



**TEST REPORT
IES LM-79-08**

**TÜV SÜD Test Report for
Electrical and Photometric Measurements of Solid-State Lighting Products**

Report reference No.....	: 68.184.15.291.01
Date of issue.....	: 2015-09-15
Project handler.....	: Levi Guo
Testing laboratory.....	: TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Address.....	: Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District 518052 Shenzhen, CHINA
Testing location	: Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District 518052 Shenzhen, CHINA
Client.....	: NEKO Lighting AG
Client number	: 90185
Address.....	: Flüelastrasse 12, 8048 Zürich, SWITZERLAND
Contact person	: SVEN SPEISSEGGER
Standard	: This TÜV SÜD test program is based on the following requirements: IES LM-79-08
TRF originated by.....	: TÜV SÜD Product Service GmbH, Mr. Kenneth Lau
Copyright blank test report.....	: This test report is based on the content of the standard (see above). The test report considered selected clauses of the a.m. standard(s) and experience gained with product testing. It was prepared by TÜV SÜD Product Service GmbH. TUV SUD Group takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.
Test procedure	: <input type="checkbox"/> TÜV Mark <input checked="" type="checkbox"/> without certification
Non-standard test method	: N/A
National deviations	: N/A
Number of pages (Report)	: 12
Number of pages (Attachments).....	: 2
Compiled by..... (+ signature)	: Levi Guo  
Approved by..... (+ signature)	: Daniel Chen  

Test sample..... : LED Downlight	
Type of test object : LED Downlight	
Trade mark..... :	NEKO
Model and/or type reference..... : EF150-18W-840	
Rating(s)..... : 220-240V~; 50/60HZ; 22W	
Manufacturer : NEKO LIGHTING LTD	
Manufacturer number : 90243	
Address : SenYang High-Tech Park, GuangMing high-tech Area, West Zone, GuangMing District, 518132 Shenzhen, PEOPLE'S REPUBLIC OF CHINA	
Contact person..... : Stone Shaw	
Sub-contractors/ tests (clause)..... : N/A	
Name..... : N/A	
Order description	<input checked="" type="checkbox"/> Complete test according to TRF
	<input type="checkbox"/> Partial test according to manufacturer's specifications
	<input type="checkbox"/> Preliminary test
	<input type="checkbox"/> Spot check
	<input type="checkbox"/> Other:
Date of order : 2015-09-06	
Date of receipt of test item..... : 2015-09-06	
Date(s) of performance of test..... : 2015-09-06 to 2015-09-15	
Test item particulars (declared):	
Lamp type :	<input type="checkbox"/> Bare lamp <input type="checkbox"/> Covered lamp, no reflector <input type="checkbox"/> Lamp with reflector <input checked="" type="checkbox"/> other: LED Downlight
Lamp cap installed :	--
Rated Voltage:	220-240V~; 50/60Hz
Rated Power:	22W
Rated Power Factor :	> 0.9
Rated Luminous Flux :	1900lm
Rated CCT :	4000K
Rated CRI :	83
Attachments:	
<ol style="list-style-type: none"> 1. Test Equipment List 2. Lighting Facts Uniform Reporting Template 	

General remarks:

"(See remark #)" refers to a remark appended to the report.

"(See appended table)" refers to a table appended to the report.

Throughout this report a point is used as the decimal separator.

The test results presented in this report relate only to the object tested.

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Measurement uncertainty budgets have been determined for applicable test methods and are available

TUV SUD Cert & Testing (China) Co., Ltd. Shenzhen Branch is an accredited Test Laboratory (NVLAP Lab Code: 500067-0) to IESNA LM-79-08 by NVLAP (National Voluntary Laboratory Accreditation Program).



NVLAP LAB CODE 500067-0

The report must not be used by the client to claim product certification, approval or endorsement by NVLAP, NIST or any agency of the federal government.

Summary of testing:

Model:	EF150-18W-840
Luminous Efficacy (Lumens/Watt)	94.1
Luminous Flux (Lumens)	1885
Input Power (Watts)	20.0
Power Factor	0.9472
CCT (K)	4092
CRI	82.7
Stabilisation Time (Light Power) (minutes)	90
ISTMT (In-Situ Temp Test) (°C)	--

LED specification:

Model:	Manufactory	Vf (V)	If (mA)	Viewing angle (°)	CCT(K)	Ra
CLU036-1206C1-403M2G2	CITIZEN	31.8~37.5	540	--	4000	80

Picture of the product



1. Overview



2. LED view

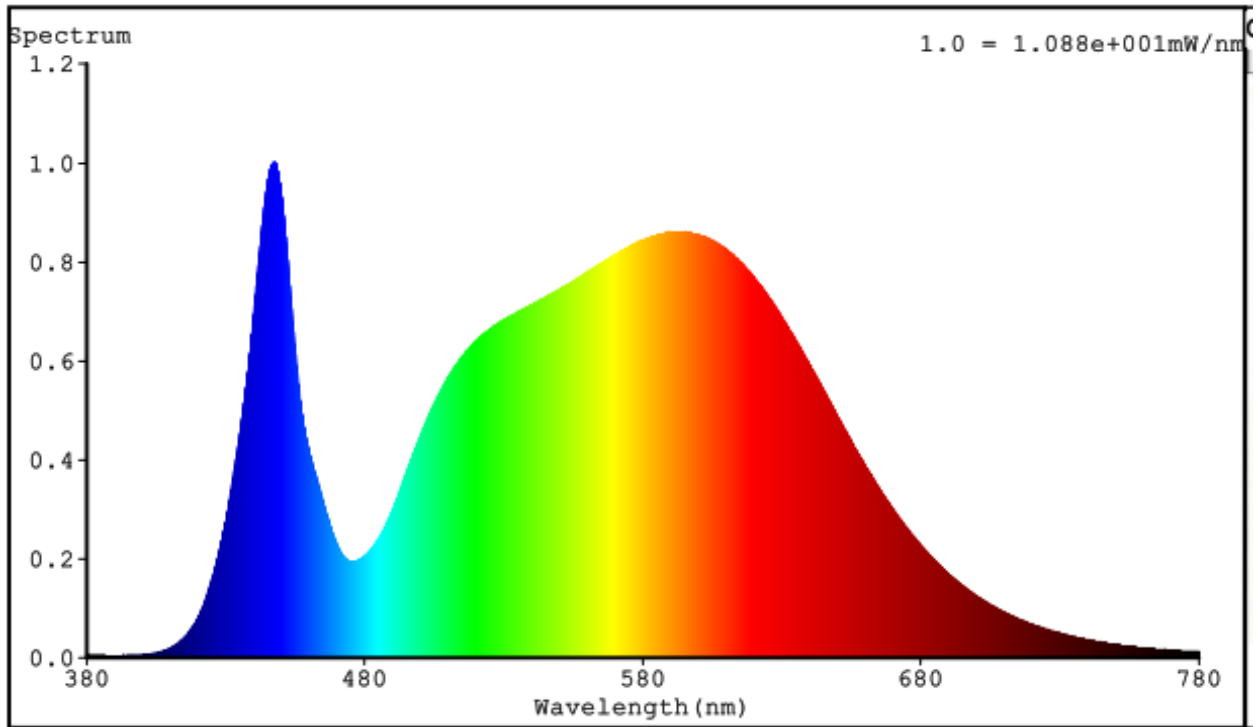
Copy of marking plate: --
Characteristic data --
Purpose of the product LED Downlight for general lighting purpose.
Possible test case verdicts: - test case does not apply to the test object:: N/A - test object does meet the requirement.....: P(ass) - test object does not meet the requirement:: F(ail) Possible suffixes to the verdicts: - suffix for detailed information for the client.....: - C(comment) - suffix for important information for factory inspection...: - M(manufacturing)

IES LM-79-08			
Clause	Requirement – Test	Measuring result – Remark	Verdict
1.0	Introduction		--
2.0	Ambient Conditions		P
2.1	General		P
2.2	Air Temperature		P
2.3	Thermal Condition for Mounting SSL Products		P
2.4	Air Movement		P
3.0	Power Supply Characteristics		P
3.1	Wave shape of AC power supply		P
3.2	Voltage regulation		P
4.0	Seasoning of SSL Product	No seasoning of SSL product	N/A
5.0	Stabilization of SSL Product		P
	SSL product has sufficiently stabilized before measurement		P
6.0	Operation Orientation		P
	SSL product shall be stabilized and measured in intended operating orientation	As normal working	P
7.0	Electrical Settings		P
	SSL product shall be operated at rated voltage		P
	SSL product with dimming capability are tested at maximum input power condition		N/A
	SSL product with different modes are measured in all relevant modes		N/A
8.0	Electrical Instrumentations		P
8.1	Circuits		P
8.2	Uncertainties		P
9.0	Test methods for Luminous Flux measurement		P
9.1	Integrating sphere with a spectroradiometer (Sphere-spectroradiometer system)		P
9.2	Integrating sphere with a photometer head (Sphere-photometer system)		N/A
9.3	Goniophotometer		P
10.0	Luminous Intensity Distribution		P
	Reporting acc, to IEC LM-63		P
11.0	Luminous Efficacy		P
	Calculation	See table 1	P
12.0	Test Methods for Colour Characteristics of SSL Products		P
	Measurements	See table 1	P
13.0	Uncertainty statement		N/A
14.0	Test report		--

Table 1		Test data	
Model:	EF150-18W-840		
Rated Voltage (V):	220-240V~	Rated Power (W):	22
Rated luminous flux (lm):	1900	Ambient temperature 25 ±1 (°C):	25.1
Test item	Measured Value		
	Integrating Sphere		Goniophotometer
Key Photometric Results			
Luminous Efficacy (Lumens/Watt)	--	94.1	
Total Luminous Flux (Lumens)	--	1885	
Correlated Color Temperature (CCT:K)	4092	--	
Color Rendering Index (CRI)	82.7	--	
Chromaticity (Chroma x / Chroma y)	0.3779 / 0.3797	--	
Chromaticity (Chroma u / Chroma v)	--	--	
Chromaticity (Chroma u' / Chroma v')	0.2223 / 0.5025	--	
Duv Value	0.0021	--	
Colour Angular Uniformity (Max,du'v')	--	--	
Stabilization Time (Light and Power)	--	90Minutes	
Total Run Time – (Minutes)	--	150Minutes	
Zonal flux (0-60°)	--	97.4%	
Spacing Criteria (0-180°)	--	--	
Spacing Criteria (90-270°)	--	--	
Spacing Criteria (C/γ)	--	C:15.0° / γ:1.0°	
Electrical Input Results			
Input Power (Watts)	--	20.0	
Input Voltage (Volts AC)	--	230	
Input Current (Amps)	--	0.09	
Input Frequency (Hertz)	--	50	
Power Factor	--	0.9472	
A-THD (Current – Total Harmonic Distortion)	--	7.42%	
Additional Information			
Ambient Temperature (°C):	25.0	25.1	
ISTMT (In-Situ Temperature Measurement) (°C):	--		
Photometric measurement condition	--	--	
Supplementary Information:			
<ul style="list-style-type: none"> - Absorbtion Correction used: Yes - Stabilization was considered reached by: the variation (maximum-minimum) of at least 3 readings of the light output and electrical power over a period of 30 minutes is less than 0,5%. 			

Table 2	Spectral Flux Graph
Model:	EF150-18W-840

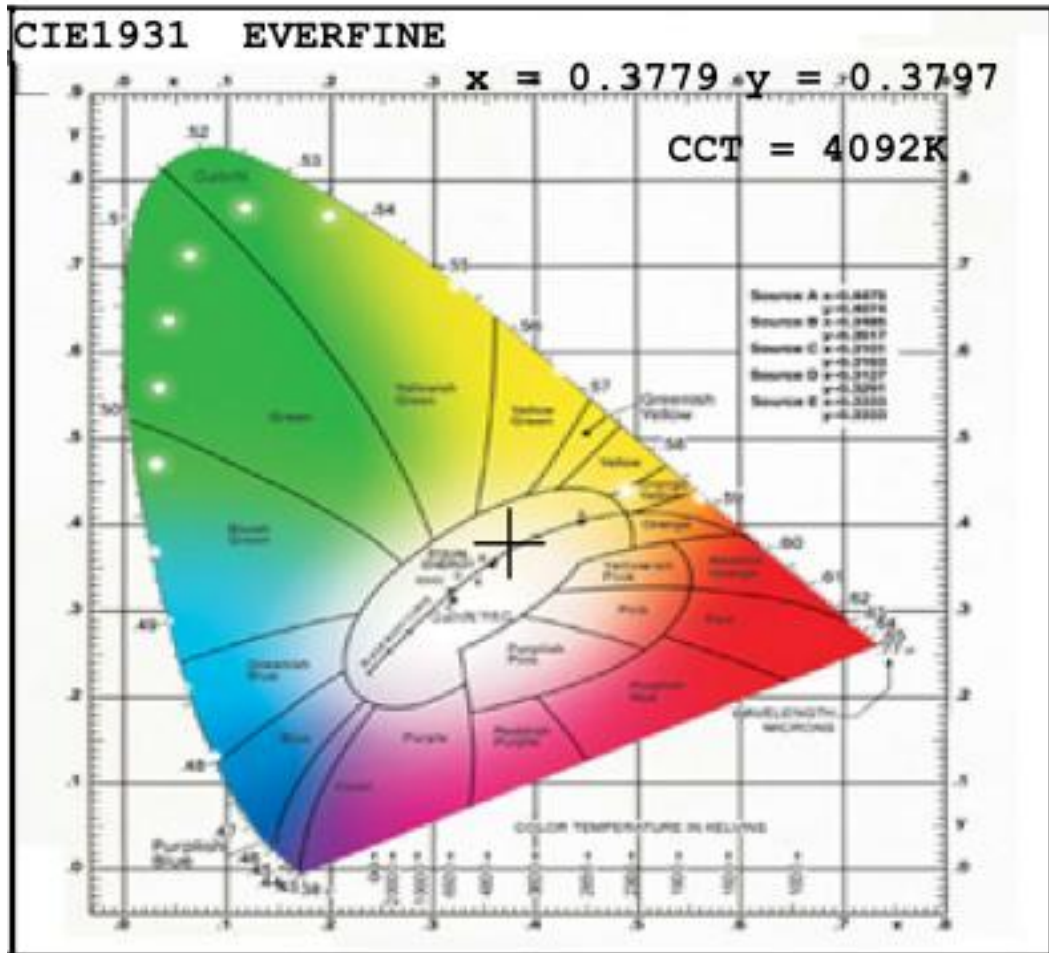
The following graph shows the spectral response curve of the radiant flux for the sample:



Spectral response of the Radiant Flux

(380nm to 780nm – calibrated range of the Spectroradiometer)

Table 3	Chromaticity Diagram
Model:	Model: EF150-18W-840



Tristimulus values:
 $x / y = 0.3779 / 0.3797$
 Location is indicated by: The black cross

Table 4	Luminous Intensity distribution diagram
Model:	EF150-18W-840

Luminous Intensity distribution diagram(Unit: cd)

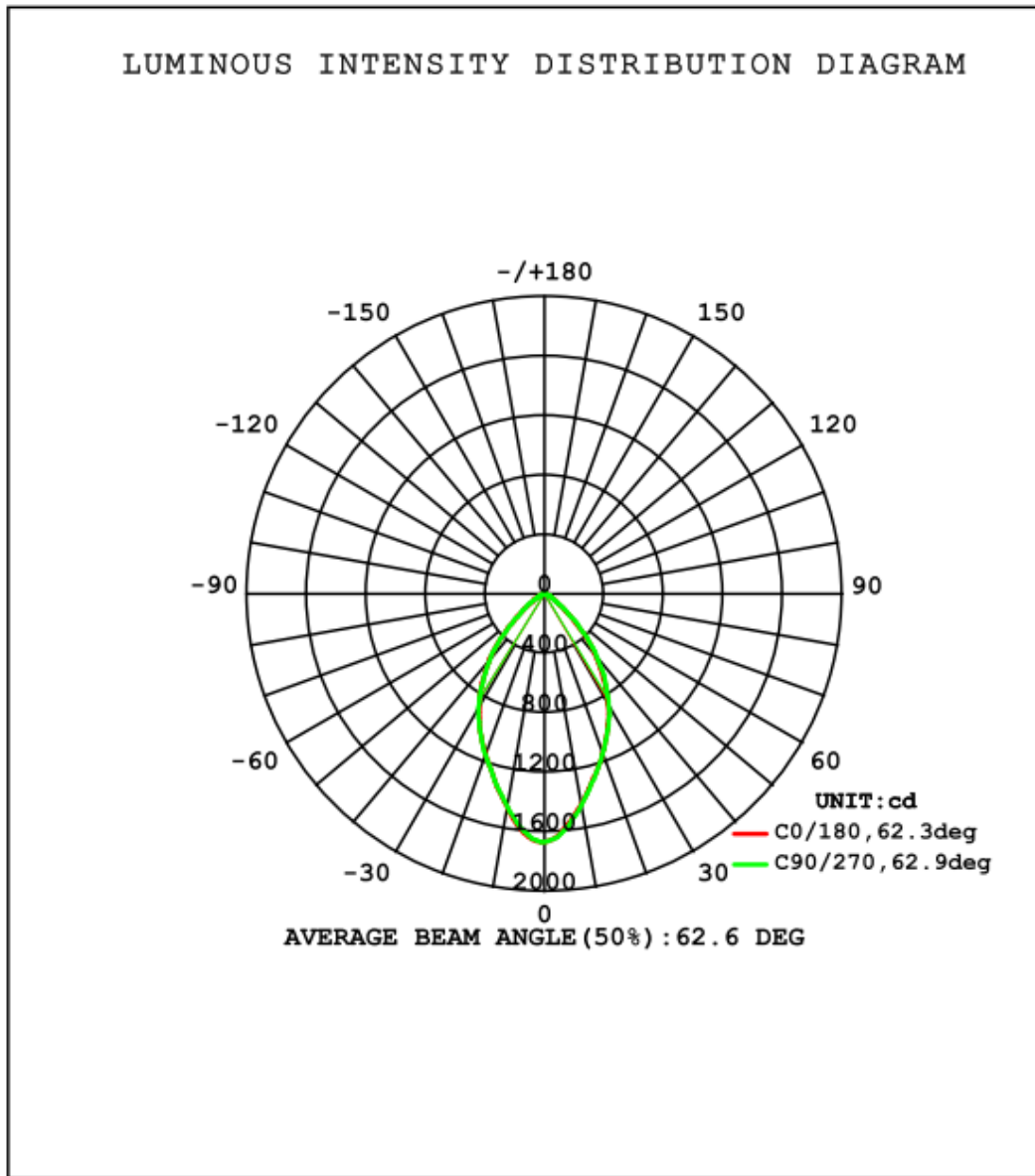


Table 5	Planar Illuminance Curve
Model:	EF150-18W-840

Planar Illuminance Curve (Unit: lx)

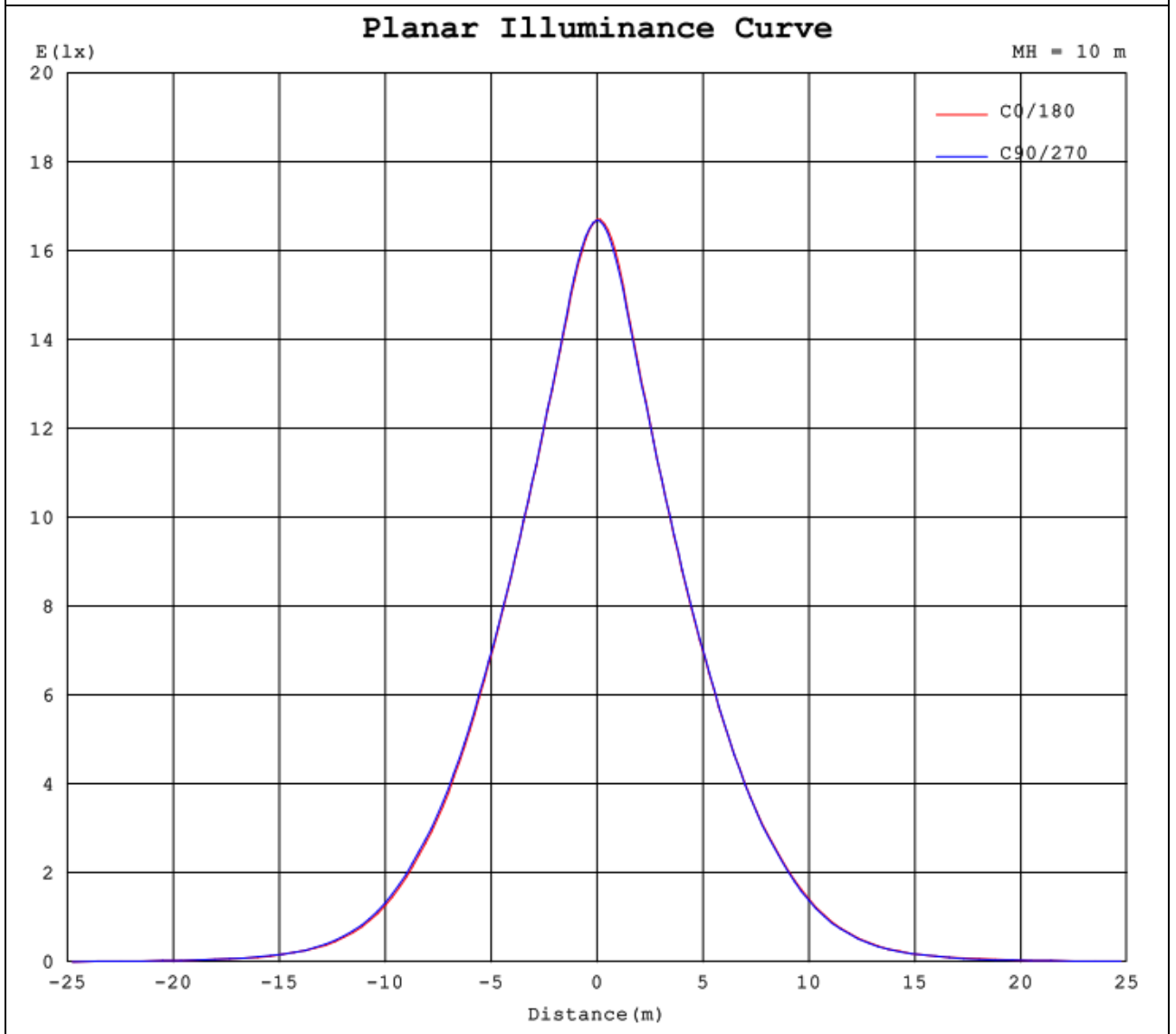


Table 6		Zonal flux diagram										
Model:		EF150-18W-840										
γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%lum
10	1436	1438	1441	1453	1461	1462	1454	1439	0- 10	147.6	147.6	7.83
20	1146	1148	1149	1155	1157	1163	1161	1150	10- 20	362.8	510.5	27.1
30	858.7	863.0	870.9	880.9	883.5	889.2	885.1	871.7	20- 30	466.8	977.2	51.9
40	534.7	539.4	554.1	571.6	575.3	578.6	570.1	551.4	30- 40	446.8	1424	75.6
50	210.4	211.7	220.6	239.6	243.5	242.0	237.0	218.7	40- 50	296.1	1720	91.3
60	60.58	60.52	63.35	68.39	70.13	71.30	68.22	63.33	50- 60	115.4	1836	97.4
70	16.68	16.86	18.18	21.39	22.66	22.72	20.61	18.23	60- 70	38.95	1874	99.5
80	0.0661	0.0662	0.0664	0.0719	0.0714	0.0839	0.0594	0.0624	70- 80	6.904	1881	99.8
90	0.0184	0.0190	0.0182	0.0189	0.0214	0.0223	0.0196	0.0184	80- 90	0.0464	1881	99.8
100	0.0326	0.0342	0.0323	0.0306	0.0391	0.0388	0.0381	0.0414	90-100	0.0275	1881	99.8
110	0.1042	0.1057	0.1033	0.0974	0.0921	0.0905	0.0909	0.0963	100-110	0.0641	1882	99.8
120	0.3049	0.3071	0.3040	0.2917	0.1970	0.1944	0.1960	0.2040	110-120	0.1632	1882	99.8
130	0.6518	0.6541	0.6523	0.6346	0.3717	0.3675	0.3705	0.3811	120-130	0.3276	1882	99.9
140	1.171	1.174	1.173	1.152	0.6245	0.6201	0.6247	0.6369	130-140	0.5353	1883	99.9
150	1.701	1.704	1.705	1.686	0.9318	0.9297	0.9355	0.9455	140-150	0.6903	1883	99.9
160	2.058	2.056	2.058	2.050	1.178	1.195	1.199	1.200	150-160	0.6876	1884	100
170	2.006	2.011	2.010	2.014	1.124	1.124	1.119	1.117	160-170	0.4629	1884	100
180	1.163	1.162	1.164	1.165	1.164	1.161	1.163	1.164	170-180	0.1349	1885	100
DEG	LUMINOUS INTENSITY:cd								UNIT:lm			

Attachment 1: Equipment List

Equipment	ID No.	Model	Brand/Manufacturer	Calibration due date
Digital Power Meter	13217	WT210	YOKOGAWA	2016-08-19
Anemometer	13117	471-1	Dwyer	2016-01-03
Temperature and Humidity meter	13397	SK-L200TH	SATO	2016-01-11
Goniophotometer system	13345	GO-R5000-SML	Everfine	2016-03-11
Integrating sphere test system	13342	CSLMS-7621	Labsphere	2016-03-11

Attachment 2

U,S, Department of Energy

Lighting Facts^{cm} Uniform LM-79 Reporting Template



Laboratory Information

Name of test lab	TÜV SÜD Certification and Testing (China) Co., Ltd, Shenzhen Branch
Date of test report	2015-09-15
Test report number	68.184.15.291.01
Laboratory contact name	Daniel Chen
Laboratory contact signature*	<i>Daniel Chen</i>

* By signing this form, the signatory is attesting that the information on the form is correct and the same as on the original, complete test report(s), The signatory also attests that all of the results on this form were measured entirely in accordance with IES LM-79-08,

Product Information

Manufacturer	NEKO LIGHTING LTD		
Brand name	NEKO		
Model number	EF150-18W-840		
SKU (if available)	--		
Type of luminaire (for integral lamps, list base type and lamp type)	LED Downlight		
Luminaire aperture (downlights)	12.5	<input type="checkbox"/> in,	<input checked="" type="checkbox"/> cm
Luminaire length	--	<input type="checkbox"/> in,	<input type="checkbox"/> cm
Luminaire width	--	<input type="checkbox"/> in,	<input type="checkbox"/> cm
Number of units (modular products)	--		

Electrical Measurements	Integrating sphere output	Goniophotometer output	
Input wattage	--	20.0	W
Input current	--	0.09	A
Input voltage (AC)	--	230	V
Power factor	--	0.9472	
Off-state power	--	--	W

Photometric Characteristics

Total initial lumen output	--	1885	lm
Initial luminaire efficacy	--	94.1	lm/W
Correlated color temperature / CCT	4092	--	K
Color rendering index / CRI	82.7	--	
R ₉ value	15	--	
Duv	0.0021	--	

Luminous Intensity Distribution		Goniophotometer output	
Centre beam candlepower (if applicable)	--	1672	cd
Beam angle (if applicable)	--	62.6	°
Zonal lumens in the 0°-60° zone	--	97.4	%
Zonal lumens in the 60°-90° zone	--	2.4	%
Zonal lumens in the 90°-120° zone	--	0	%
Zonal lumens in the 120°-180° zone	--	0.2	%

END OF TEST REPORT