



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

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

Report reference No.....	68.184.15.296.01
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..... :	<b>NEKO</b>
Model and/or type reference..... : EF150-26W-840	
Rating(s)..... : 220-240V~; 50/60HZ; 30W	
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:	30W
Rated Power Factor :	> 0.9
Rated Luminous Flux :	2500lm
Rated CCT :	4000K
Rated CRI :	83
Attachments:	
<ol style="list-style-type: none"> <li>1. Test Equipment List</li> <li>2. Lighting Facts Uniform Reporting Template</li> </ol>	

**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.

This report shall not be reproduced except in full without the written approval of the testing laboratory.

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:	EF150-26W-840
Luminous Efficacy (Lumens/Watt)	89.0
Luminous Flux (Lumens)	2396
Input Power (Watts)	26.9
Power Factor	0.9538
CCT (K)	4116
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

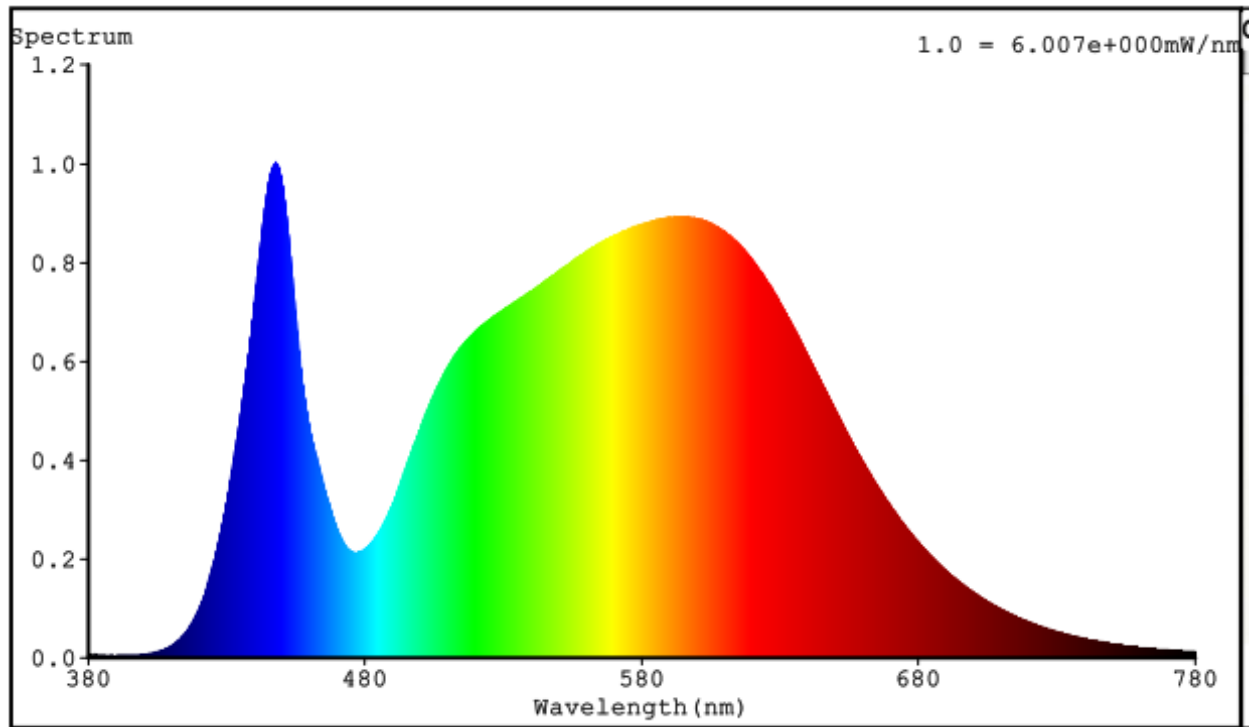
Copy of marking plate: --
Characteristic data --
Purpose of the product LED Downlight for general lighting purpose.
Possible test case verdicts: - test case does not apply to the test object: .....: N/A - test object does meet the requirement.....: P(ass) - test object does not meet the requirement: .....: 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:	EF150-26W-840		
Rated Voltage (V):	220-240V~	Rated Power (W):	30
Rated luminous flux (lm):	2500	Ambient temperature 25 ±1 (°C):	25.1
Test item	Measured Value		
	Integrating Sphere		Goniophotometer
<b>Key Photometric Results</b>			
Luminous Efficacy (Lumens/Watt)	--	89	
Total Luminous Flux (Lumens)	--	2396	
Correlated Color Temperature (CCT:K)	4116	--	
Color Rendering Index (CRI)	82.7	--	
Chromaticity (Chroma x / Chroma y)	0.3765 / 0.3778	--	
Chromaticity (Chroma u / Chroma v)	--	--	
Chromaticity (Chroma u' / Chroma v')	0.2221 / 0.5014	--	
Duv Value	0.0016	--	
Colour Angular Uniformity (Max,du'v')	--	--	
Stabilization Time (Light and Power)	--	90Minutes	
Total Run Time – (Minutes)	--	150Minutes	
Zonal flux (0-60°)	--	97.5%	
Spacing Criteria (0-180°)	--	--	
Spacing Criteria (90-270°)	--	--	
Spacing Criteria (C/γ)	--	C:15.0° / γ:1.0°	
<b>Electrical Input Results</b>			
Input Power (Watts)	--	26.9	
Input Voltage (Volts AC)	--	230	
Input Current (Amps)	--	0.12	
Input Frequency (Hertz)	--	50	
Power Factor	--	0.9538	
A-THD (Current – Total Harmonic Distortion)	--	8.73%	
<b>Additional Information</b>			
Ambient Temperature (°C):	25.0	25.1	
ISTMT (In-Situ Temperature Measurement) (°C):	--		
Photometric measurement condition	--	--	
Supplementary Information:			
<ul style="list-style-type: none"> <li>- Absorbtion Correction used: Yes</li> <li>- 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%.</li> </ul>			

<b>Table 2</b>	<b>Spectral Flux Graph</b>
<b>Model:</b>	EF150-26W-840

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

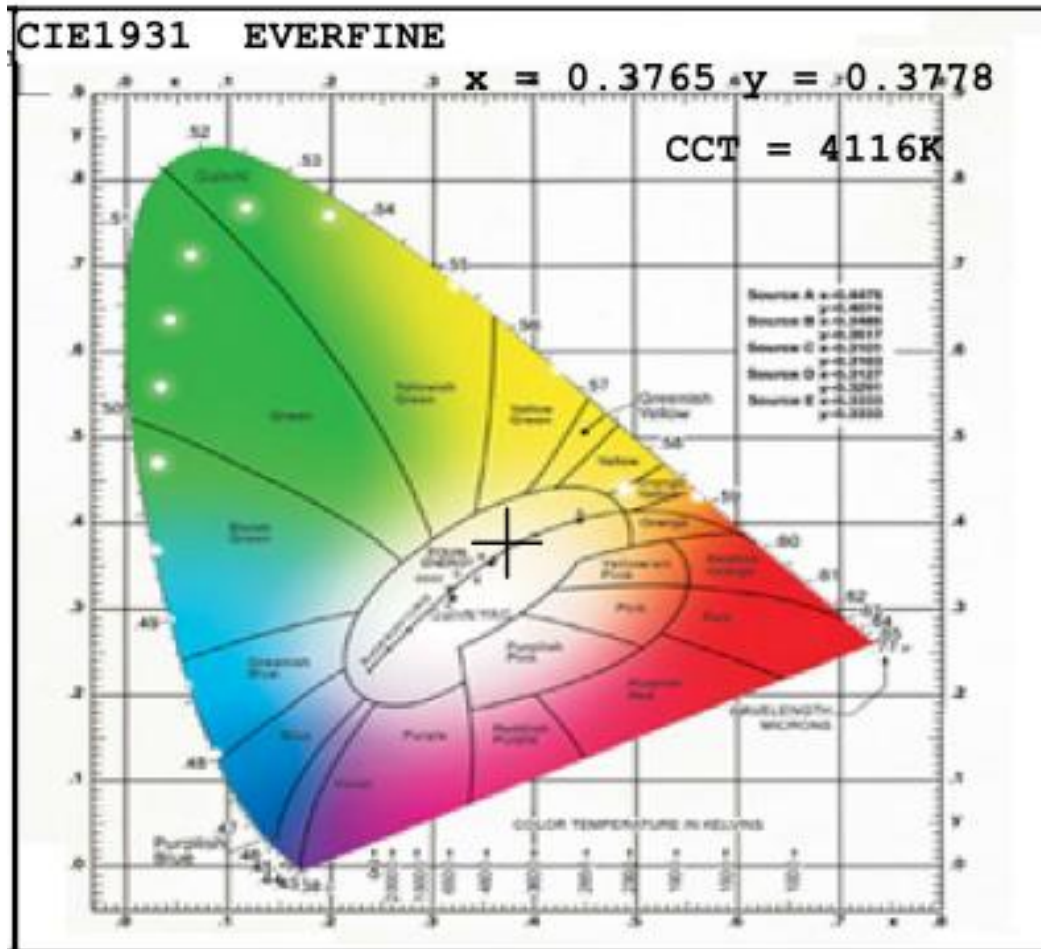


**Spectral response of the Radiant Flux**

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



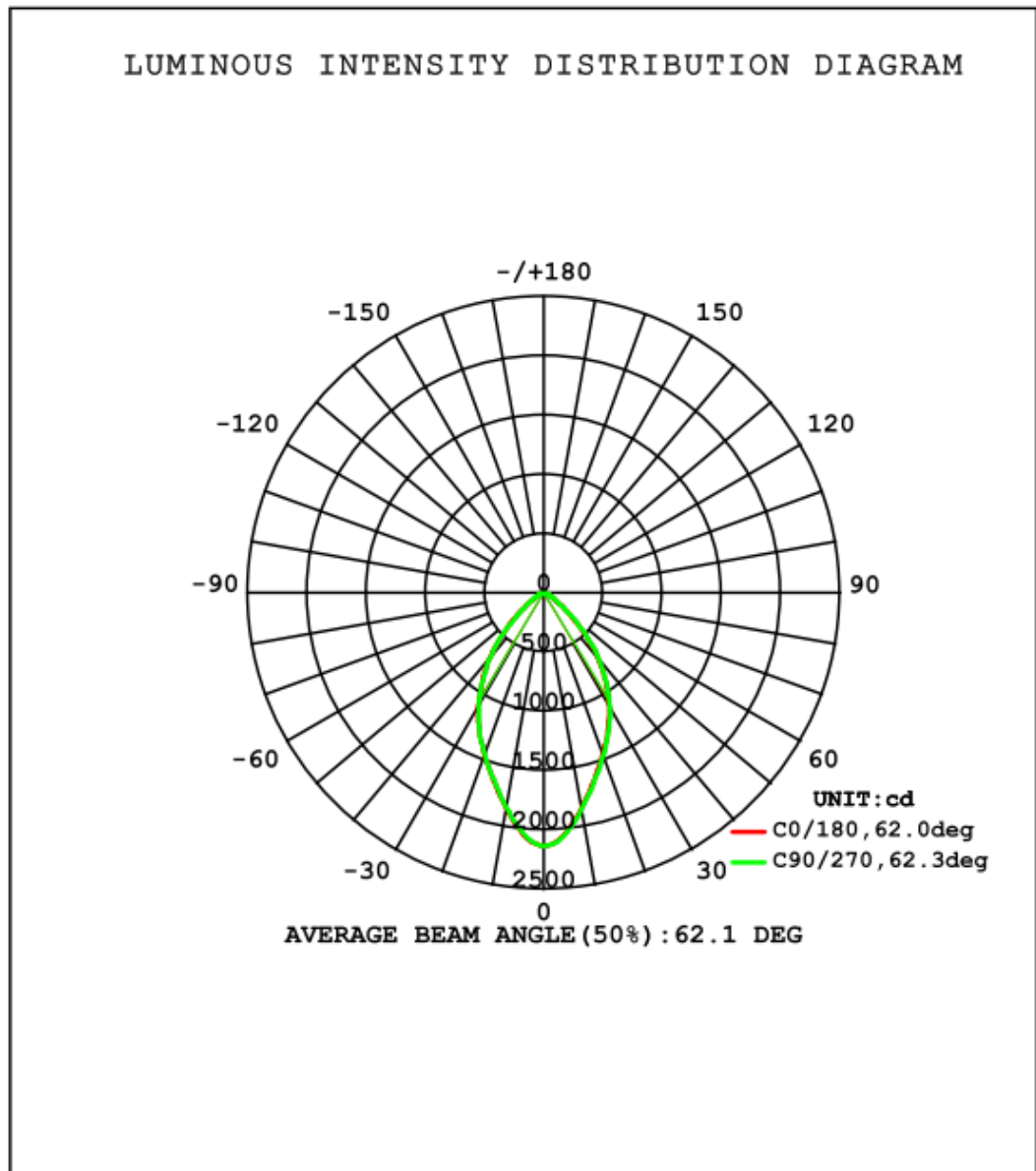
<b>Table 3</b>	<b>Chromaticity Diagram</b>
<b>Model:</b>	Model: EF150-26W-840



**Tristimulus values:**  
 $x / y = 0.3765 / 0.3778$   
 Location is indicated by: The black cross

<b>Table 4</b>	<b>Luminous Intensity distribution diagram</b>
<b>Model:</b>	EF150-26W-840

**Luminous Intensity distribution diagram(Unit: cd)**



<b>Table 5</b>	<b>Planar Illuminance Curve</b>
<b>Model:</b>	EF150-26W-840

Planar Illuminance Curve (Unit: lx)

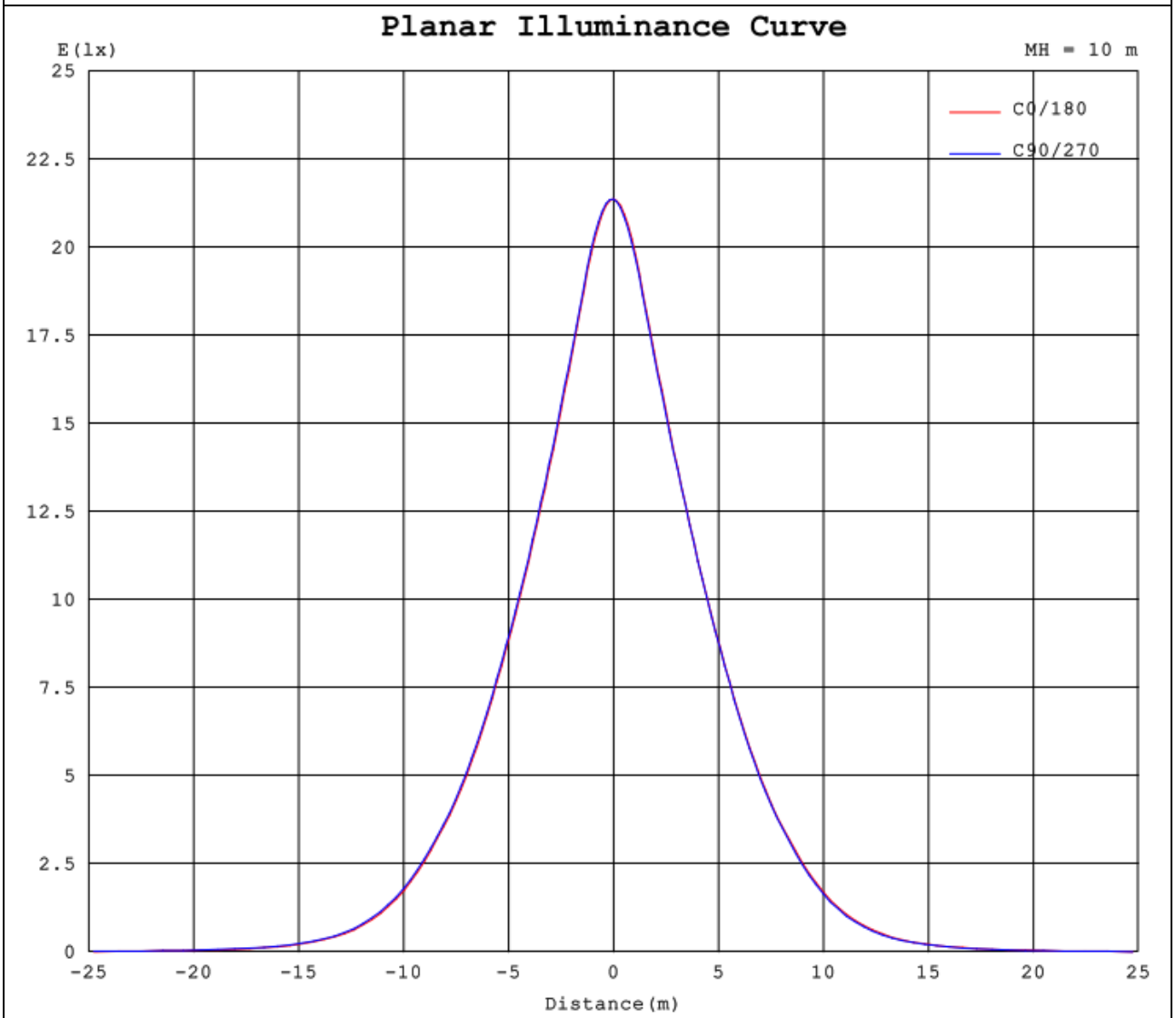


Table 6		Zonal flux diagram										
Model:		EF150-26W-840										
$\gamma$	C0	C45	C90	C135	C180	C225	C270	C315	$\gamma$	$\Phi$ zone	$\Phi$ total	%lum
10	1849	1859	1861	1861	1846	1836	1837	1838	0- 10	188.8	188.8	7.88
20	1461	1468	1475	1477	1464	1459	1461	1459	10- 20	461.7	650.5	27.2
30	1108	1118	1123	1122	1106	1101	1101	1103	20- 30	592.4	1243	51.9
40	715.0	729.0	730.3	726.8	707.1	700.4	695.2	701.0	30- 40	568.0	1811	75.6
50	291.3	308.0	306.0	303.4	287.5	275.7	274.3	274.7	40- 50	377.8	2189	91.4
60	84.10	88.77	87.98	86.51	82.08	79.23	77.60	78.67	50- 60	146.1	2335	97.5
70	24.01	26.48	25.90	25.97	23.64	21.58	20.95	21.60	60- 70	48.69	2383	99.5
80	0.1122	0.1141	0.1217	0.1108	0.0989	0.0963	0.1051	0.1072	70- 80	8.132	2392	99.8
90	0.0258	0.0278	0.0251	0.0262	0.0276	0.0295	0.0258	0.0265	80- 90	0.0703	2392	99.8
100	0.0404	0.0387	0.0373	0.0399	0.0553	0.0572	0.0554	0.0564	90-100	0.0372	2392	99.8
110	0.1282	0.1239	0.1222	0.1250	0.1256	0.1290	0.1286	0.1293	100-110	0.0839	2392	99.8
120	0.3793	0.3713	0.3704	0.3723	0.2624	0.2680	0.2682	0.2685	110-120	0.2102	2392	99.8
130	0.8189	0.8072	0.8083	0.8087	0.4886	0.4969	0.4977	0.4972	120-130	0.4198	2392	99.9
140	1.481	1.472	1.470	1.474	0.8169	0.8272	0.8286	0.8261	130-140	0.6855	2393	99.9
150	2.168	2.163	2.157	2.163	1.216	1.226	1.229	1.223	140-150	0.8861	2394	99.9
160	2.642	2.649	2.637	2.649	1.565	1.582	1.586	1.577	150-160	0.8860	2395	100
170	2.595	2.586	2.595	2.583	1.457	1.456	1.454	1.452	160-170	0.5998	2395	100
180	1.402	1.403	1.407	1.407	1.401	1.403	1.407	1.406	170-180	0.1728	2396	100
DEG	LUMINOUS INTENSITY:cd								UNIT:lm			

**Attachment 1: Equipment List**

<b>Equipment</b>	<b>ID No.</b>	<b>Model</b>	<b>Brand/Manufacturer</b>	<b>Calibration due date</b>
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<sup>cm</sup> 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	68.184.15.296.01
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	<b>NEKO</b>		
Model number	EF150-26W-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)	--		

<b>Electrical Measurements</b>	<b>Integrating sphere output</b>	<b>Goniophotometer output</b>	
Input wattage	--	26.9	W
Input current	--	0.12	A
Input voltage (AC)	--	230	V
Power factor	--	0.9538	
Off-state power	--	--	W

**Photometric Characteristics**

Total initial lumen output	--	2396	lm
Initial luminaire efficacy	--	89	lm/W
Correlated color temperature / CCT	4116	--	K
Color rendering index / CRI	82.7	--	
R <sub>9</sub> value	15	--	
Duv	0.0016	--	

<b>Luminous Intensity Distribution</b>		<b>Goniophotometer output</b>	
Centre beam candlepower (if applicable)	--	2138	cd
Beam angle (if applicable)	--	62.1	°
Zonal lumens in the 0°-60° zone	--	97.5	%
Zonal lumens in the 60°-90° zone	--	2.3	%
Zonal lumens in the 90°-120° zone	--	0	%
Zonal lumens in the 120°-180° zone	--	0.2	%

END OF TEST REPORT