S08	447.7	430.8	96.22%	100%	41.5	789.6
S09	442.5	424.8	96.01%	100%	40.9	790.4
S10	450.8	434.2	96.32%	100%	40.4	811.3
Average value	446.3	430.0	96.35%	100%	41.0	798.4

Table 4

Model No.: LH3C-D5W

Sample No.	Flicker for LED and OLED MLS (P_{st} LM≤ 1.0)	Stroboscopic effect for LED and OLED MLS (SVM ≤ 0.4)
S01	0.476	0.169
S02	0.497	0.162
S03	0.483	0.145
S04	0.609	0.141
S05	0.525	0.151
S06	0.637	0.166
S07	0.602	0.125
S08	0.609	0.177
S09	0.511	0.145
S10	0.574	0.153
Average value	0.552	0.153

Test data sheet

Table 5

Model No.: LH3C-D5W

Spectral Distribution

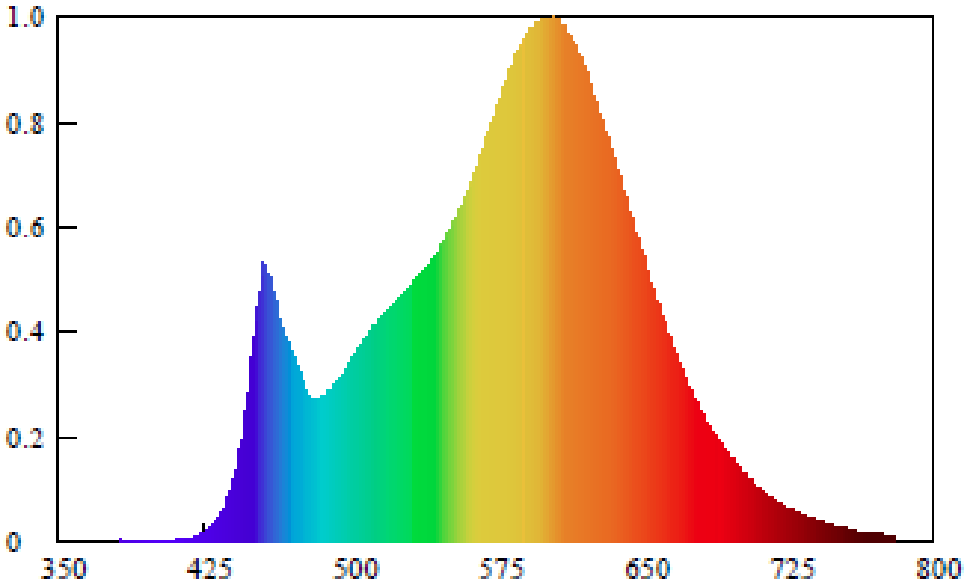
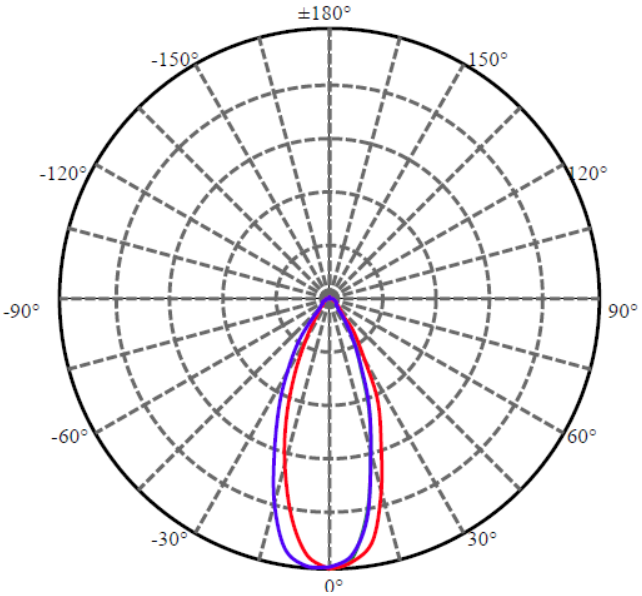


Table 5a

Model No.: LH3C-D5W

Light Distribution Curve



Test data sheet

Table 7

Model No.: LH3C-D5W

Energy efficiency classes				
According to rated value				
Total mains efficacy η_{TM} (lm/W)	Useful luminous flux Φ_{use} (lm) at 0h	P_{on}(W)	Factor F_{TM}	Energy Efficiency Class
111.1	425	4.5	1.176	E

Energy efficiency class	Total mains efficacy η_{TM} (lm/W)
A	$210 \leq \eta_{TM}$
B	$185 \leq \eta_{TM} < 210$
C	$160 \leq \eta_{TM} < 185$
D	$135 \leq \eta_{TM} < 160$
E	$110 \leq \eta_{TM} < 135$
F	$85 \leq \eta_{TM} < 110$
G	$\eta_{TM} < 85$

Factors F_{TM} by light source type	
Light source type	Factor FTM
Non-directional (NDLS) operating on mains (MLS)	1,000
Non-directional (NDLS) not operating on mains (NMLS)	0,926
Directional (DLS) operating on mains (MLS)	1,176
Directional (DLS) not operating on mains (NMLS)	1,089

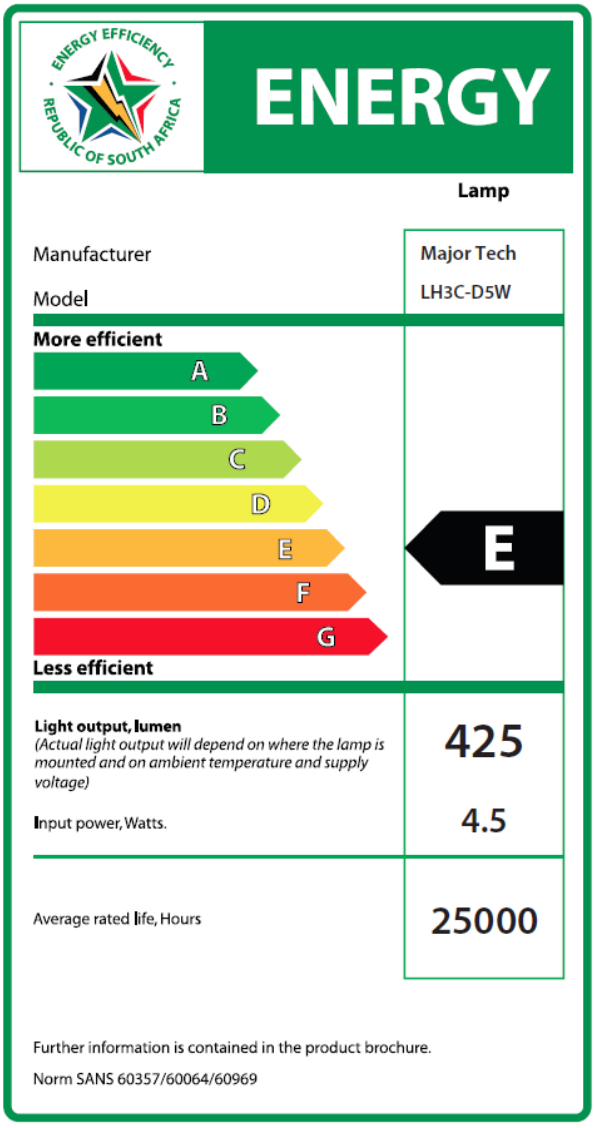
According to measured value				
Total mains efficacy η_{TM} (lm/W)	Useful luminous flux Φ_{use} (lm) at 0h	P_{on}(W)	Factor F_{TM}	Energy Efficiency Class
120.7	446.3	4.35	1.176	E

Energy efficiency class	Total mains efficacy η_{TM} (lm/W)
A	$210 \leq \eta_{TM}$
B	$185 \leq \eta_{TM} < 210$
C	$160 \leq \eta_{TM} < 185$
D	$135 \leq \eta_{TM} < 160$
E	$110 \leq \eta_{TM} < 135$
F	$85 \leq \eta_{TM} < 110$
G	$\eta_{TM} < 85$

Factors F_{TM} by light source type	
Light source type	Factor FTM
Non-directional (NDLS) operating on mains (MLS)	1,000
Non-directional (NDLS) not operating on mains (NMLS)	0,926
Directional (DLS) operating on mains (MLS)	1,176
Directional (DLS) not operating on mains (NMLS)	1,089

Test data sheet

Energy efficiency label:



Test Equipment List

Equipment Name	Manufacturer	Model No.	Reference No.	Calibration Due Date
2m Integating Sphere	SENSING	SL-300	AOC-S-126	2026-04-13
Horizontal Distribution Photometer	SENSING	GMS1800D	AOC-S-124	2026-04-13
Standard Lamp	SENSING	220V/150W	AOC-S-156	2026-06-05
Digital power meter	HENGHE	WT310E	AOC-S-012	2026-04-13
Digital power meter	SENSING	UI2008	AOC-S-123	2026-04-13
Digital power meter	SENSING	UI2021	AOC-S-123	2026-04-13
DC source	OYHS	OYHS-Z120V-50A	AOC-S-062	2026-04-13
Variable frequency power supply	WOSEN	BP6005	AOC-S-129	2026-04-13
Variable frequency power supply	AIPUSI	KDF-500	AOC-S-130	2026-04-13
Oscilloscope	TEKTRONIX	MDO3012	AOC-S-028	2026-04-13

Product Photo

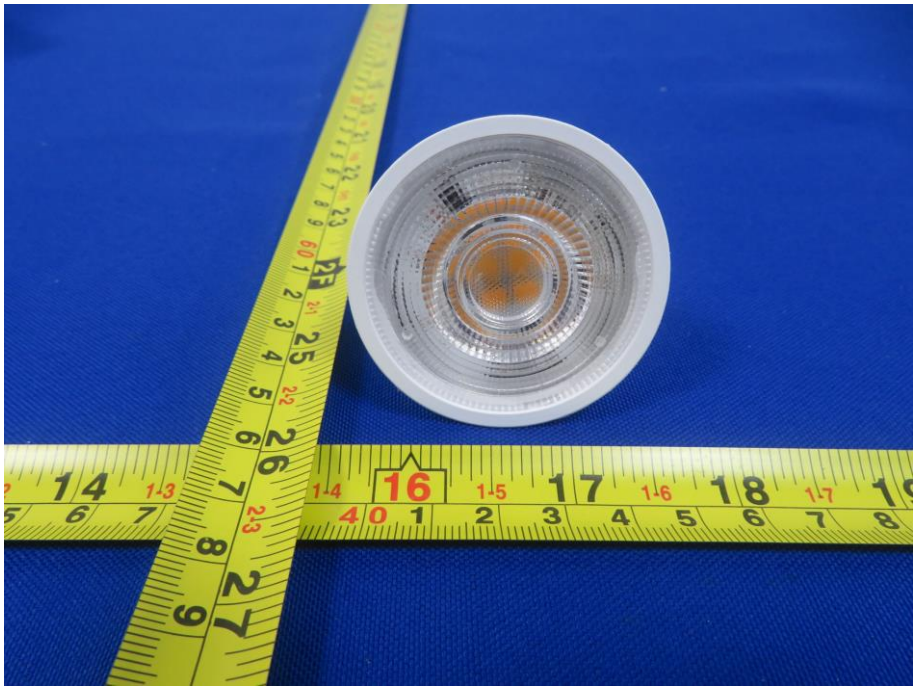


Fig. 1

Fig. 2

-- End of Report --