

LM-79-08 Test Report

For

IKIO LED LIGHTING**(Brand Name: IKIO)**8470 Allison Pointe Blvd, Suite 128
Indianapolis, IN 46250**Dual Mode Internal Driver (UL Type A or B)**

Model name(s): IK-T804-NANO-0015-X0A&B-J

Remark: "X0" could be 3000K,3500K,4000K,5000K

Representative (Tested) Model: IK-T804-NANO-0015-30A&B-J
IK-T804-NANO-0015-50A&B-J

Model Difference: All construction and rating are the same, except CCT.

Test & Report By:

Bill Luo

Engineer: Bill Luo

Date: Apr.16, 2018

Review By:

Univ Xie

Manager: Univ Xie

Note: 1. The results contained in this report pertain only to the tested samples.

2. This report does not imply product certification, approval, or endorsement by NVLAP, NIST,
or any agency of the Federal Government.**Laboratory: Standard-Tech Co., Ltd. Testing Center**
NVLAP CODE: 201011-0

Report Format Number STD/QR4909-A/2

Address: Standard-Tech Building, No.6 Guanhong Road,Guangzhou Science City, Guangzhou 510663, China

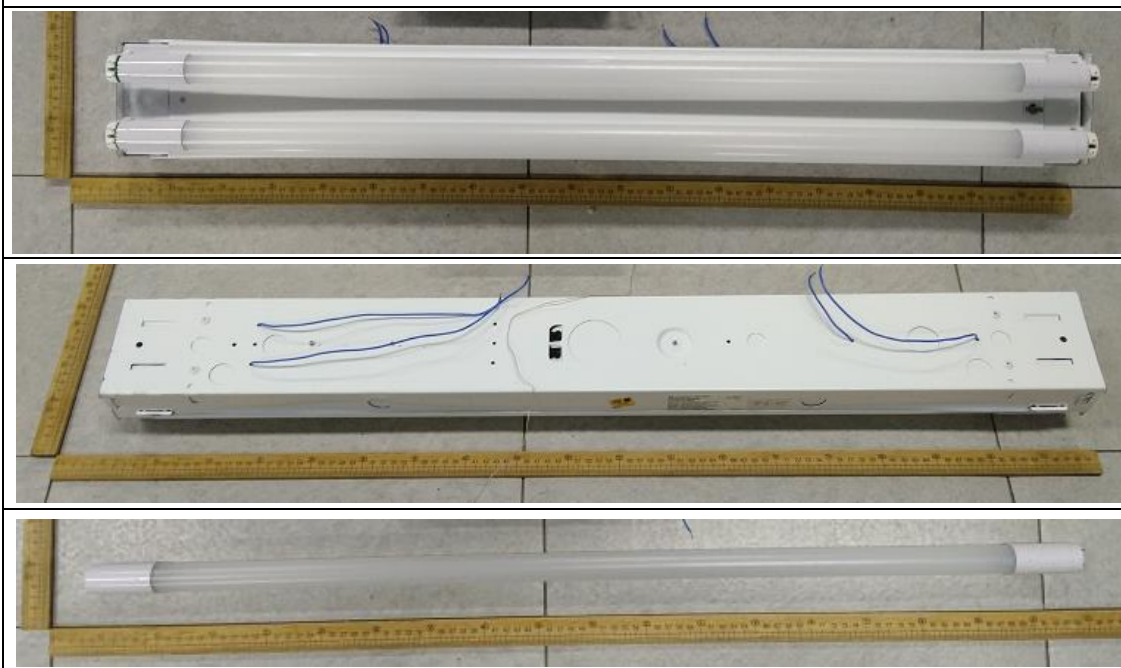
Tel: 8620-3229 0320

Fax: 8620-32290422

<http://www.standard-tech.com>

1.1 Product Information:

Organization Name	IKIO LED LIGHTING	
Brand Name	IKIO	
Model Number	IK-T804-NANO-0015-X0A&B-J	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Dual Mode Internal Driver (UL Type A or B)	
Rated Voltage / Frequency	120 ~ 277 Vac, 50/60 Hz	
Nominal Power	15W	
Rated Initial Lamp Lumen	--	
Declared CCT	3000K,3500K,4000K,5000K	
LED Manufacturer	Xiamen Dacol Photoelectronics Technology Co.,Ltd.	
LED Model	SMD 2835	
Test Ballast	OSRAM SYLVANIA QTP 2x32T8/UNV ISN-SC	
Sample Number	GZE1813055-H1,H2(3000K), H3(5000K)	
Lamp Length	600	mm
Lamp Width	--	mm
Number of Units (modular products)	N/A	s

Photo

1.2 Test Specifications:

Date of Receipt	Apr.12,2017
Date of Test	Apr.14,2017
Test item	<ol style="list-style-type: none"> 1. Total Luminous Flux 2. Luminous Distribution Intensity 3. Luminous Efficacy 4. Correlated Color Temperature 5. Color Rendering Index 6. Chromaticity Coordinate 7. Electrical Parameters
Reference Standard	<ol style="list-style-type: none"> 1. IES LM-79-2008 Electrical and Photometric Measurements of Solid-State Lighting Products 2. ANSI C78.377-2008 Specifications for the Chromaticity of Solid State Lighting Products 3. CIE 13.3-1995 Method of Measuring and Specifying Colour Rendering Properties of Light Sources 4. CIE 15-2004 Technical Report Colorimetry 5. IESNA LM-16-93 Practical Guide to Colorimetry of Light Source 6. IESNA TM-16-05 Technical Memorandum on Light Emitting Diode (LED) Sources and Systems
Reference Work Instruction	QD25

1.3 Test Methods**1) Photometric and Light Distribution Measurement – Goniophotometer Method:**

Photometric parameters were measured using the goniophotometer and software. The ambient temperature shall be maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$, measured at a point not more than 1 m from the sample and at the same height as the sample. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at 1° vertical intervals and 22.5° horizontal intervals.

2) Chromaticity Measurement – Sphere-Spectroradiometer Method:

Chromaticity parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral power distribution taken at 5 nm intervals over the range of 380 to 780 nm.

3) Electrical Measurements:

Electrical parameters were measured using power meters incorporated in goniophotometer or sphere-spectroradiometer system. The ambient temperature surrounding the sample was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Voltage, frequency, current, power, power factor and total harmonic distortion were measured by and read from the power meter.

2.1 Electrical, Photometric and Chromaticity Measurements*(Refer to Work Instruction QD25)*

Test date	2018-04-14	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-T804-NANO-0015-30A&B-J, with ballast OSRAM SYLVANIA QTP 2x32T8/UNV ISN-SC		

Electrical Measurement for Bare-lamp:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE181305	120.0	60	0.1383	16.16	0.9738	6.33
5-H1	277.0	60	0.0657	16.27	0.8939	12.58

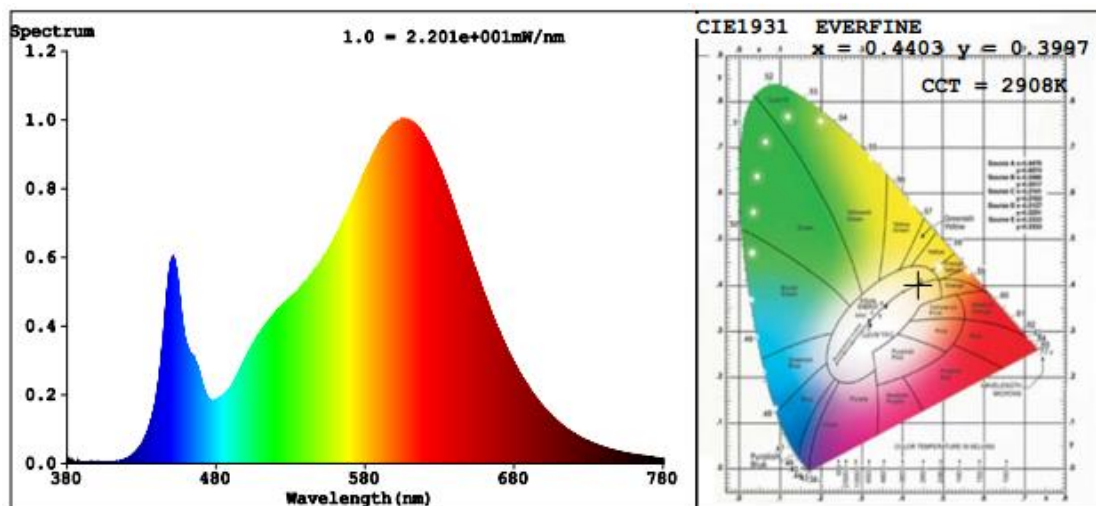
Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	83	R9	14
Frequency (Hz)	60	R2	93	R10	83
CCT (K)	2908	R3	96	R11	81
Duv	-0.0022	R4	82	R12	74
Chromaticity (x, y)	x=0.4403 y=0.3997	R5	83	R13	85
Chromaticity (u', v')	u'=0.2547 v'=0.5201	R6	91	R14	98
Color Rendering Index (CRI)	83.8	R7	83	R15	76
R9	14	R8	61	--	--

Photometric Measurement for Bare-lamp –Sphere-Spectroradiometer Method:

Parameter	Result	
Test Voltage (V)	120.0	277.0
Frequency (Hz)	60	60
Total Luminous (lm)	2097	2100
Luminous Efficacy (lm/W)	129.76	129.07
Most Worst Luminous/Highest Watts	128.89	

Spectral Power Distribution & Chromaticity Diagram



Laboratory: Standard-Tech Co., Ltd. Testing Center
NVLAP CODE: 201011-0

Report Format Number STD/QR4909-A/2

Address: Standard-Tech Building, No.6 Guanhong Road, Guangzhou Science City, Guangzhou 510663, China

Tel: 8620-3229 0320

Fax: 8620-32290422

<http://www.standard-tech.com>

2.2 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2018-04-14	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-T804-NANO-0015-30A&B-J, Connected to line voltage		

Electrical Measurement for Bare-lamp:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE181305	120.0	60	0.1269	14.94	0.9811	7.15
5-H1	277.0	60	0.0600	15.12	0.9105	13.59

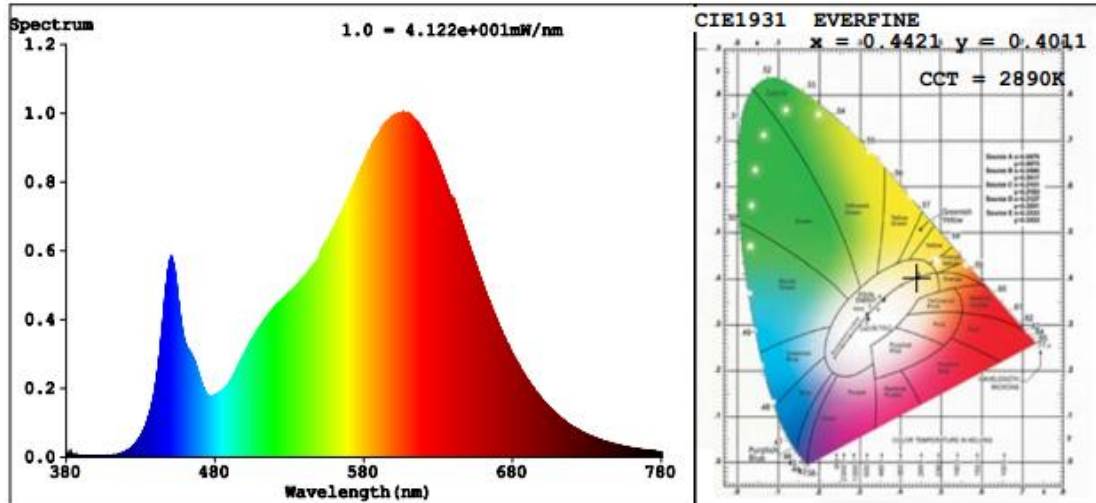
Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	82	R9	12
Frequency (Hz)	60	R2	92	R10	81
CCT (K)	2890	R3	96	R11	80
Duv	-0.0019	R4	81	R12	73
Chromaticity (x, y)	x=0.4421 y=0.4011	R5	82	R13	84
Chromaticity (u', v')	u'=0.2553 v'=0.5210	R6	90	R14	99
Color Rendering Index (CRI)	83.2	R7	82	R15	75
R9	12	R8	60	--	--

Photometric Measurement for Bare-lamp –Sphere-Spectroradiometer Method:

Parameter	Result	
Test Voltage (V)	120.0	277.0
Frequency (Hz)	60	60
Total Luminous (lm)	2037	2054
Luminous Efficacy (lm/W)	136.35	135.85
Most Worst Luminous/Highest Watts	134.72	

Spectral Power Distribution & Chromaticity Diagram



Laboratory: Standard-Tech Co., Ltd. Testing Center
NVLAP CODE: 201011-0

Report Format Number STD/QR4909-A/2

Address: Standard-Tech Building, No.6 Guanhong Road, Guangzhou Science City, Guangzhou 510663, China

Tel: 8620-3229 0320

Fax: 8620-32290422

<http://www.standard-tech.com>

Summary

Sample No.	Test Method	Voltage (Vac)	Frequency (Hz)	Lumen Output(lm)	Lumen Efficacy(lm/w)	Power (W)
GZE1813055-H1	With Ballast	120.0	60	2097	129.76	16.16
GZE1813055-H1	Connected to line voltage	120.0	60	2037	136.35	14.94

The measured lumen efficacy of test condition “with ballast” was less than test condition “Connect to line voltage”. So the following test will be “with ballast”.

2.3 Electrical, Photometric and Chromaticity Measurements
(Refer to Work Instruction QD25)

Test date	2018-04-14	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-T804-NANO-0015-30A&B-J, with ballast OSRAM SYLVANIA QTP 2x32T8/UNV ISN-SC		

Electrical Measurement for 2-lamp in Lithonia C2 25 MVOLT GEB10IS:

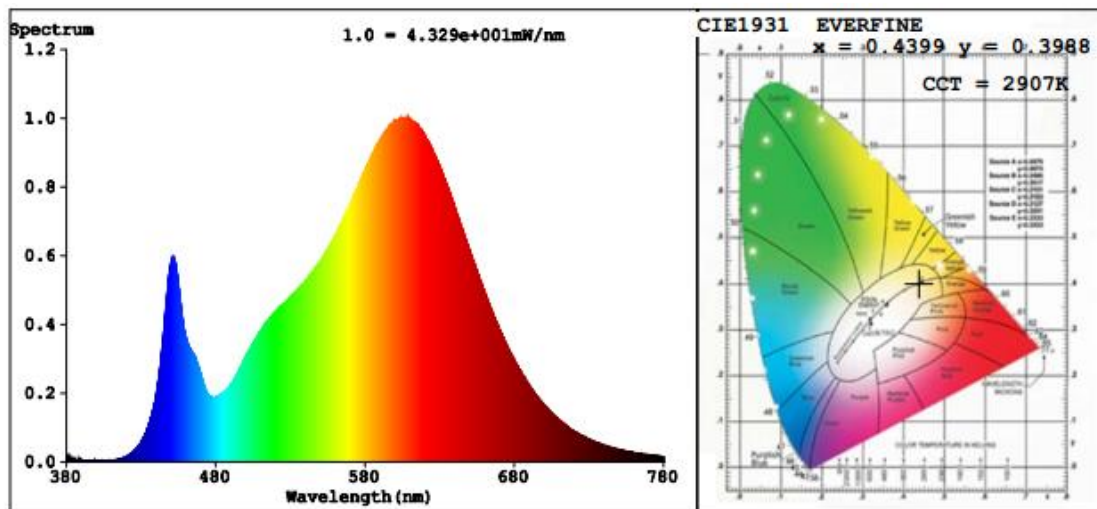
Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE181305	120.0	60	0.2671	31.20	0.9736	6.15
5-H1,H2	277.0	60	0.1279	31.68	0.8941	12.46

**Chromaticity Measurement for 2-lamp in Lithonia C2 25 MVOLT GEB10IS -
Sphere-Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	83	R9	14
Frequency (Hz)	60	R2	93	R10	83
CCT (K)	2907	R3	95	R11	81
Duv	-0.0025	R4	81	R12	75
Chromaticity (x, y)	x=0.4399 y=0.3988	R5	83	R13	85
Chromaticity (u', v')	u'=0.2548 v'=0.5197	R6	91	R14	98
Color Rendering Index (CRI)	83.8	R7	82	R15	76
R9	14	R8	61	--	--

**Photometric Measurement 2-lamp in Lithonia C2 25 MVOLT GEB10IS –
Goniophotometer Method:**

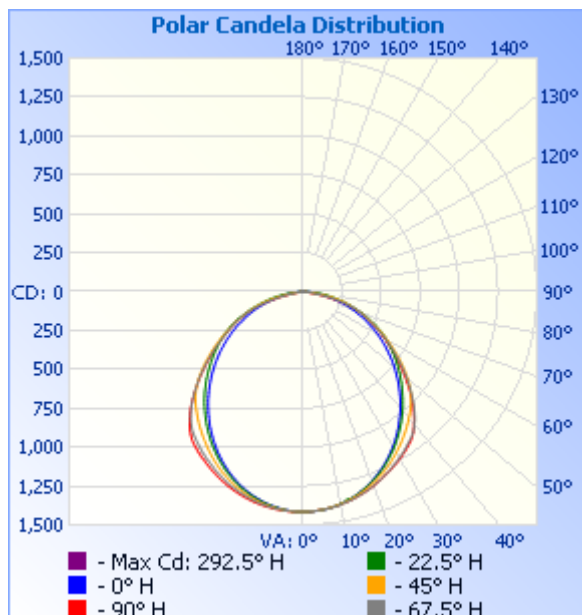
Parameter	Result	
Test Voltage (V)	120.0	277.0
Frequency (Hz)	60	60
Total Luminous (lm)	3979.5	4020.4
Luminous Efficacy (lm/W)	127.55	126.91
Most Worst Luminous/Highest Watts	125.62	
Zonal lumens in the 0-60 °zone (%)	79.7	--
SC: 0-180 °(if applicable)	1.31	--
SC: 90-270 °(if applicable)	1.20	--
Beam Angle (°)	108.0	--
Center Beam Candle Power (cd)	1415	--



Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1,095.2	27.5%
0-40	1,799.0	45.2%
0-60	3,171.2	79.7%
60-90	794.8	20%
70-100	313.7	7.9%
90-120	4.8	0.1%
0-90	3,966.0	99.7%
90-180	13.1	0.3%
0-180	3,979.1	100%

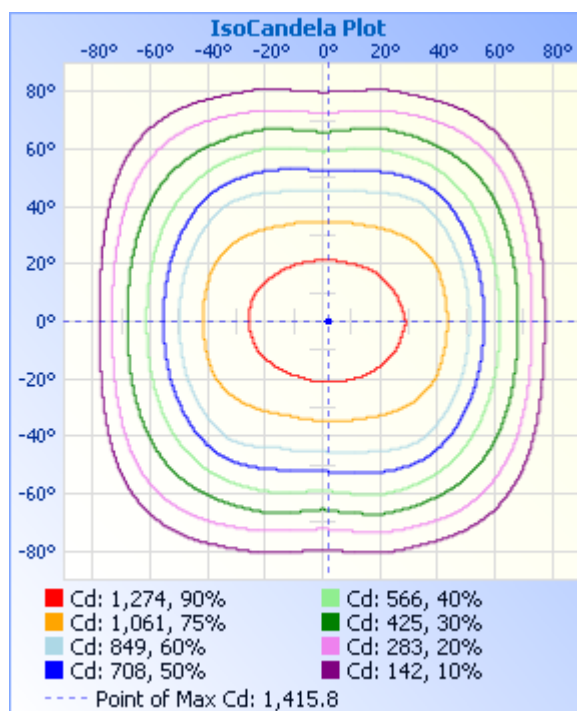
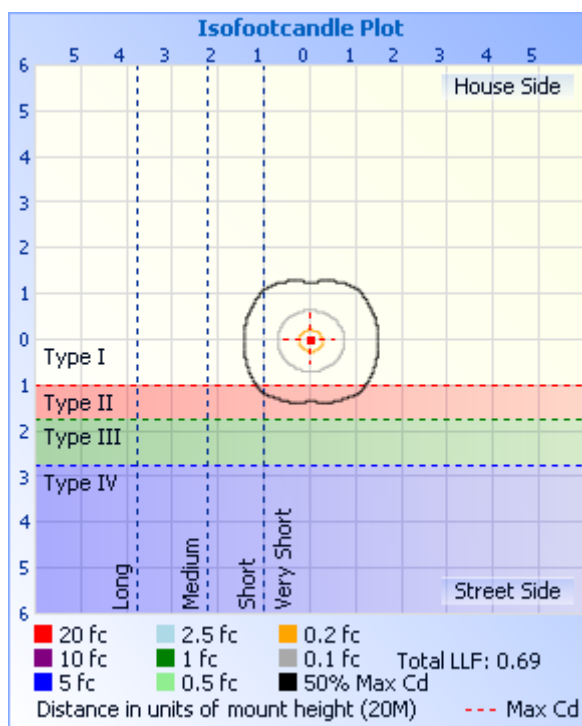
Lumens Per Zone					
Zone	Lumens	%Total	Zone	Lumens	%Total
0-10	133.7	3.4%	90-100	1.9	0%
10-20	382.4	9.6%	100-110	1.3	0%
20-30	579.1	14.6%	110-120	1.6	0%
30-40	703.7	17.7%	120-130	1.9	0%
40-50	730.1	18.3%	130-140	1.9	0%
50-60	642.1	16.1%	140-150	1.7	0%
60-70	483.0	12.1%	150-160	1.4	0%
70-80	265.2	6.7%	160-170	1.0	0%
80-90	46.6	1.2%	170-180	0.4	0%

Photometric Data


Illuminance at a Distance

	Center Beam fc	Beam Width	
3.33M	11.8 fc	8.70 M	9.78 M
6.67M	2.96 fc	17.40 M	19.55 M
10.00M	1.31 fc	26.10 M	29.33 M
13.33M	0.74 fc	34.79 M	39.09 M
16.67M	0.47 fc	43.50 M	48.87 M
20.00M	0.33 fc	52.20 M	58.65 M

■ Vert. Spread: 105.1°
■ Horiz. Spread: 111.4°



Laboratory: Standard-Tech Co., Ltd. Testing Center
 NVLAP CODE: 201011-0

Report Format Number STD/QR4909-A/2

Address: Standard-Tech Building, No.6 Guanhong Road, Guangzhou Science City, Guangzhou 510663, China

Tel: 8620-3229 0320 Fax: 8620-32290422 <http://www.standard-tech.com>

Table--1 UNIT: cd

C (DEG) γ (DEG)	0	23	45	68	90	113	135	158	180	203	225	248	270	293	315	338	
0	1415	1415	1415	1415	1415	1415	1415	1415	1415	1415	1415	1415	1415	1415	1415	1415	
5	1412	1412	1412	1409	1408	1407	1406	1407	1406	1406	1403	1403	1405	1407	1409	1410	
10	1400	1397	1395	1388	1385	1385	1385	1390	1388	1386	1380	1377	1380	1383	1389	1395	
15	1378	1372	1366	1351	1347	1348	1353	1362	1361	1357	1345	1334	1338	1344	1358	1368	
20	1346	1335	1323	1300	1294	1297	1309	1326	1326	1319	1296	1280	1282	1292	1313	1333	
25	1306	1291	1269	1237	1227	1234	1256	1282	1284	1272	1239	1212	1213	1228	1259	1288	
30	1260	1240	1205	1163	1150	1161	1194	1234	1240	1220	1174	1135	1133	1154	1196	1238	
35	1210	1188	1134	1082	1064	1080	1127	1181	1190	1165	1105	1050	1044	1071	1126	1184	
40	1133	1125	1060	994	969	992	1056	1112	1106	1096	1032	957	948	983	1054	1117	
45	1010	1019	982	901	870	900	981	999	988	985	955	863	847	890	977	1008	
50	868	884	889	804	767	806	877	870	855	857	857	768	743	794	876	873	
55	727	743	767	705	662	713	752	738	724	726	734	674	637	698	749	732	
60	598	611	636	609	555	619	626	613	604	600	607	581	531	605	617	599	
65	487	492	508	514	448	513	505	496	495	485	486	483	424	500	489	483	
70	366	379	387	401	343	397	391	393	391	383	372	370	319	382	373	365	
75	201	232	276	285	240	284	287	263	239	251	268	259	218	265	255	212	
80	54.9	77.7	140	176	145	179	157	106	84.7	95.1	139	157	125	159	110	63.3	
85	11.0	12.8	19.6	74.1	64.2	79.2	22.5	14.9	12.4	12.5	17.2	57.4	48.4	42.2	14.6	10.6	
90	0.56	0.89	2.74	8.38	9.78	8.59	3.33	1.90	0.22	0.44	2.95	5.61	4.41	4.04	1.29	3.50	
95	0.33	0.68	1.31	3.80	1.64	3.08	1.32	0.66	0.45	0.33	2.02	2.06	2.51	2.13	1.14	1.14	
100	0.11	0.70	0.96	2.17	1.42	1.97	1.07	0.53	0.49	0.48	1.26	1.59	1.76	2.01	0.99	1.04	
105	0.34	0.73	1.07	1.77	1.47	1.68	1.03	0.52	0.74	0.77	1.09	1.54	2.40	1.89	1.06	0.94	
110	0.34	0.75	1.23	1.93	1.54	1.75	0.99	0.55	0.97	1.10	1.38	1.63	2.95	2.16	1.45	1.00	
115	0.45	0.77	1.53	2.09	1.62	1.86	1.54	0.88	1.19	1.21	1.74	1.95	3.22	2.74	1.43	1.44	
120	1.00	1.26	1.77	2.22	2.07	1.89	1.88	1.22	1.42	1.48	1.72	2.30	3.39	2.80	2.09	1.68	
125	1.57	1.43	1.91	2.38	2.09	2.19	1.92	1.62	1.55	1.65	1.85	2.60	3.72	3.07	2.29	1.77	
130	1.73	1.68	2.06	2.65	2.29	2.21	1.95	1.93	1.68	1.79	2.10	2.78	3.58	3.18	2.39	2.01	
135	1.79	1.87	2.31	3.25	2.38	2.45	2.31	1.99	2.02	2.03	2.26	2.85	3.53	3.24	2.73	2.31	
140	1.79	1.95	2.51	3.43	2.47	2.96	2.39	1.99	2.02	2.42	2.40	2.96	3.45	3.35	2.97	2.57	
145	1.85	2.01	3.16	3.51	2.55	3.29	2.63	1.99	2.21	2.44	2.73	3.06	3.50	3.62	3.19	2.77	
150	2.14	2.07	3.27	3.58	2.64	3.40	2.93	2.10	2.48	2.60	2.88	3.15	3.71	3.60	3.63	3.10	
155	2.22	2.20	3.42	3.58	2.72	3.83	3.09	2.77	2.66	2.77	3.08	3.24	3.86	3.75	3.72	3.54	
160	2.30	2.85	3.49	3.62	2.88	3.64	3.23	3.10	2.82	2.95	3.31	3.33	4.05	3.89	3.96	3.65	
165	2.67	3.08	3.56	3.72	3.26	3.77	3.41	3.37	3.15	3.41	3.50	4.23	4.56	4.18	4.84	4.43	
170	3.36	3.24	3.83	4.11	3.69	4.49	4.07	3.53	3.33	3.46	3.54	4.45	4.77	4.22	5.12	4.76	
175	3.54	3.53	4.47	4.33	4.26	5.15	4.62	3.65	3.52	3.51	3.58	4.52	4.81	4.26	5.39	4.76	
180	3.59	3.64	4.58	4.55	4.26	5.16	4.73	3.98	3.81	3.53	3.60	4.55	4.59	4.28	5.17	4.76	

Laboratory: Standard-Tech Co., Ltd. Testing Center
 NVLAP CODE: 201011-0

Report Format Number STD/QR4909-A/2

Address: Standard-Tech Building, No.6 Guanhong Road, Guangzhou Science City, Guangzhou 510663, China

Tel: 8620-3229 0320 Fax: 8620-32290422 <http://www.standard-tech.com>

2.4 Electrical, Photometric and Chromaticity Measurements
(Refer to Work Instruction QD25)

Test date	2018-04-14	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-T804-NANO-0015-50A&B-J, with ballast OSRAM SYLVANIA QTP 2x32T8/UNV ISN-SC		

Electrical Measurement for Bare-lamp:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE181305	120.0	60	0.1388	16.22	0.9741	6.08
5-H3	277.0	60	0.0658	16.31	0.8945	12.37

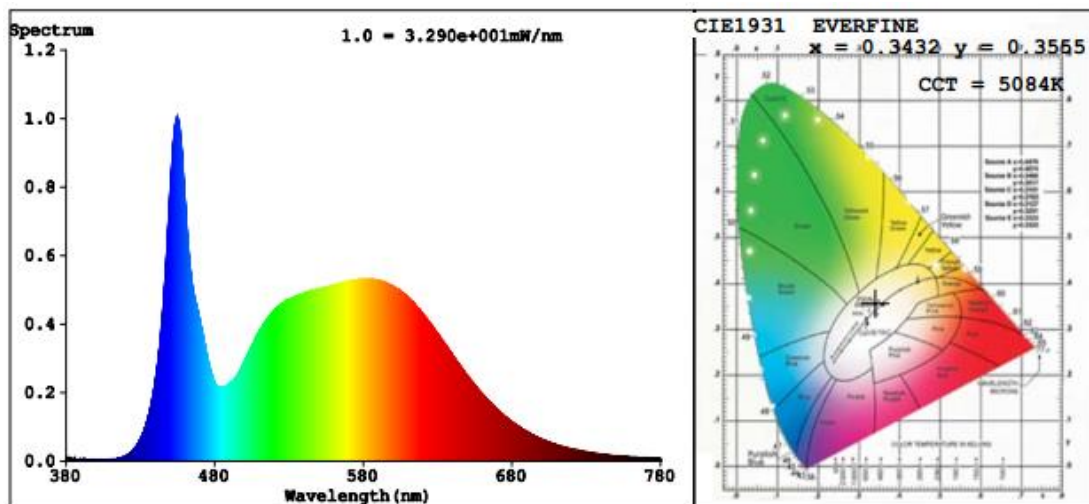
Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	82	R9	10
Frequency (Hz)	60	R2	90	R10	74
CCT (K)	5084	R3	93	R11	80
Duv	0.0027	R4	81	R12	56
Chromaticity (x, y)	x=0.3432 y=0.3555	R5	82	R13	84
Chromaticity (u', v')	u'=0.2087 v'=0.4863	R6	84	R14	97
Color Rendering Index (CRI)	83.2	R7	87	R15	77
R9	10	R8	67	--	--

Photometric Measurement for Bare-lamp –Sphere-Spectroradiometer Method:

Parameter	Result	
Test Voltage (V)	120.0	277.0
Frequency (Hz)	60	60
Total Luminous (lm)	2140	2142
Luminous Efficacy (lm/W)	131.94	131.33
Most Worst Luminous/Highest Watts	131.21	

Spectral Power Distribution & Chromaticity Diagram



Laboratory: Standard-Tech Co., Ltd. Testing Center
NVLAP CODE: 201011-0

Report Format Number STD/QR4909-A/2

Address: Standard-Tech Building, No.6 Guanhong Road, Guangzhou Science City, Guangzhou 510663, China

Tel: 8620-3229 0320 Fax: 8620-32290422 <http://www.standard-tech.com>

2.3 Performance Assessment:

Model name	CCT(K)	Total Luminous (lm)	Power (W)	Luminous Efficacy (lm/W)
IK-T804-NANO-0015-30A&B-J	3000K	2097	16.16	129.76
IK-T804-NANO-0015-35A&B-J	3500K	2108 ^{*1}	16.19 ^{*2}	130.20 ^{*3}
IK-T804-NANO-0015-40A&B-J	4000K	2119 ^{*1}	16.19 ^{*2}	130.88 ^{*3}
IK-T804-NANO-0015-50A&B-J	5000K	2140	16.22	131.94

*1: This value is calculated and the calculation formula is as below:

$$2108 = (2140 - 2097) / 4 * 1 + 2097$$

$$2119 = (2140 - 2097) / 4 * 2 + 2097$$

*2: This value is calculated and the calculation formula is as below:

$$16.19 = (16.16 + 16.22) / 2$$

*3: This value is calculated and the calculation formula is as below:

$$130.20 = 2108 / 16.19$$

$$130.88 = 2119 / 16.19$$

Laboratory: Standard-Tech Co., Ltd. Testing Center

NVLAP CODE: 201011-0

Report Format Number STD/QR4909-A/2

Address: Standard-Tech Building, No.6 Guanhong Road, Guangzhou Science City, Guangzhou 510663, China

Tel: 8620-3229 0320

Fax: 8620-32290422

<http://www.standard-tech.com>

3. Test Equipment

Equipment ID	Equipment Name	Last Calibration Date	Next Calibration Date
ST-R-331	2 meter Integrating Sphere	2017-07-01	2018-06-30
ST-R-327	Spectral analysis system HAAS-2000	2017-07-01	2018-06-30
D204	Standard Lamp	2017-07-12	2018-07-11
PF2010	Power Meter for Integrating Sphere	2017-07-01	2018-06-30
GO-R5000	Goniophotometer system	2017-07-01	2018-06-30
D908S	Standard Lamp	2017-07-12	2018-07-11
PF210	Power Meter for Goniophotometer	2017-07-07	2018-07-06
Expand Uncertainty: Photometric Measurement (Sphere):2.04%, k=2 Chromaticity Measurement(Sphere):28.8K, k=2 Photometric Measurement(Goniophotometer):2.36%, k=2			

******* END OF REPORT *******