Test Report issued under the responsibility of:

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TEST REPORT
(EU) 2019/2020
Ecodesign and Energy labelling requirement for Light Source Implementation measure (EU) 2019/2020 and (EU) 2019/2015

Report Reference No. ..... :	EFSH21031755-IE-16-P01
Tested by ..... :	Andy Gong Project Engineer
Approved by ..... :	Neil Shi Reviewer
Date of issue ..... :	2021-05-12
Total number of pages	19 pages
Testing Laboratory ..... :	Eurofins Product Testing Service (Shanghai) Co., Ltd.
Address ..... :	Building 18, No. 2168 Chenhang Highway, Minhang District, Shanghai, China
Applicant's name ..... :	Foshan Electrical and Lighting Co.,Ltd
Address ..... :	64 North Fenjiang Road, Foshan, Guangdong, China
Test specification:	
Standard ..... :	Ecodesign and Energy labelling requirement for Light Source Implementation measure (EU) 2019/2020 and (EU) 2019/2015
Test procedure ..... :	☒type test ☐customer specific ☐verification
Test Report Form No. ..... :	EU_2019_2020_2A
Test Report Form(s) Originator ..... :	Eurofins.
Master TRF ..... :	2020-02

Test item description ..... :	LED Lamp
Trademark ..... :	FSL
Manufacturer ..... :	Same as applicant
Factory ..... :	Same as applicant
Model and/or type reference ..... :	G45-4-27/G128/562, G45-4-27/G138/562, G45-4-27/G118/562, G45-4-27/G148/562
Rating(s) (V; Hz) ..... :	AC220-240 V, 50 Hz, 4 W, 2700 K, 470 lm (Non-replaceable LED, integral LED module, non-dimmable)

List of Attachments (including a total number of pages in each attachment):

Attachment 1 – Measured lamp parameters (1 page)

Attachment 2 – Photos (1 page)

Attachment 3 – Luminous Intensity Distribution (1 page)

Attachment 4 – Energy labelling (1 page)

Attachment 5 – Packaging (1 page)

Tests performed (name of test and test clause):	**Testing location:**
This is the complete report for self-ballasted LED lamp, the sample are tested according Ecodesign and Energy labelling requirement for Light Source Implementation measure (EU) 2019/2020 and (EU) 2019/2015 The test results presented in this report relate only to the object tested include 3.1 Colour rendering 3.2 Displacement factor (DF, cos φ1) at power input Pon for LED and OLED MLS 3.5 Colour consistency for LED and OLED light sources 3.6 Flicker for LED and OLED MLS 3.7 Stroboscopic effect for LED and OLED MLS 7.1 Calculation the total mains efficacy	Eurofins Product Testing Service (Shanghai) Co., Ltd. Building 18, No. 2168 Chenhang Highway, Minhang District, Shanghai, China

Copy of marking plate

N/A

Test item particulars:	LED Lamp
EUT type	☒ Lamp ☐ LED Module ☐ luminaires ☐ Controlgear
Light source type:	☒ LED (Light Emitting Diode) ☐ OLED (Organic Light Emitting Diode) ☐ CFLni (Compact Fluorescent Lamp without integrated ballast) ☐ HL (Halogen Lamp) ☐ FL (Fluorescent Lamp, including circular, U-shape, etc.) ☐ LFL (Linear Fluorescent Lamp) ☐ Magnetic induction light source ☐ HID (High-intensity Discharge lamp, including metal halide, high-pressure sodium and mercury vapour type)
Light source construction	☐ User replaceable ☐ Non-user replaceable ☒ Non replaceable
Directionality	☐ Directional ☒ Non-directional
Controlgear	☒ Integral controlgear ☐ External
Envelope transparency	☒ Non-Clear lamp ☐ Clear
Lamp cap	E27/B22/E14/B15d
Nominal power (W)	4
Nominal luminous flux (lm)	470
Color temperature (CCT)	2700K
Color rendering (Ra)	80
Nominalbeam angle (°)	320
Nominal life time (h)	25000
Displacement factor	/
Declared mercury content (mg)	N/A
Lamp dimming	☐Dimming ☒No-dimming
Possible test case verdicts:	
- test case does not apply to the test object	N/A (Not applicable)
- test object does not check	NC (Not check)
- test object does meet the requirement	P (Pass)
- test object does not meet the requirement	F (Fail)
Testing:	
Date of receipt of test item	2020-10-20
Date (s) of performance of tests	2020-10-21 to 2021-03-25

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.
Determination of the test result includes consideration of measurement uncertainty from the test equipment and methods.

General product information:

The product in this report is LED Lamps for indoor use.

Model	Rating	Cap
G45-4-27/G128/562	AC220-240 V, 50 Hz, 4 W, 2700 K, 470 lm	E27
G45-4-27/G138/562	AC220-240 V, 50 Hz, 4 W, 2700 K, 470 lm	B22
G45-4-27/G118/562	AC220-240 V, 50 Hz, 4 W, 2700 K, 470 lm	E14
G45-4-27/G148/562	AC220-240 V, 50 Hz, 4 W, 2700 K, 470 lm	B15d

All models are same except for lamp cap and select model G45-4-27/G128/562 to do the test.

(EU) 2019/2020			
Clause	Requirement + Test	Result - Remark	Verdict

0	**Measurement methods**		**P**
	Recognised state of art measurement methods incl. the one published in the Official Journal taking into account the measurement methods of (EU) 2019/2020		P
Measured Lamp Parameters on representative sample(s)			—
	Rated voltage (V) .....:	230	—
	Rated wattage at rated voltage (W) .....:	3.9	—
	Rated Lumen output (lm) .....:	444.9	—
	Rated beam angle (°) .....:	303.7	—
	Correlated colour temperature (K) .....:	2756	—
	Colour consistency (Steps) .....:	2.2	—
	Colour rendering (Ra) .....:	82.3	—
	Displacement factor .....:	/	—
	Light output at least 80% within solid angle π sr .:	N/A	—
	Total useful luminous flux Φuse		—
	Rated luminous flux Φuse measured in a 120° cone (Beam angle ≥ 90°) .....:	N/A	—
	Rated luminous flux Φuse measured in a 90° cone (Beam angle < 90°) .....:	N/A	—
	Rated peak intensity (cd) .....:	45.75	—
	Spectral power distribution (chart)		—
1.	**Sample**		
	Number of sample used for test .....:	10	P
2.	**Energy efficiency requirements (Annex II, clause 1 of EU 2019/2020)**		**P**
2.1	Maximum allowed power P_{onmax} of light source (Annex II, clause 1, (a) of EU 2019/2020)		P
	From 1 September 2021, the declared power consumption of a light source P_{on} shall not exceed the maximum allowed power P_{onmax} (in W), defined as a function of the declared useful luminous flux Φ_{use} (in lm) and the declared colour rendering index CRI (-) as follows	P_{on}: 4 $P_{on} \leq P_{onmax}$	P
	$P_{onmax} = C \times (L + \Phi_{use}/(F \times \eta)) \times R$	P_{onmax}: 5.85	P
	where:		—
	-The values for threshold efficacy (η in lm/W) and end loss factor (L in W) are specified in Table 1, depending on the light source type. They are constants used for computations and do not reflect true parameters of light sources. The threshold efficacy is not the minimum required efficacy; the latter can be computed by dividing the useful luminous flux by the computed maximum allowed power	η : 120 L: 1.5	P

(EU) 2019/2020			
Clause	Requirement + Test	Result - Remark	Verdict

	Table 1 Threshold efficacy (η) and end loss factor (L)		—

Light source description	η [lm/W]	L [W]
LFL T5-HE	**98,8**	**1,9**
LFL T5-HO, 4 000 ≤ Φ ≤ 5 000 lm	**83,0**	**1,9**
LFL T5-HO, other lm output	**79,0**	**1,9**
FL T5 circular	**79,0**	**1,9**
FL T8 (including FL T8 U-shaped)	**89,7**	**4,5**
From 1 September 2023, for FL T8 of 2-, 4- and 5-foot	**120,0**	**1,5**
Magnetic induction light source, any length/flux	**70,2**	**2,3**
CFLni	**70,2**	**2,3**
FL T9 circular	**71,5**	**6,2**
HPS single-ended	**88,0**	**50,0**
HPS double-ended	**78,0**	**47,7**
MH ≤ 405 W single-ended	**84,5**	**7,7**
MH > 405 W single-ended	**79,3**	**12,3**
MH ceramic double-ended	**84,5**	**7,7**
MH quartz double-ended	**79,3**	**12,3**
Organic light-emitting diode (OLED)	**65,0**	**1,5**
Until 1 September 2023: HL G9, G4 and GY6.35	**19,5**	**7,7**
HL R7s ≤ 2 700 lm	**26,0**	**13,0**
Other light sources in scope not mentioned above	**120,0**	**1,5** (*1)

	-Basic values for correction factor (C) depending on light source type, and additions to C for special light source features are specified in Table 2.	C: 1.08	P
	Table 2 Correction factor C depending on light source characteristics		—

Light source type	Basic C value
Non-directional (NDLS) not operating on mains (NMLS)	**1,00**
Non-directional (NDLS) operating on mains (MLS)	**1,08**
Directional (DLS) not operating on mains (NMLS)	**1,15**
Directional (DLS) operating on mains (MLS)	**1,23**
Special light source feature	**Bonus on C**
FL or HID with CCT > 5 000 K	**+0,10**
FL with CRI > 90	**0,10**
HID with second envelope	**+0,10**
MH NDLS > 405 W with non-clear envelope	**+0,10**
DLS with anti-glare shield	**+0,20**
Colour-tuneable light source (CTLS)	**+0,10**
High luminance light sources (HLLS)	**+0,0058 • Luminance-HLLS - 0,0167**

	Where applicable, bonuses on correction factor C are cumulative		N/A
	The bonus for HLLS shall not be combined with the basic C-value for DLS (basic C-value for NDLS shall be used for HLLS)		N/A
	-Efficacy factor (F) is:		P
	1,00 for non-directional light sources (NDLS, using total flux)	F: 1.00	P
	0,85 for directional light sources (DLS, using flux in a cone)		N/A
	-CRI factor (R) is:		P
	0,65 for CRI ⩽ 25		N/A
	(CRI+80)/160 for CRI > 25, rounded to two decimals		P

(EU) 2019/2020			
Clause	Requirement + Test	Result - Remark	Verdict

	Light sources that allow the end-user to adapt the spectrum and/or the beam angle of the emitted light, thus changing the values for useful luminous flux, colour rendering index (CRI) and/or correlated colour temperature (CCT), and/or changing the directional/non-directional status of the light source, shall be evaluated using the reference control settings.			N/A
	Standby power P_{sb} and networked standby power P_{net} of light source			N/A
	The standby power P_{sb} of a light source shall not exceed 0,5 W	P_{sb}:		N/A
	The networked standby power P_{net} of a connected light source shall not exceed 0,5 W	P_{net}:		N/A
	The allowable values for P_{sb} and P_{net} shall not be added together			N/A
	CLS and CSCG designed and marketed specifically for scene-lighting use in film-studios, TV-studios and locations, and photographic studios and locations, or for stage-lighting use in theatres, discos and during concerts or other			N/A
	entertainment events, for connection to high speed control networks (utilising signalling rates of 250 000 bits per second and higher) in always-listening mode, shall be exempt from the requirements on standby (Psb) and on networked standby (Pnet) of points 1(a) and 1(b) of Annex II			N/A
3	**Functional requirements (Annex II, clause 2 of EU 2019/2020)**			
	From 1 September 2021, the functional requirements should apply for **light sources** (Annex II, clause 2, table 4 of EU 2019/2020)			P
3.1	Colour rendering			P
	CRI ≥ 80	CRI: 82.3		P
	except for HID with Φuse > 4 klm and for light sources intended for use in outdoor applications, industrial applications or other applications where lighting standards allow a CRI< 80, when a clear indication to this effect is shown on the light source packaging and in all relevant printed and electronic documentation	CRI:		N/A
3.2	Displacement factor (DF, cos φ_1) at power input P_{on} for LED and OLED MLS			P
	No limit at $P_{on} \leq 5$ W	P_{on}: 4.1 W		P
	DF ≥ 0,5 at 5 W < $P_{on} \leq 10$ W	P_{on}:	DF:	N/A
	DF ≥ 0,7 at 10 W < $P_{on} \leq 25$ W	P_{on}:	DF:	N/A
	DF ≥ 0,9 at 25 W < P_{on}	P_{on}:	DF:	N/A
3.3	Lumen maintenance factor (for LED and OLED)			P
	The lumen maintenance factor X_{LMF}% after endurance testing shall be at least $X_{LMF,MIN}$ % calculated as follows			P
	$X_{LMF,MIN}\% = 100 \times e^{\frac{(3000 \times \ln(0.7))}{L_{70}}}$	25000H		P

(EU) 2019/2020			
Clause	Requirement + Test	Result - Remark	Verdict
	where L_{70} is the declared $L_{70}B_{50}$ lifetime (in hours)		
	If the calculated value for $X_{LMF,MIN}$ exceeds 96,0 %, an $X_{LMF,MIN}$ value of 96,0 % shall be used	$X_{LMF,MIN}$%=95.8%	P
3.4	Survival factor (SF) (for LED and OLED)		P
	At least 9 light sources of the 10 test samples must be operational after completing the endurance testing	10 light sources are operational after endurance testing	P
3.5	Colour consistency for LED and OLED light sources		P
	Variation of chromaticity coordinates within a six-step MacAdam ellipse or less.		P
3.6	Flicker for LED and OLED MLS		P
	P_{st} LM ≤ 1,0 at full-load		P
3.7	Stroboscopic effect for LED and OLED MLS		P
	SVM ≤ 0,4 at full-load		P
	except for HID with Φ_{use} > 4 klm and for light sources intended for use in outdoor applications, industrial applications or other applications where lighting standards allow a CRI< 80		N/A
4	**Information requirements (Annex II, clause 3 of EU 2019/2020)**		**N/T**
	From 1 September 2021 the following information requirements shall apply:		N/T
4.1	Information to be displayed on the light source itself	No information was provide from applicant	N/T
4.2	Information to be visibly displayed on the packaging		N/T
5	Circumvention (Article 7 of EU 2019/2020)		
	The manufacturer, importer or authorised representative shall not place on the market products designed to be able to detect they are being tested (e.g. by recognising the test conditions or test cycle), and to react specifically by automatically altering their performance during the test with the aim of reaching a more favourable level for any of the parameters declared by the manufacturer, importer or authorised representative in the technical documentation or included in any of the documentation provided.		N/A
	The energy consumption of the product and any of the other declared parameters shall not deteriorate after a software or firmware update when measured with the same test standard originally used for the declaration of conformity, except with explicit consent of the end-user prior to the update.		N/A

(EU) 2019/2020			
Clause	Requirement + Test	Result - Remark	Verdict

(EU) 2019/2015 - Energy labelling requirement:				
6	Measurment methods			P
	Recognised state of art measurement methods incl. the one published in the Official Journal taking into account the measurement methods of EU 2019/2015			P
7	Method for calculating the total mains efficacy (Annex II, EU 2019/2015)			P
7.1	Calculation the total mains efficacy			P
	The energy efficiency class of light sources shall be determined as set out in Annex II, Table 1 of EU 2020/2015		See attached table 2	P
	on the basis of the total mains efficacy η_{TM}, which is calculated by dividing the declared useful luminous flux Φ_{use} (expressed in lm) by the declared on mode power consumption P_{on} (expressed in W) and multiplying by the applicable factor F_{TM} of Annex II, Table 2 of EU 2019/2015 as follow: $\eta_{TM} = (\Phi_{use}/P_{on}) \times F_{TM}$ (lm/W)		See attached table 2	P
	declared useful luminous flux Φ_{use} (expressed in lm)		See attached table 2	P
	declared on mode power consumption P_{on} (expressed in W)		See attached table 2	P
	applicable factor F_{TM} of Annex II, Table 2 of EU 2019/2015			-
	Factors F_{TM} by light source type (Table 2 of Annex II, EU 2019/2015)			-
	Light source type	Factor F_{TM}		-
	Non-directional (NDLS) operating on mains (MLS)	1,000		P
	Non-directional (NDLS) not operating on mains (NMLS)	0,926		N/A
	Directional (DLS) operating on mains (MLS)	1,176		N/A
	Directional (DLS) not operating on mains (NMLS)	1,089		N/A
7.2	CALCULATION OF THE ENERGY CONSUMPTION			
	The weighted energy consumption (Ec) is calculated in kWh/1000 h as follows and is rounded to two decimal places: $Ec=P_{on}\times 1000h/1000$		See attached table 2	P
8	Evaluation			P
	Declared values are not more favorable then value based on measured data		See attached table 2	P
9	Exemptions (Annex IV of EU 2019/2015)			N/A
9.1	This Regulation shall not apply to light sources specifically tested and approved to operate			N/A

(EU) 2019/2020			
Clause	Requirement + Test	Result - Remark	Verdict
(a)	in radiological and nuclear medicine installations, as defined in Article 3 of Council Directive 2009/71/Euratom		N/A
(b)	for emergency use		N/A
(c)	in or on military or civil defence establishments, equipment, ground vehicles, marine equipment or aircraft as set out in Member States' regulations or in documents issued by the European Defence Agency		N/A
(d)	in or on motor vehicles, their trailers and systems, interchangeable towed equipment, components and separate technical units, as set out in Regulation (EC) No 661/2009 of the European Parliament and of the Council, Regulation (EU) No 167/2013 of the European Parliament and of the Council and Regulation (EU) No 168/2013 of the European Parliament and of the Council		N/A
(e)	in or on non-road mobile machinery as set out in Regulation (EU) 2016/1628 of the European Parliament and of the Council and in or on their trailers		N/A
(f)	in or on interchangeable equipment as set out in Directive 2006/42/EC of the European Parliament and of the Council intended to be towed or to be mounted and fully raised from the ground or that cannot articulate around a vertical axis when the vehicle to which it is attached is in use on a road by vehicles as set out in Regulation (EU) No 167/2013		N/A
(g)	in or on civil aviation aircraft as set out in Commission Regulation (EU) No 748/2012		N/A
(h)	in railway vehicle lighting as set out in Directive 2008/57/EC of the European Parliament and of the Council		N/A
(i)	in marine equipment as set out in Directive 2014/90/EU of the European Parliament and of the Council		N/A
(j)	in medical devices as set out in Council Directive 93/42/EEC or Regulation (EU) 2017/745 of the European Parliament and of the Council and in vitro medical devices as set out in Directive 98/79/EC of the European Parliament and of the Council		N/A
9.2	In addition, this Regulation shall not apply to		N/A
(a)	electronic displays (e.g. televisions, computer monitors, notebooks, tablets, mobile phones, e-readers, game consoles), including but not limited to displays within the scope of Commission Regulation (EU) 2019/2021 and of Commission Regulation (EU) No 617/2013		N/A
(b)	light sources in range hoods within the scope of Commission Delegated Regulation (EU) No 65/2014		N/A
(c)	light sources in battery-operated products, including but not limited to e.g. torches, mobile phones with an integrated torch light, toys including light sources, desk lamps operating only on batteries, armband lamps for cyclists, solar-powered garden lamps		N/A

(EU) 2019/2020			
Clause	Requirement + Test	Result - Remark	Verdict
(d)	light sources on bicycles and other non-motorised vehicles		N/A
(e)	light sources for spectroscopy and photometric applications, such as for example UV-VIS spectroscopy, molecular spectroscopy, atomic absorption spectroscopy, nondispersive infrared (NDIR), fourier-transform infrared (FTIR), medical analysis, ellipsometry, layer thickness measurement, process monitoring or environmental monitoring		N/A
9.3	Any light source within the scope of this Delegated Regulation shall be exempt from the requirements of this Regulation, with the exception of the requirements set out in point 4 of Annex V, if it is specifically designed and marketed for its intended use in at least one of the following applications		N/A
(a)	signalling (including, but not limited to, road-, railway-, marine- or air traffic- signalling, traffic control or airfield lamps)		N/A
(b)	image capture and image projection (including, but not limited to, photocopying, printing (directly or in preprocessing), lithography, film and video projection, holography);		N/A
(c)	light sources with specific effective ultraviolet power > 2 mW/klm and intended for use in applications requiring high UV-content		N/A
(d)	light sources with a peak radiation around 253,7 nm and intended for germicidal use (destruction of DNA)		N/A
(e)	light sources emitting 5 % or more of total radiation power of the range 250-800 nm in the range of 250-315 nm and/or 20 % or more of total radiation power of the range 250-800 nm in the range of 315-400 nm, and intended for disinfection or fly trapping		N/A
(f)	light sources having the primary purpose to emit radiation around 185,1 nm and intended to be used for the generation of ozone		N/A
(g)	light sources emitting 40 % or more of total radiation power of the range 250-800 nm in the range of 400-480 nm, and intended for coral zooxanthellae symbioses		N/A
(h)	FL light sources emitting 80 % or more of total radiation power of the range 250-800 nm in the range of 250-400 nm, and intended for sun-tanning		N/A
(i)	HID light sources emitting 40 % or more of total radiation power of the range 250-800 nm in the range of 250-400 nm, and intended for sun-tanning		N/A
(j)	light sources with a photosynthetic efficacy > 1,2 µmol/J, and/or emitting 25 % or more of total radiation power of the range 250-800 nm in the range of 700-800 nm, and intended for use in horticulture		N/A
(k)	LED or OLED light sources, complying with the definition of ‘original works of art’ as defined in Directive 2001/84/EC of the European Parliament and of the Council, made by the artist him/herself in a limited number below 10 pieces		N/A

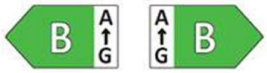
(EU) 2019/2020			
Clause	Requirement + Test	Result - Remark	Verdict

10	Product information (Annex V of EU 2019/2015)		N/T
10.1	Product information sheet	No information was provide from applicant	N/T
10.1.1	Pursuant to point 1(b) of Article 3, the supplier shall enter into the product database the information as set out in Annex V, Table 3, including when the light source is a part in a containing product		N/T
	For light sources that can be tuned to emit light at full-load with different characteristics, the values of parameters that vary with these characteristics shall be reported at the reference control settings		N/T
	If the light source is no longer placed on the EU market, the supplier shall put in the product database the date (month, year) when the placing on the EU market stopped		N/T
10.2	Information to be displayed in the documentation for a containing product		N/T
	If a light source is placed on the market as a part in a containing product, the technical documentation for the containing product shall clearly identify the contained light source(s), including the energy efficiency class		N/T
	If a light source is placed on the market as a part in a containing product, the following text shall be displayed, clearly legible, in the user manual or booklet of instructions:		N/T
	'This product contains a light source of energy efficiency class <X>'		N/T
	where <X> shall be replaced by the energy efficiency class of the contained light source		N/T
	If the product contains more than one light source, the sentence can be in the plural, or repeated per light source, as suitable		N/T
10.3	Information to be displayed on the supplier's free access website		N/T
(a)	The reference control settings, and instructions on how they can be implemented, where applicable		N/T
(b)	Instructions on how to remove lighting control parts and/or non-lighting parts, if any, or how to switch them off or minimize their power consumption		N/T
(c)	If the light source is dimmable: a list of dimmers it is compatible with, and the light source — dimmer compatibility standard(s) it is compliant with, if any		N/T
(d)	If the light source contains mercury: instructions on how to clean up the debris in case of accidental breakage		N/T
(e)	Recommendations on how to dispose of the light source at the end of its life in line with Directive 2012/19/EU of the European Parliament and of the Council		N/T
10.4	Information for products specified in point 3 of Annex IV		N/T

(EU) 2019/2020			
Clause	Requirement + Test	Result - Remark	Verdict
	For the light sources specified in point 3 of Annex IV, their intended use shall be stated on all forms of packaging, product information and advertisement, together with a clear indication that the light source is not intended for use in other applications		N/T
	The technical documentation file drawn up for the purposes of conformity assessment, in accordance with paragraph 3 of Article 3 of Regulation (EU) 2017/1369 shall list the technical parameters that make the product design specific to qualify for the exemption		N/T
11	Technical documentation (Annex VI of EU 2019/2015)		N/T
11.1	The technical documentation referred to in point 1(d) of Article 3 shall include:	No information was provide from applicant	N/T
(a)	the name and address of the supplier		N/T
(b)	supplier’ s model identifier		N/T
(c)	the model identifier of all equivalent models already placed on the market		N/T
(d)	identification and signature of the person empowered to bind the supplier		N/T
(e)	the declared and measured values for the following technical parameters		N/T
(1)	useful luminous flux (Φ use) in lm		N/T
(2)	colour rendering index (CRI)		N/T
(3)	on-mode power (P_{on}) in W		N/T
(4)	beam angle in degrees for directional light sources (DLS)		N/T
(5)	correlated colour temperature (CCT) in K for FL and HID light sources		N/T
(6)	standby power (P_{sb}) in W, including when it is zero		N/T
(7)	networked standby power (P_{net}) in W for connected light sources (CLS)		N/T
(8)	displacement factor (cos ϕ 1) for LED and OLED mains light sources		N/T
(9)	colour consistency in MacAdam ellipse steps for LED and OLED light sources		N/T
(10)	luminance-HLLS in cd/mm^2 (only for HLLS)		N/T
(11)	flicker metric (P_{st}LM) for LED and OLED light sources		N/T
(12)	stroboscopic effect metric (SVM) for LED and OLED light sources		N/T
(13)	excitation purity, only for CTLS, for the following colours and dominant wavelength within the given range		N/T
	Colour Dominant wave-length range		N/T
	Blue 440 nm — 490 nm		N/T
	Green 520 nm — 570 nm		N/T

(EU) 2019/2020			
Clause	Requirement + Test	Result - Remark	Verdict
	Red 610 nm — 670 nm		N/T
(f)	the calculations performed with the parameters, including the determination of the energy efficiency class		N/T
(g)	references to the harmonised standards applied or other standards used		N/T
(h)	testing conditions if not described sufficiently in point (g)		N/T
(i)	the reference control settings, and instructions on how they can be implemented, where applicable		N/T
(j)	instructions on how to remove lighting control parts and/or non-lighting parts, if any, or how to switch them off or minimise their power consumption during light source testing		N/T
(k)	specific precautions that shall be taken when the model is assembled, installed, maintained or tested		N/T
12	Information to be provided in visual advertisements, in technical promotional material and in distance selling, except distance selling on the internet (Annex VII of EU 2019/2015)		N/T
12.1	In visual advertisements, for the purposes of ensuring conformity with the requirements laid down in point 1(e) of Article 3 and point 1(c) of Article 4, the energy class and the range of efficiency classes available on the label shall be shown as set out in point 4 of this Annex		N/T
12.2	In technical promotional material, for the purposes of ensuring conformity with the requirements laid down in point 1(f) of Article 3 and point 1(d) of Article 4, the energy class and the range of efficiency classes available on the label shall be shown as set out in point 4 of this Annex		N/T
12.3	Any paper-based distance selling must show the energy class and the range of efficiency classes available on the label as set out in point 4 of this Annex		N/T
12.4	The energy efficiency class and the range of energy efficiency classes shall be shown, as indicated in Figure 2, with		N/T
(a)	an arrow, containing the letter of the energy efficiency class in 100 % white, Calibri Bold and in a font size at least equivalent to that of the price, when the price is shown		N/T
(b)	the colour of the arrow matching the colour of the energy efficiency class		N/T
(c)	the range of available energy efficiency classes in 100 % black; and		N/T

(EU) 2019/2020			
Clause	Requirement + Test	Result - Remark	Verdict
(d)	the size shall be such that the arrow is clearly visible and legible. The letter in the energy efficiency class arrow shall be positioned in the centre of the rectangular part of the arrow, with a border of 0,5 pt in 100 % black placed around the arrow and the letter of the energy efficiency class By way of derogation, if the visual advertisement, technical promotional material or paper-based distance selling is printed in monochrome, the arrow can be in monochrome in that visual advertisement, technical promotional material or paper-based distance selling *Figure 2* Coloured/monochrome left/right arrow, with range of energy efficiency classes indicated 		N/T
12.5	Telemarketing-based distance selling must specifically inform the customer of the energy efficiency class of the product and of the range of energy efficiency classes available on the label, and that the customer can access the full label and the product information sheet through a free access website, or by requesting a printed copy		N/T
12.6	For all the situations mentioned in points 1 to 3 and 5, it must be possible for the customer to access the label and the product information sheet through a link to the product database website, or to request a printed copy		N/T
13	Information to be provided in the case of distance selling on the internet (Annex VIII of EU 2019/2015)		N/A
13.1	The appropriate label made available by suppliers in accordance with point 1(g) Article 3 shall be shown on the display mechanism in proximity to the price of the product. The size shall be such that the label is clearly visible and legible and shall be proportionate to the size specified for the standard label in Annex III		N/T
	The label may be displayed using a nested display, in which case the image used for accessing the label shall comply with the specifications laid down in point 3 of this Annex. If nested display is applied, the label shall appear on the first mouse click, mouse roll-over or tactile screen expansion on the image		N/T
13.2	The image used for accessing the label in the case of nested display, as indicated in Figure 3, shall		N/T
(a)	be an arrow in the colour corresponding to the energy efficiency class of the product on the label		N/T
(b)	indicate the energy efficiency class of the product on the arrow in 100 % white, Calibri Bold and in a font size equivalent to that of the price		N/T
(c)	have the range of available energy efficiency classes in 100 % black; and		N/T

(EU) 2019/2020			
Clause	Requirement + Test	Result - Remark	Verdict
(d)	have one of the following two formats, and its size shall be such that the arrow is clearly visible and legible. The letter in the energy efficiency class arrow shall be positioned in the centre of the rectangular part of the arrow, with a visible border in 100 % black placed around the arrow and the letter of the energy efficiency class: *Figure 3* **Coloured left/right arrow, with range of energy efficiency classes indicated** 		N/T
13.3	In the case of nested display, the sequence of display of the label shall be as follows		N/T
(a)	the image referred to in point 2 of this Annex shall be shown on the display mechanism in proximity to the price of the product		N/T
(b)	the image shall link to the label set out in Annex III		N/T
(c)	the label shall be displayed after a mouse click, mouse roll-over or tactile screen expansion on the image		N/T
(d)	the label shall be displayed by pop up, new tab, new page or inset screen display		N/T
(e)	for magnification of the label on tactile screens, the device conventions for tactile magnification shall apply		N/T
(f)	the label shall cease to be displayed by means of a close option or other standard-closing mechanism		N/T
(g)	the alternative text for the graphic, to be displayed upon failure to display the label, shall be the energy efficiency class of the product in a font size equivalent to that of the price		N/T
13.4	The appropriate product information sheet made available by suppliers in accordance with point 1(h) of Article 3 shall be shown on the display mechanism in proximity to the price of the product. The size shall be such that the product information sheet is clearly visible and legible. The product information sheet may be displayed using a nested display or by referring to the product database, in which case the link used for accessing the product information sheet shall clearly and legibly indicate ‘Product information sheet’. If nested display is used, the product information sheet shall appear on the first mouse click, mouse roll-over or tactile screen expansion on the link		N/T

Attachment 1 – Measured lamp parameters

Lamp No.	1	2	3	4	5	6	7	8	9	10	Average
Test Voltage(V)	230	230	230	230	230	230	230	230	230	230	230
Lamp wattage(W)	3.9	3.9	4.0	3.9	4.0	3.9	3.9	3.9	4.0	3.9	3.9
Initial useful uminous flux (lm)	443.5	444.2	443.6	442.8	448.7	448.3	441.1	442.8	446.2	447.3	444.9
Useful Lumen after 1200 cycles*(lm)	429.0	428.0	431.0	429.2	428.0	432.0	431.0	436.1	432.0	432.5	430.9
Colour Rendering(Ra)	82.4	82.1	82.5	82.7	82.3	82.2	82.1	82.5	82.4	82.1	82.3
Displacement factor	/	/	/	/	/	/	/	/	/	/	/
Survival factor	1	1	1	1	1	1	1	1	1	1	1
Colour consistency	2.2	2.0	2.4	2.3	2.1	2.2	2.0	2.1	2.3	2.4	2.2
Flicker PstLM	0.012	0.010	0.000	0.013	0.015	0.010	0.01	0.01	0.015	0	0.01
Stroboscopic Effect SVM	0.062	0.06	0.057	0.051	0.056	0.063	0.052	0.051	0.052	0.049	0.055
Beam angle(˚)	303.9	303.5	304.6	304.1	304.5	303.2	303.1	303.6	304.5	302.3	303.7
Correlated colour temperature(K)	2764	2741	2758	2761	2753	2755	2768	2749	2758	2751	2756
Lumen Maintenance factor	97.06%	97.01%	97.16%	96.93%	97.56%	98.56%	97.71%	98.49%	96.82%	98.90%	97.62%

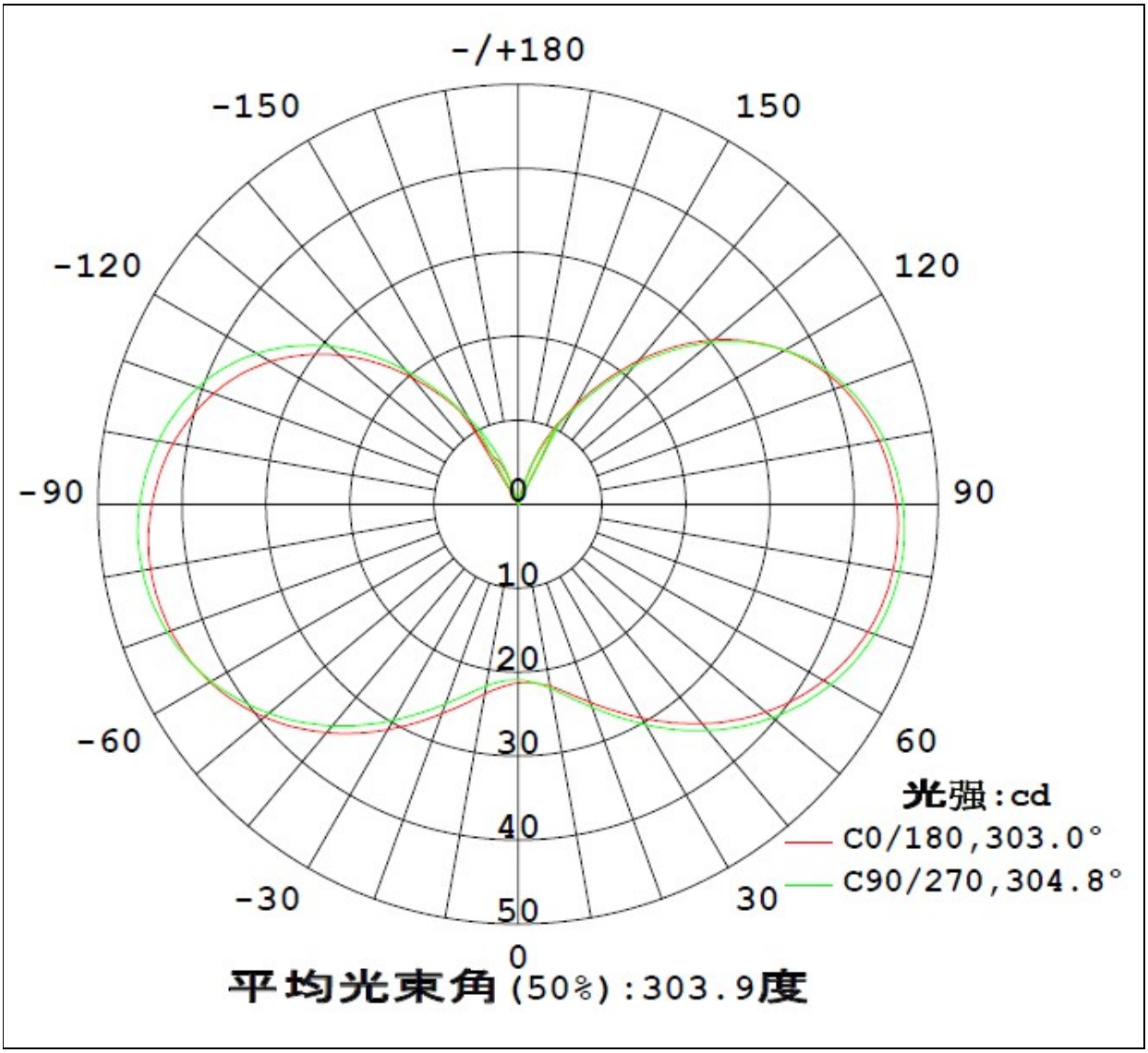
Data calculation & comparision				
Item	**Rated value**	**Measured value**	**Deviation**	**Limit**
Beam angel (˚)	320	314.2	-1.8%	±25%
Φ_{use} (lm)	470	444.9	-5.3%	-10%
P_{on} (W)	4	3.9	-2.5%	+5%
η_{TM}	117.5	114.08	-2.9%	-5%
Energy efficiency class	E	E	-	-
E_C (kWh/1000h)	4	3.9	-2.5%	+5%

Attachment 2–Photos

Photo 1 Description: Overview of sample

Photo 2 Description: View of LEDs


Attachment 3 – Luminous Intensity Distribution



Attachment 4 – Energy labelling

No information was provided form the applicant

Attachment 5 – Packaging

No information was provided form the applicant

- **End of report** -