TEST REPORT

Ecodesign Requirements for Directional Lamps, LED lamps and related equipment

Report Reference No.....:	4345008.57
Tested by (name + signature) .....:	Fair Deng
Approved by (name + signature).....:	Magic Tong
Date of issue.....:	2019-01-25
Number of pages.....:	21 pages
Testing Laboratory.....:	DEKRA Testing and Certification (Shanghai) Ltd. Guangzhou Branch
Address .....:	No. 3 Qiyun Road, Science City, Guangzhou Hi-Tech Industrial Development Zone, Guangzhou, P. R. China
Applicant's name.....:	FOSHAN SHUNDE HENGHUI LIGHTING INDUSTRIES CO., LTD.
Address .....:	No. 3, Fifth Road North, Chihua Industrial Zone, Chencun Avenue, Chencun Town Shunde District, Foshan City, Guangdong Province, China
Test specification:	
Implementing Measure of Energy-related Product	Commission Regulation (EU) No 1194/2012 of 12 December 2012 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for directional Lamps, LED lamps and related equipment Commission Regulation (EC) No 244/2009 of 18 March 2009 and (EC) No 859/2009 of 18 September 2009 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for non-directional household lamps COMMISSION REGULATION (EU) 2015/1428 of 25 August 2015 amending Commission Regulation (EC) No 244/2009 with regard to ecodesign requirements for non-directional household lamps and Commission Regulation (EC) No 245/2009 with regard to ecodesign requirements for fluorescent lamps without integrated ballast, for high intensity discharge lamps, and for ballasts and luminaires able to operate such lamps and repealing Directive 2000/55/EC of the European Parliament and of the Council and Commission Regulation (EU) No 1194/2012 with regard to ecodesign requirements for directional lamps, light emitting diode lamps and related equipment
Non-standard test method……..:	N/A
Test Report Form No.....:	1194/2012/EC
Test procedure .....:	☐ Partial test ☒ Type test ☐ Verification test

Test item description:	LED luminaire
ERP tests results base on:	☐ Whole Luminaries ☒ LED Module
Trade Mark .....:	--
Manufacturer .....:	FOSHAN SHUNDE HENGHUI LIGHTING INDUSTRIES CO., LTD. No. 3, Fifth Road North, Chihua Industrial Zone, Chencun Avenue, Chencun Town Shunde District, Foshan City, Guangdong Province, China
Factory .....:	FOSHAN SHUNDE HENGHUI LIGHTING INDUSTRIES CO., LTD. No. 3, Fifth Road North, Chihua Industrial Zone, Chencun Avenue, Chencun Town Shunde District, Foshan City, Guangdong Province, China
Model/Type reference .....:	HCE160709-1

Summary of testing:

4345008.52:

HCE160709-1 (removing diffusor) was subjected to full test. HCE160709-1 was subjected to compatibility test and photometric test.

This report is a type test report. The ErP evaluation for the luminaire is based on the LED modules. The LED modules used in this luminaire complied stage **3** requirements of (EU) No 1194/2012 ***except 6000hrs lumen maintenance and 6000hrs lamp survival factor***. Also this luminaire **complied** stage **3** requirements of (EU) No 1194/2012 ***except 6000hrs lumen maintenance and 6000hrs lamp survival factor***.

4345008.57:

Updated HCE160709-1 (removing diffusor) 6000hrs lumen maintenance and 6000hrs lamp survival factor test data. Until now, all tests are finished. And all the test results **complied** stage **3** requirements of (EU) No 1194/2012.

Standard Reference:

☒ 874/2012/EC	☒ EN 61000-3-2: 2014
☒ EN 13032-1: 2004+ A1:2012	☐ EN 60188: 2001
☒ prEN 13032-4	☐ EN 60969: 1993+A1:1993+A2:2000
☒ CIE 13.3:1995	☒ EN 62612:2013
☒ CIE 15: 2004	☒ IEC 62717:2014+AMD1:2015CSV
☒ CIE 18.2:1983	☒ IEC 62722-1:2014
☒ CIE 84:1989	☒ IEC/PAS 62722-2-1:2014
☒ CIE 97: 2005	☒ EN 60081: 1998 (incl. all amendments up to A4:2010)
☐ CIE 154: 2003	☒ ANSI/UL 1598-2008

Test item particulars :

Stage .....:	☐ Stage 1	☐ Stage 2	☒ Stage 3
EUT type.....:	☐ Lamp	☐ LED Module	☒ Equipment
Light source type.....:	☐ CFL	☒ LED	☐ Halogen
	☐ Others		
Directionality	☐ Directional	☒ Non-directional	
Lamp cap .....:	--		
Rated voltage and frequency (V/Hz)....:	220-240 Vac		
Rated current (A) .....:	0,130 A		
Rated /nominal wattage (0,1W) .....:	28,0 W		
Declared lamp power factor .....:	> 0,9		
Declared Light output within a solid angle of π sr (%).....:	--		
Declared EEI.....:	0,330		
Declared weighted energy consumption(Ec) kWh/1000h.....:	28,0 kWh/1000h		
Declared New Energy Class .....:	--		
Declared start time x,x seconds.....:	< 0,5		
Declared color rendering (Ra) .....:	> 80		
Declared color consistence -SDCM.....:	< 6		
Rated peak intensity in candela (cd) ...:	--		
Rated / nominal beam angle (°) .....:	--		
Rated / nominal total lumen (lm)	1000 lm		
Rated / nominal useful lumen (lm) .....:	1000 lm		
Rated / nominal lamp life.....:	30000 hrs		
Declared color temperature (K) .....:	F3000		

Declared number of switching cycles (x) ..... :	--
Declared number of Switching cycles before failure (x) ..... :	15000
Declared warm up time to 95% of lumen (s) ..... :	Instant full light (<1 s)
Declared premature failure ..... :	5% at ☐ 100 h ☐ 200 h ☐ 400 h ☐ 500 h ☒ 1000 h
Declared lumen maintenance at nominal life (except for filament lamp) (%) ..... :	70
Declared lumen maintenance (%) ..... :	93,1 at ☐ 2000 h ☒ 6000 h ☐ 75% of rated average lifetime
Declared survival factor at 6000 h (except for filament lamp) (%) ..... :	90
Optimum use in standard condition Ta = 25°C (Yes / No) ..... :	☒ Yes ☐ No ☐ N/A
Dimmable ..... :	☐ Yes ☒ No ☐ N/A
Application for outdoor/ industrial ..... :	☐ Yes ☒ No ☐ N/A
Warning : Lamp is not suitable for accent lighting ..... :	☐ Need ☐ No Need ☒ N/A
Comparing drawing ..... :	☐ Need ☐ No Need ☒ N/A
An indication of lamp type ..... :	☐ Yes _____ ☐ No ☒ N/A
An equivalence claim (W) ..... :	N/A
Mercury content x,x mg ..... :	☐ Yes _____mg ☒ No
Declared mercury in amalgam form or Not ..... :	☐ Yes ☒ No
LED light source (Brand/Model) ..... :	Brand: SAMSUNG Model: SPMWH22286D5WAV Quantity : 120 pieces
LM-80 report No. ..... :	--

Possible test case verdicts:

- 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)

Testing :

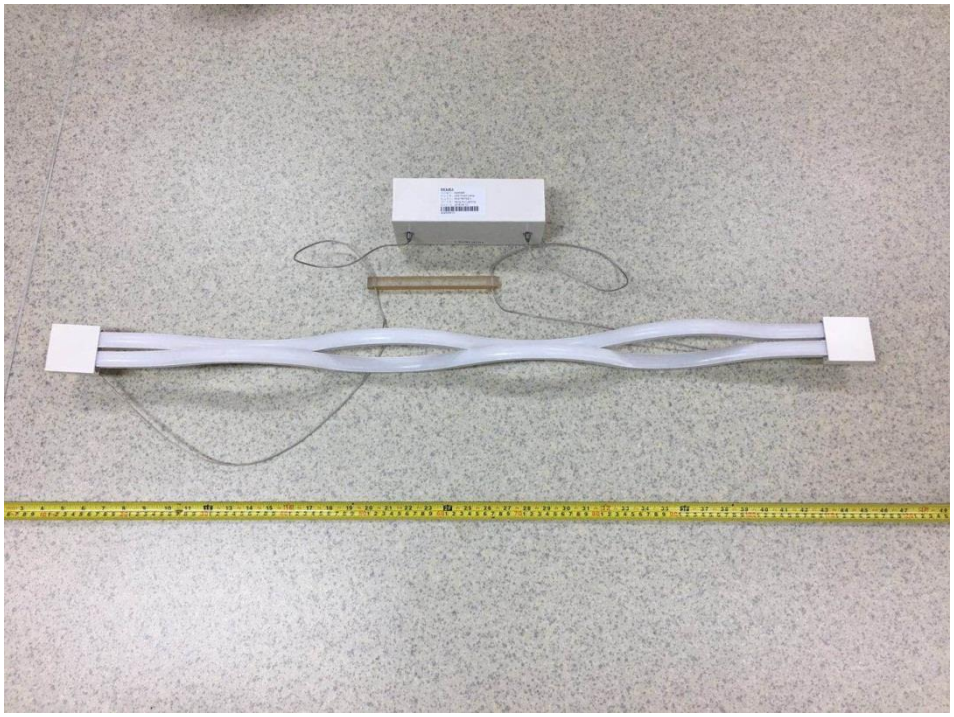
Date of receipt of test item ..... :	2018-04-12
Date (s) of performance of tests ..... :	2018-04-12 to 2019-01-24

The test results shown in this report relate only to the tests performed according to the test program. The test object has not been submitted to a full test program.

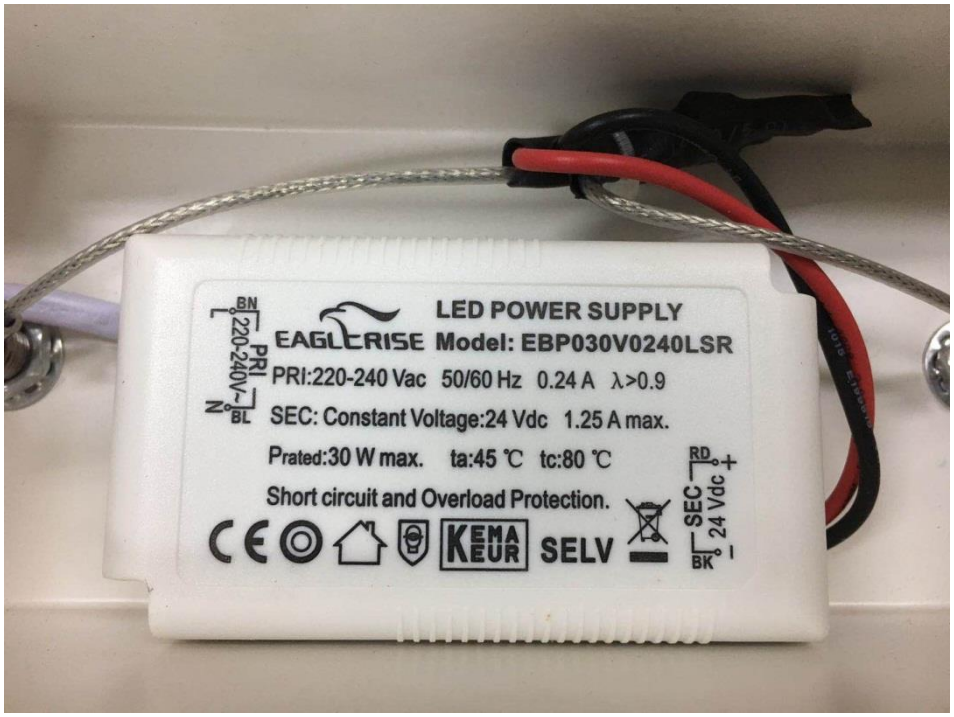
Number of the tested samples for each items				
Test	☐ Partial test	☒ Type Test	☐ Verification test	Verdict
EEI*	5	5	5	P
Useful luminous flux*	5	5	5	P
Peak Intensity and beam angle*	5	5	5	N/A
Lamp lifetime	--	5	5	N/A
Lamp survival factor*	--	5	5	P
Lumen maintenance*	--	5	5	P
Number of switching cycles*	5	5	5	P
Starting time*	5	5	5	P
Lamp warm-up time*	5	5	5	P
Premature failure rate*	5	5	5	P
Lamp power factor*	5	5	5	P
Color rendering (Ra)*	5	5	5	P
Color consistency*	5	5	5	P
Product information requirements on lamp	--	1	1	N/A
No-load power	1	1	1	N/A
Standby power	1	1	1	N/A
Efficiency of halogen lamp control gear	--	1	1	N/A
Compatibility with lamps	1	1	1	P
Dimmer performance	--	1	1	N/A
Product information requirements on equipment	1	1	1	N/A
Standard / Regulation	As requested	1194/2012/EC	1194/2012/EC	--

Note: Test items with * are for LED module test only.

Picture of test object:

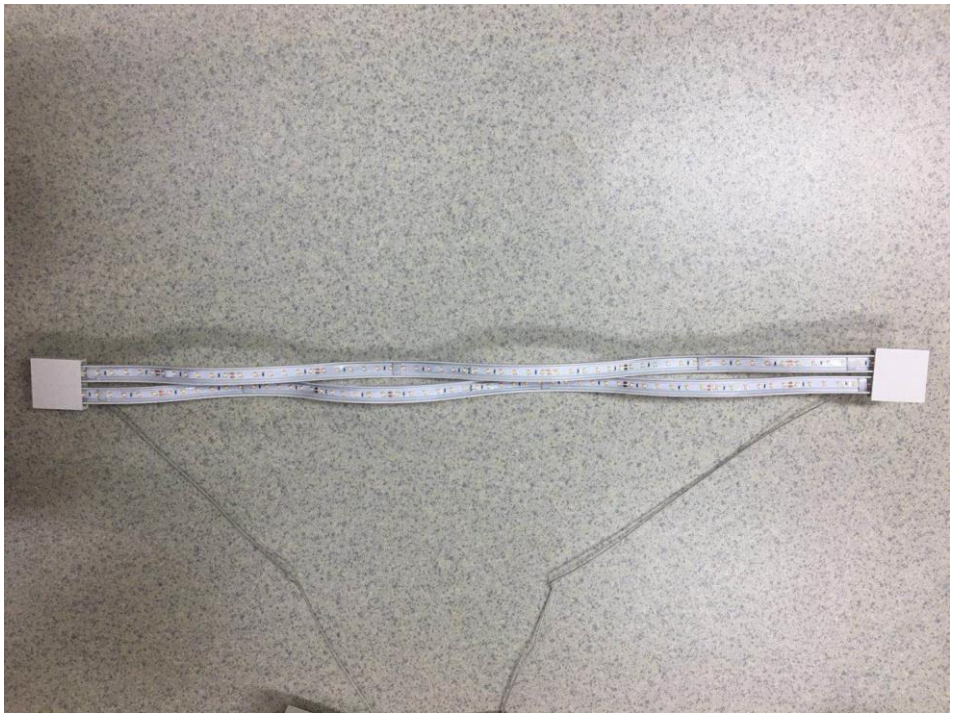


LED Luminaire overview – HCE160709-1



Driver view of HCE160709-1 (EBP030V0240LSR)

Picture of test object:



LED module view - removing diffusor of HCE160709-1

Copy of Package:

N/A

General remarks:

Throughout this report a ☒ comma or ☐ point is used as the decimal separator.

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 testing laboratory.

- Appendix I to III: Test Results of LED module
- The measurement result is considered in conformance with the requirement if it is within the prescribed limit, It is not necessary to calculate the uncertainty associated with the measurement result, unless the specification, standard or customer have special requirements
- This report will not be used for social proof function in China market.

General product information :

The luminaire equipped with non-replaceable LED module.

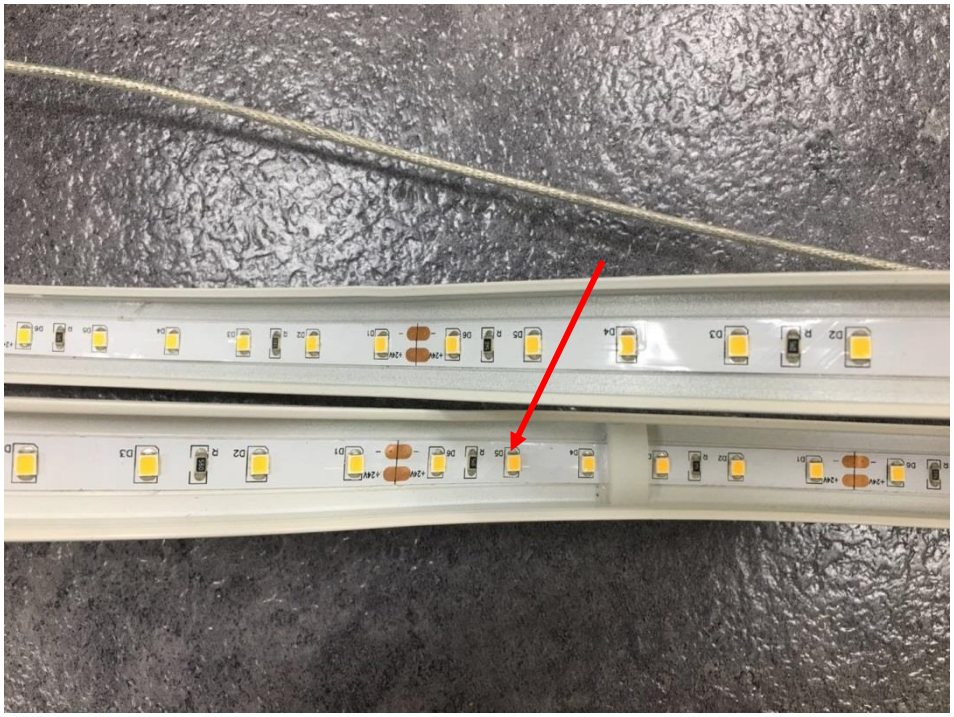
LED Module which installed in model HCE160709-1 was dismantled for testing according technical document which provided by manufacturer, and They were complied with the stage 3 requirements of Regulation 1194/2012 (Details test data refer to ***Appendix I*** of this report). Total 1 set of module was used in this model. The module Tp value is 50 °C.

Compare with the whole luminaire, the LED module just removes the diffusor. All other components are the same.

LED module ratings and luminaire relative test result:

LED module ratings			Luminaire test result	
Model name	--		Model name	HCE160709-1
Rated voltage [Vac]	220-240		Voltage [Vac]	220-240
Rated current [mA]	130		Current [mA]	130
Rated power [W]	28,0		Power [W]	28,00
Module set	1		Module set	1
Rated module Tp [°C]	50		Module Tp test value in real model [°C]	45,1
Rated module current [mA]	130		Module current test value in real model [mA]	126
Rated module Power [W]	28,0		Module Power test value in real model [W]	28,01

Photo of LED Module:



Tp test point

This report is based on original report (report No.: 4345008.52) issued on 2018-07-25. It is issued due to HCE160709-1 (removing diffusor) 6000hrs lumen maintenance and 6000hrs lamp survival factor test data were updated.

1194/2012/EC			
Clause	Test Item	Requirements	Verdict
Article 2	Definitions		
	At least 80% Light output within a solid angle of π sr (%)	Checked on Sample 1#, Test Result: _____ %	N/A
	Non-Directional lamp: lamp is not a directional lamp		N/A
AII-1 of 244/2009/EC	Lamp efficacy requirements for non-directional household lamps		
	Rated luminous flux.....:	Φ_{rated} = 1900 lm	P
	Rated power.....:	P_{rated} = 28,0 W	P
	Stage 1 to 5		
	Lamp efficacy:	Maximum rated power	
	Clear lamps: $P_{max} = 0,8 * (0,88\sqrt{\Phi}+0,049\Phi)$ .....:	P_{max} = _____ W	N/A
	Non clear lamps: $P_{max} = 0,24\sqrt{\Phi}+0,0103\Phi$.....:	P_{max} = 31,32 W	P
	Stage 6		
	Lamp efficacy	Maximum rated power	
	Clear lamps: $P_{max} = 0,6 * (0,88\sqrt{\Phi}+0,049\Phi)$.....:	P_{max} = _____ W	N/A
	Non clear lamps: $P_{max} = = 0,24\sqrt{\Phi}+0,0103\Phi$.....:	P_{max} = 31,32 W	P
	Applied Exemptions		
	Lumen .....:	Maximum rated power	
	Clear lamps 60 lm ≤ Φ ≤ 950 lm in Stage 1.....:	$P_{max} = 1,1*(0,88\sqrt{\Phi}+0,049\Phi)$	N/A
	Clear lamps 60 lm ≤ Φ ≤ 725 lm in Stage 2.....:	$P_{max} = 1,1*(0,88\sqrt{\Phi}+0,049\Phi)$	N/A
	Clear lamps 60 lm ≤ Φ ≤ 450 lm in Stage 3.....:	$P_{max} = 1,1*(0,88\sqrt{\Phi}+0,049\Phi)$	N/A
	Clear lamps with G9 or R7s cap in Stage 6.....:	$P_{max} = 0,8*(0,88\sqrt{\Phi}+0,049\Phi)$	N/A
	Applied Correction factors		
	Correction scope	Correction factor	
	Filament lamp requiring external power supply .....:	P_{max} / 1,06	N/A

1194/2012/EC			
Clause	Test Item	Requirements	Verdict
	Discharge lamp with cap GX53..... :	P_{max} / 0,75	N/A
	Non-clear lamp with colour rendering index ≥ 90 and P ≤ 0,5 * (0,88√Φ+0,049Φ) ..... :	P_{max} / 0,85	N/A
	Discharge lamp with colour rendering index ≥ 90 and Tc >=5000K..... :	P_{max} / 0,76	N/A
	Non-clear lamp with second envelope and P ≤ 0,5 * (0,88√Φ+0,049Φ) ..... :	P_{max} / 0,95	N/A
	LED lamp requiring external power supply ..... :	P_{max} / 1,1	N/A
AIII-1	Lamp efficacy requirements **(Test results see appendix)**		
AIII-1.1	Lamp efficacy requirements for directional lamps		
	$EEI_{rated} = P_{cor} / P_{ref}$	EEI_{rated} = _____	N/A
	Corrected power P_{cor} corrected from P_{rated} based on following table:	P_{cor} = _____ W	N/A
	Correction factors		
	Scope of the correction	Corrected power (P_{cor})	
	Lamps operating on external halogen lamp control gear	P_{rated} × 1,06	N/A
	Lamps operating on external LED lamp control gear	P_{rated} × 1,10	N/A
	Fluorescent lamps of 16 mm diameter (T5 lamps) and 4-pin single capped fluorescent lamps operating on external fluorescent lamp control gear	P_{rated} × 1,10	N/A
	Other lamps operating on external fluorescent lamp control gear	$P_{rated} x \frac{0{,}24\sqrt{\phi_{use}} + 0{,}0103\phi_{use}}{0{,}15\sqrt{\phi_{use}} + 0{,}0097\phi_{use}}$	N/A
	Lamps operating on external high-intensity discharge lamp control gear	P_{rated} × 1,10	N/A
	Compact fluorescent lamps with colour rendering index ≥ 90	P_{rated} × 0,85	N/A
	Lamps with anti-glare shield	P_{rated} × 0,80	N/A
	Rated useful luminous fluxΦ_{use}	Φ_{use} = _____ lm	N/A
		directional lamps with a beam angle ≥ 90° other than filament lamps and carrying a warning on their packaging rated luminous flux in a 120° cone ($\Phi_{120°}$)	N/A
		other directional lamps: rated luminous flux in a 90° cone ($\Phi_{90°}$).	N/A

1194/2012/EC						
Clause	Test Item	Requirements				Verdict
	P_{ref} is the reference power obtained from the useful luminous flux of the lamp (Φ_{use})	P_{ref} = _____ W				N/A
		For models with Φ use < 1 300 lumen: $0{,}88\sqrt{\Phi}+0{,}049\Phi_{use}$				N/A
		For models with Φ use ≥ 1 300 lumen: P ref = $0{,}07341\Phi_{use}$				N/A
	Maximum energy efficiency index (EEI)					
	Application date	☐ Mains-voltage filament lamps	☐ Other filament lamps	☐ HID lamps	☐ Other lamps	N/A
	Stage 1	If Φ_{use} > 450 lm: 1,75	If Φ_{use} ≤ 450 lm: 1,20 If Φ_{use} > 450 lm: 0,95	0,50	0,50	N/A
	Stage 2	1,75	0,95	0,50	0,50	N/A
	Stage 3	0,95	0,95	0,36	0,20	N/A
AIII-1.2	Efficacy requirements for lamp control gear					
	Lamp control gear with output power (P) less than 250W:	☐ Stage 2		☐ Stage 3		N/A
		No-load power ≤ 1,0W		No-load power ≤ 0,5W		N/A
	Lamp control gear with output power (P) over 250W:			No-load power : ≤ 0,5W x (P) / 250		N/A
	Lamp control gear with build in switching function and permanently connected to the supply voltage when in normal use:	--		Standby power: ≤ 0,5W		N/A
	Halogen lamp control gear:	Efficiency : ≥ 91% at 100% load		Efficiency : ≥ 91% at 100% load		N/A
AIII-2	Lamp functionality requirements **(Test results see appendix)**					
AIII-2.2	Non-directional and directional LED lamps	Requirement as from stage 1, except where indicated otherwise				P
	Lamp survival factor at 6 000 h :	From 1 March 2014: ≥ 0,90				P
	Lumen Maintenance at 6 000 h :	From 1 March 2014: ≥ 0,80				P
	Number of switching cycles before failure :	≥ 15 000 if rated lamp life ≥ 30 000 h otherwise: ≥ half the rated lamp life expressed in hours				P
	Starting time :	< 0,5 s				P
	Lamp warm-up time to 95% Φ :	< 2 s				P
	Premature failure rate :	≤ 5,0 % at 1000 h				P
	Colour rendering (Ra):	≥ 80 ≥ 65 if the lamp is intended for outdoor or industrial applications in accordance with point 3.1.3(l) of Annex III				P

1194/2012/EC			
Clause	Test Item	Requirements	Verdict
	Colour consistency:	Variation of chromaticity coordinates within a six-step MacAdam ellipse or less.	P
	Lamp power factor (PF) for lamps with integrated control gear:	P ≤ 2 W: no requirement 2 W < P ≤ 5 W: PF > 0,4 5 W < P ≤ 25 W: PF > 0,5 P > 25 W: PF > 0,9	P
AIII-2.3	Equipment designed for installation between the mains and the lamps		P
(a)	Requirement as from stage 2, except where indicated otherwise		P
	Compatibility with lamps whose energy efficiency index is at most:	0,24 for non-directional lamps	P
		0,40 for directional lamps	N/A
	Dimming control devices:	When the dimmer switched on at its lowest control setting for which the operated lamps consume power, the operated lamps shall emit at least 1 % of their luminous flux at full load	N/A
	Luminaire intended to be marketed to the end-users, and lamps that the end-users can replace are included with the luminaire:	Presented lamps shall be of one of the two highest energy classes, according to Commission Delegated Regulation (EU) No 874/2012, with which the luminaire is labelled to be compatible	N/A
(b)	Requirement as from stage 3, except where indicated otherwise		N/A
	A luminaire designed for lamps replaceable by the end-user, which is placed on the market.	The luminaire shall be fully compatible with lamps of at least the energy efficiency class “A+” according to delegated regulation (EU) No 874/2012.	N/A
AIII-3	Product information requirements for directional lamps from stage 1		
3.3	Product information requirements for equipment other than luminaires, designed for installation between the mains and the lamps		N/A
		As from stage 2, if the equipment provides no compatibility with any of the energy-saving lamps according to part 2.3 of this Annex, a warning that the equipment is not compatible with the energy-saving lamps shall be published on publicly available free-access websites and in the other forms the manufacturer deems appropriate.	N/A
3.4	Product information requirements for lamp control gears		N/A

1194/2012/EC			
Clause	Test Item	Requirements	Verdict
		As from stage 2, the following information shall be published on publicly available free access websites and in other forms the manufacturer deems appropriate: - Indication that the product is intended to be used as a lamp control gear, - If applicable, the information that the product may be operated in no-load mode.	N/A
Additional	In Situ Temperature Measurement Test		N/A
	LED driver current	Not exceed rated current	N/A
	TMP temperature	Not exceed LM-80 maximum temperature	N/A

Appendix I: Test Results

Table 1: Initial Test Results: LED modules test data which dismantled from the luminaire for testing

For HCE160709-1 removing diffusor

		Test Results												P
Sample No	Test Voltage (Vac)	Current (A)	Lamp Wattage (W)	Power factor	Φ_{total} (lm)	Φ_{use} (lm)	Peak Intensity (cd)	Beam angle (º)	Ra	CCT (K)	Chromaticity		Colour consistency (SDCM)	EEI_{test}
											x	y		
1	230,00	0,128	28,49	0,9684	2071,9	2071,9	--	--	83,6	3009	0,4306	0,3920	5,2	0,187
2	230,00	0,125	27,88	0,9680	1980,7	1980,7	--	--	83,6	3023	0,4296	0,3916	5,6	0,192
3	230,00	0,126	27,99	0,9678	1998,5	1998,5	--	--	83,6	3018	0,4301	0,3920	5,4	0,191
4	230,00	0,125	27,85	0,9678	1982,2	1982,2	--	--	83,6	3010	0,4306	0,3922	5,2	0,191
5	230,00	0,123	27,45	0,9680	1962,0	1962,0	--	--	83,6	3013	0,4302	0,3917	5,4	0,191
Average	230,00	0,126	27,93	0,9680	1999,1	1999,1	--	--	83,6	3015	0,4302	0,3919	5,4	0,190

For HCE160709-1:

		Test Results												P
Sample No	Test Voltage (Vac)	Current (A)	Lamp Wattage (W)	Power factor	Φ_{total} (lm)	Φ_{use} (lm)	Peak Intensity (cd)	Beam angle (º)	Ra	CCT (K)	Chromaticity		Colour consistency (SDCM)	EEI_{test}
											x	y		
1	230,00	0,128	28,52	0,9684	1183,4	1183,4	--	--	82,7	2812	0,4471	0,4012	5,1	0,323
2	230,00	0,126	27,98	0,9683	1119,5	1119,5	--	--	82,7	2819	0,4466	0,4010	4,8	0,332
3	230,00	0,126	28,08	0,9680	1144,8	1144,8	--	--	82,8	2819	0,4465	0,4009	4,8	0,327
4	230,00	0,125	27,91	0,9680	1123,1	1123,1	--	--	82,8	2812	0,4470	0,4010	5,1	0,330
5	230,00	0,124	27,54	0,9680	1124,9	1124,9	--	--	82,9	2812	0,4469	0,4008	5,1	0,325
Average	230,00	0,126	28,01	0,9681	1139,1	1139,1	--	--	82,8	2815	0,4468	0,4010	5,0	0,328

Table 2: Test Result of Starting Time and Warm-up Time:
LED modules test data which dismantled from the luminaire for testing
For HCE160709-1 removing diffusor

		Test Results					P
Starting time (s)	Sample No.	1	2	3	4	5	
	Test results	0,332	0,332	0,332	0,332	0,332	
	Average	0,332					
Warm up time (s) (to ☒ 95% or ☐ 60% full light)	Sample No.	1	2	3	4	5	
	Test results	<1	<1	<1	<1	<1	
	Average	<1					
Remark: The lamp belongs to “Instant full light” type							

Table 3: Energy Class

LED modules test data which dismantled from the luminaire for testing: For HCE160709-1 removing diffusor

$EEI=P_{cor}/P_{ref}$ (based on rated value)		
Energy efficiency index (EEI) for non-directional lamps	Energy efficiency index (EEI) for directional lamps	Energy efficiency class
EEI≤0,11	EEI≤0,13	☐ CLASS A++ (most efficient)
0,11<EEI≤0,17	0,13<EEI≤0,18	☐ CLASS A+
0,17<EEI≤0,24	0,18<EEI≤0,40	☒ CLASS A
0,24<EEI≤0,60	0,40<EEI≤0,95	☐ CLASS B
0,60<EEI≤0,80	0,95<EEI≤1,20	☐ CLASS C
0,80<EEI≤0,95	1,20<EEI≤1,75	☐ CLASS D
EEI>0,95	EEI>1,75	☐ CLASS E (least efficient)

$EEI=P_{cor}/P_{ref}$ (based on tested value)		
Energy efficiency index (EEI) for non-directional lamps	Energy efficiency index (EEI) for directional lamps	Energy efficiency class
EEI≤0,11	EEI≤0,13	☐ CLASS A++ (most efficient)
0,11<EEI≤0,17	0,13<EEI≤0,18	☐ CLASS A+
0,17<EEI≤0,24	0,18<EEI≤0,40	☒ CLASS A
0,24<EEI≤0,60	0,40<EEI≤0,95	☐ CLASS B
0,60<EEI≤0,80	0,95<EEI≤1,20	☐ CLASS C
0,80<EEI≤0,95	1,20<EEI≤1,75	☐ CLASS D
EEI>0,95	EEI>1,75	☐ CLASS E (least efficient)

CALCULATION OF THE ENERGY CONSUMPTION:

$E_c = P_{cor}$ x 1000h / 1000 = **27,93 kWh/1000h**

Table 4: Test Result of Number of Switching cycles:

LED modules test data which dismantled from the luminaire for testing: For HCE160709-1 removing diffusor

	Test Results									P
Sample No	☐Number of Switching cycles ☒Number of Switching cycles before failure									
	1000	2000	4000	5000	8000	10000	12500	15000	30000	--
1	X	X	X	X	X	X	X	X	X	--
2	X	X	X	X	X	X	X	X	X	--
3	X	X	X	X	X	X	X	X	X	--
4	X	X	X	X	X	X	X	X	X	--
5	X	X	X	X	X	X	X	X	X	--

Note *: “X” means the lamp still lights on when the number of switching cycles reach, “F” means the lamp failed when the number of switching cycles reach.

Table 5: Test Result of premature failure, Lumen maintenance & Lamp survival factor:

LED modules test data which dismantled from the luminaire for testing: For HCE160709-1 removing diffusor

	Test results*					
Sample No	Test Voltage (Vac)	Φ_{total} (lm)		Lumen Maintenance	Premature failure rate	Lamp survival factor
		Initial	6000 H	6000 H	At 2000 H	At 6000 H
1	230,00	2071,9	2008,1	96,92	X	X
2	230,00	1980,7	1901,4	96,00	X	X
3	230,00	1998,5	1911,2	95,63	X	X
4	230,00	1982,2	1972,6	99,52	X	X
5	230,00	1962,0	1956,6	99,72	X	X
Average/Result	230,00	1999,1	1950,0	97,56	--	--

Note *: “X” means the lamp still lit when the time(s) reach, “F” means the lamp failed when the time(s) reach.

Appendix II: Efficacy Test for equipment

Table 1

No-load mode and Standby mode Test results			N/A
Mode	Input voltage (V)	Input current (mA)	Input power
No-load mode	--	--	--
Standby mode	--	--	--

Table 2

Halogen control gear efficiency Test results					N/A
Lamp model	Input voltage (V)	Input power P_{in} (W)	Output voltage (V)	Output power P_{out} (W)	Efficiency P_{out}/P_{in} (%)
--	--	--	--	--	--

Table 3

Compatibility with lamps list				P
Brand	Used lamp model	Measured power (W)	Measured Φ or useful luminous flux Φ_{use} (lm)	EEI
--	Non-directional LED Module	28,49	2071,9	0,187
--	Directional LED Module	--	--	--
Conclusion: --				

Table 4

Luminous flux at different dimming control setting Test results				N/A
Dimming status	Output voltage (V)	Output current (A)	Output power (W)	Output luminous flux (lm)
Maximum Level	--	--	--	--
Minimum Level	--	--	--	--
Conclusion: --				

Appendix III: List of Equipment Used

Equipment name	TYPE	Manufacturer
Digital Thermo Hydrograph	175-H1	Testo
Digital power meter	PF2010A	EVERFINE
Digital CC&CV DC power supply	WY305	EVERFINE
Intelligent Pure Sine-wave Power Supply	TPS-500B	EVERFINE
Integrating sphere	2,0 m	EVERFINE
Plus UV-VIS-Near IR spectrophoto colorimeter	PMS-80	EVERFINE
Standard Light Source	D204	EVERFINE
Standard Light Source	D204C	EVERFINE
Digital Power Meter	PF2010A	EVERFINE
AC power source	DPS1060	EVERFINE
Digital Power Meter	PF2010A	EVERFINE
Goniophotometers	GO-R5000-SML	EVERFINE
Goniophotometer controller	CT400	EVERFINE
High-accuracy digital photometer head(f1&f2)	ID-1000	EVERFINE
High-accuracy digital photometer head(f1)	ID-1000	EVERFINE
High accuracy array spectroradiometer	HAAS-2000	EVERFINE
Aging-life Tester DJ3000	DJ3000	EVERFINE
Standard light source	D908	EVERFINE
Digital CC&CV DC power supply	WY12010	EVERFINE

Appendix Ⅳ: ERP PRODUCT SUMMARY FOR ☒ Whole Luminaries ☐ LED Module:

Parameters	Declared	Measured / Checked	Verdict
Nominal Wattage (W)	28,0	28,01	P
Lamp Power Factor	> 0,9	0,9681	P
Light output within a solid angle of π sr (%)	--	--	--
EEI	0,330	0,328	P
Weighted energy consumption(Ec) kWh/1000h	28,0	28,01	P
New Energy Class	--	--	N/A
Start time x.x seconds	< 0,5	0,332	P
Color Rendering (Ra)	> 80	82,8	P
Color consistence - SDCM	<6	5,0	P
Rated peak intensity in candela (cd)	--	--	N/A
Nominal Beam Angle (°)	--	--	N/A
Rated /Nominal useful Lumen	1000 lm	1139,1	P
-Lumen in Total (lm)	1000 lm	1139,1	P
-Lumen in a 120° cone (lm)	--	--	--
-Lumen in a 90° cone (lm)	--	--	--
Nominal Life (h)	30000	--	--
Color temperature (K)	3000 K	2815	P
Switching cycle (x)	30000	30000	P
Warm up time to 60% of lumen (in second)	<1	<1	P
Declared premature failure (%)	< 5%	0	P
Declared lumen maintenance at nominal life (%)	70	--	--
Declared lumen maintenance (%) at 6000h	93,1	--	--
Dimmable/ Non-dimmable	Non-Dimmable	--	--

----------END----------