



DesignLights Consortium Test Report

Reference Standards

UL1598-2008

ANSI C82.77-10-2014

IES LM-79-2008

Prepared For

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Test Laboratory:

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Test Laboratory Address:

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Catalog Number

55751

Project Number

4790652658

Report Number

4790652658_4

Test Date

2022-12-03~2022-12-05

Issue Date

2022-12-08

Revision Date

N/A

Prepared By

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Approved By

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Wu, Elvis

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Test Summary

DLC Technical Requirements V5.1- issued 2020-02-14

Requirement Category	Test Method	Requirements	Tolerance	Test Result
Minimum Light Output (lm)-Luminaires	IES LM-79-2008	≥2000	-10%	2621.49
Minimum Luminaire Efficacy (lm/W)-Luminaires	IES LM-79-2008	≥110	-3%	126.80
Spacing Criteria (0-180°)	IES LM-79-2008	1.0-2.0	±0.1	1.28
Spacing Criteria (90-270°)	IES LM-79-2008	1.0-2.0	±0.1	1.28
Zonal Lumen Requirement 1(0°-60°)	IES LM-79-2008	≥75%	-3%	78.10%
Allowable CCT (3500K)	IES LM-79-2008/ANSI C78.377-2015	3465±245	N/A	3449
Allowable CCT (4000K)	IES LM-79-2008/ANSI C78.377-2015	3985±275	N/A	4093
Allowable CCT (5000K)	IES LM-79-2008/ANSI C78.377-2015	5029±283	N/A	4984
Allowable CCT (3500K)	IES LM-79-2008/ANSI C78.377-2015	3465±245	N/A	3443
Allowable CCT (3500K)	IES LM-79-2008/ANSI C78.377-2015	3465±245	N/A	3440
Minimum CRI	IES LM-79-2008/CIE 13.3-1995	≥80	-1	83
Minimum R9	IES LM-79-2008	≥0	-1	7.0
Minimum Rg	IES LM-79-2008	≥89	-1	97
Minimum Rf	IES LM-79-2008	≥70	-1	84
Rcs,h1	IES LM-79-2008	-12%-23%	-1%	-12%
Unified Glare Rating (UGR)	IES LM-79-2008	≤22	N/A	21.3
L70 Lumen maintenance (Hours)	N/A	≥50000	N/A	≥50000
L90 Lumen maintenance (Hours)	N/A	≥36000	N/A	≥36000
Power Factor	ANSI C82.77-10-2014	≥0.9	-0.03	0.8968
Total Harmonic Distortion (A%)	ANSI C82.77-10-2014	≤20%	5%	16.64%
In-Situ Temperature Measurement Test for LED 1 (°C)	UL1598-2008	≤105	N/A	35.8
In-Situ Temperature Measurement Test for Driver 1 (°C)	UL1598-2008	≤90	N/A	50.3
Max Chromaticity Shift (1000-6000h)	N/A	≤0.004	0.0004	0.0016
Minimum Luminaire Warranty (Years)	N/A	≥5	N/A	≥5



Test List

Sample Received Date: 2022-11-18

Test Item	Test Date	Model Number	Tests Conducted By
Integrating Sphere Test	2022-12-03	55751-30W-35K	Yang, Gavin X
Integrating Sphere Test	2022-12-03	55751-30W-40K	Yang, Gavin X
Integrating Sphere Test	2022-12-03	55751-30W-50K	Yang, Gavin X
Integrating Sphere Test	2022-12-05	55751-25W-35K	Yang, Gavin X
Integrating Sphere Test	2022-12-05	55751-20W-35K	Yang, Gavin X
Goniophotometer Test	2022-12-03	55751-30W-35K	Yang, Gavin X
Goniophotometer Test	2022-12-03	55751-30W-50K	Yang, Gavin X
THD and PF Test	2022-12-03	55751-30W-35K	Yang, Gavin X
THD and PF Test	2022-12-03	55751-30W-40K	Yang, Gavin X
THD and PF Test	2022-12-03	55751-30W-50K	Yang, Gavin X
THD and PF Test	2022-12-03	55751-25W-35K	Yang, Gavin X
THD and PF Test	2022-12-03	55751-20W-35K	Yang, Gavin X
In-Situ Temperature Measurement Test	2022-12-05	55751-30W-35K	Yang, Gavin X

Remark (if any)

1. UL test equipment information is recorded on Meter Use in UL's Aurora database.
2. The accuracy method decision rule is applied when the compliance or verdict is made to the results of this report.



Product Description

Lamp/Luminaire Description: 2x2 Luminaires for Ambient Lighting of Interior Commercial Spaces

Model Number: 55751

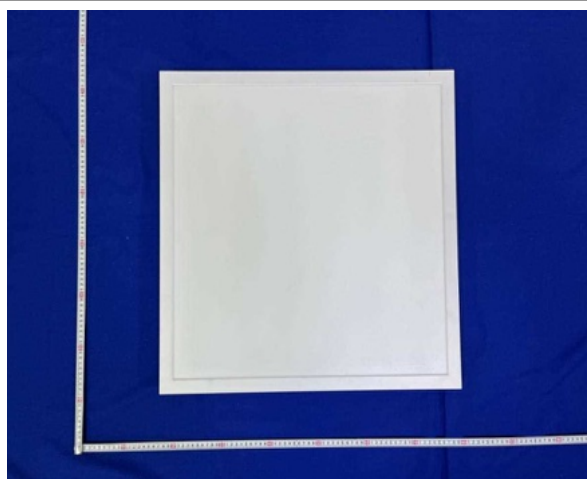
Electrical Parameter: 120-277V, 50/60Hz

LED Package: BXEN-(A)E-13H-9RB

Dimming Information: Continuous dimming capability

Products Scaled Value

Model Number	CCT	Luminous Flux	Power	Luminous Efficacy
55751-30W-35K	3500K	3750	30	125
55751-30W-40K	4000K	4050	30	135
55751-30W-50K	5000K	3810	30	127
55751-25W-35K	3500K	3200	25	128
55751-25W-40K	4000K	3450	25	138
55751-25W-50K	5000K	3250	25	130
55751-20W-35K	3500K	2620	20	131
55751-20W-40K	4000K	2820	20	141
55751-20W-50K	5000K	2660	20	133





Integrating Sphere Test

Model No.	55751-30W-35K	Sample ID.	5550477,5580366
Operate time (Min.)	90	Stabilization time (Min.)	45

Test Method

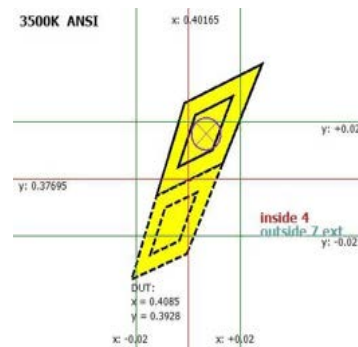
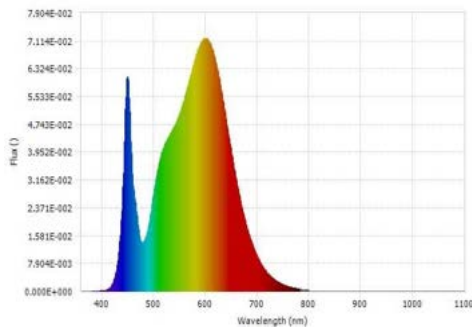
1. The sample was tested according to the IES LM-79-2008, and the product is assumed to be brand new without seasoning.
 2. Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25 °C ± 1 °C. The reference standard lamp is rated current 2.679A omni-directional Incandescent lamp and was calibrated by National Institute of Metrology P.R.China.
 3. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. Coating reflectance of the integrating sphere was 90% to 98%. Photometric measurement conditions was using 4π geometry. The self-absorption factor is applied in the final test result. The sample was operated at rated voltage and was stabilized before measurement. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780 nm.

Integrating Sphere Test Conditions

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
24.8	120.02	60	0.2710	29.628	0.9112	Horizontal

Test Results

CCT (K)	CRI (Ra)	R9	Duv	Flux (lm)	Luminous Efficacy (lm/W)	Efficacy(lm/ft)
3449	83	7.0	0.0002	3795.93	128.12	N/A

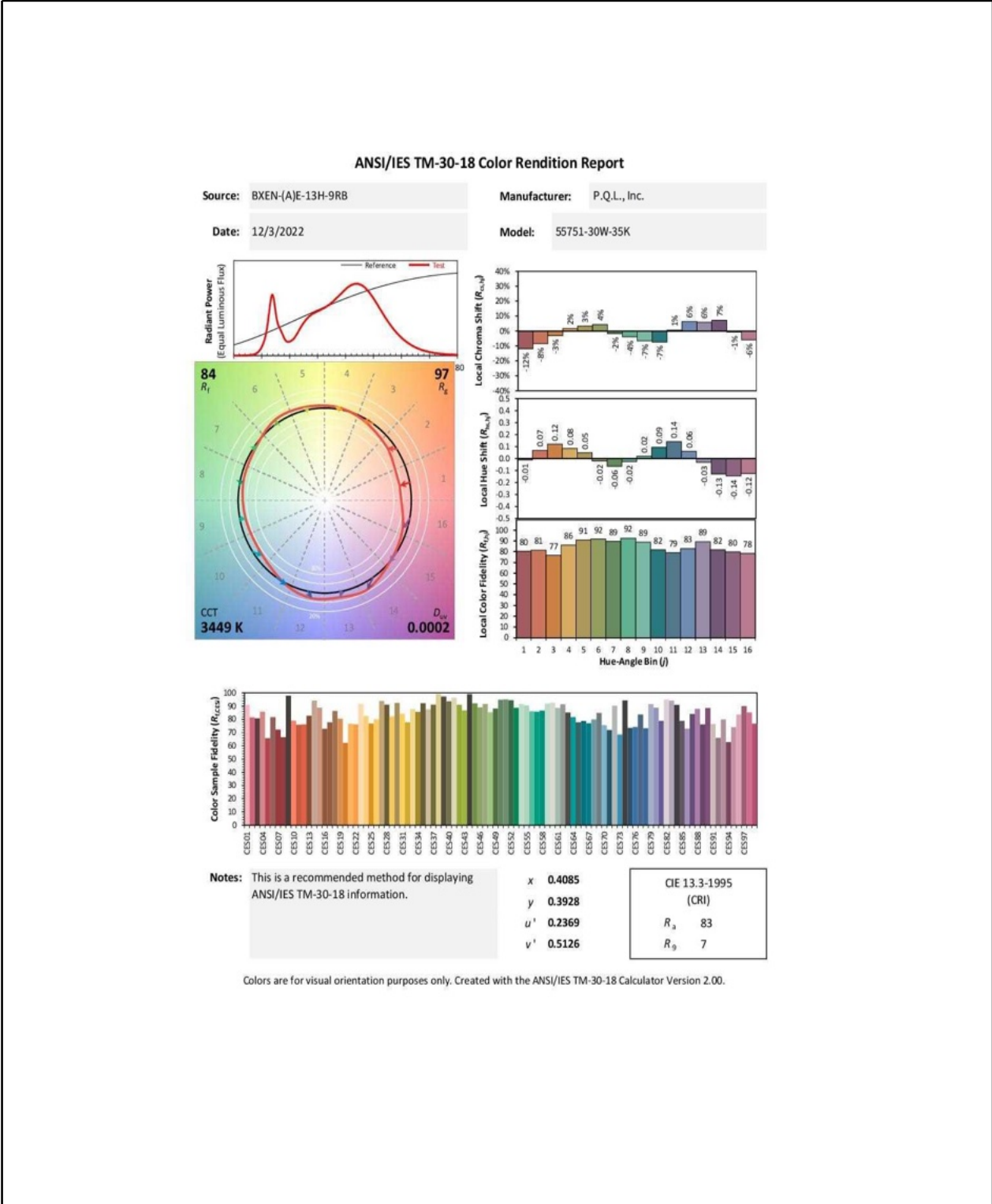


Luminous Flux (lm)	3795.93	Chrom x	0.4085
Chrom y	0.3928	Chrom u	0.2369
Chrom v	0.3417	Duv	0.0002
Chrom u'	0.2369	Chrom v'	0.5126
CCT (K)	3449	Luminous Efficacy (lm/W)	128.12
Ra	83	R1	81.0
R2	89.0	R3	96.0
R4	82.0	R5	81.0
R6	86.0	R7	85.0
R8	62.0	R9	7.0
R10	74.0	R11	82.0
R12	66.0	R13	83.0
R14	98.0	R15	74.0
Rf	84	Rg	97
Rcs,h1	-12%		



Integrating Sphere Test (Cont'd)

TM-30 Report





Integrating Sphere Test

Model No.	55751-30W-40K	Sample ID.	5550477,5580366
Operate time (Min.)	90	Stabilization time (Min.)	45

Test Method

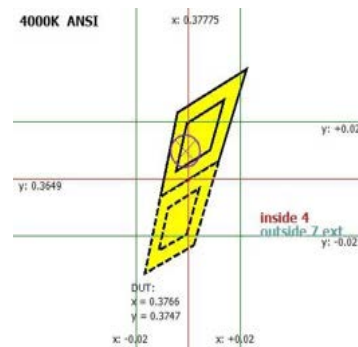
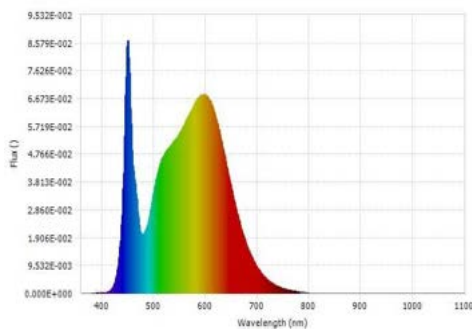
1. The sample was tested according to the IES LM-79-2008, and the product is assumed to be brand new without seasoning.
 2. Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25 °C ± 1 °C. The reference standard lamp is rated current 2.679A omni-directional Incandescent lamp and was calibrated by National Institute of Metrology P.R.China.
 3. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. Coating reflectance of the integrating sphere was 90% to 98%. Photometric measurement conditions were using 4π geometry. The self-absorption factor is applied in the final test result. The sample was operated at rated voltage and was stabilized before measurement. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780 nm.

Integrating Sphere Test Conditions

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
24.8	120.04	60	0.2615	28.62	0.9117	Horizontal

Test Results

CCT (K)	CRI (Ra)	R9	Duv	Flux (lm)	Luminous Efficacy (lm/W)	Efficacy(lm/ft)
4093	85	15.0	0.0002	3955.8	138.22	N/A

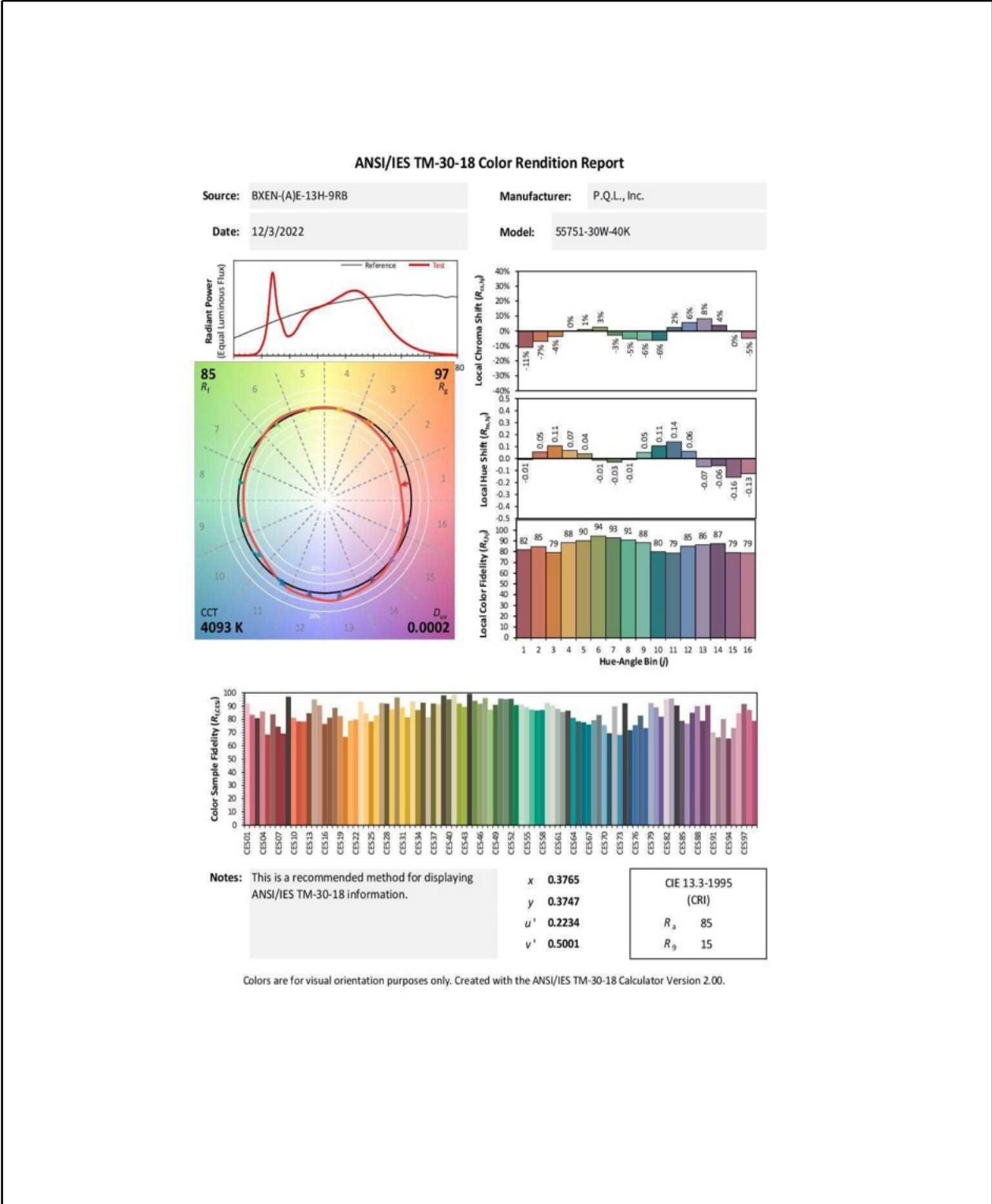


Luminous Flux (lm)	3955.8	Chrom x	0.3766
Chrom y	0.3747	Chrom u	0.2234
Chrom v	0.3334	Duv	0.0002
Chrom u'	0.2234	Chrom v'	0.5001
CCT (K)	4093	Luminous Efficacy (lm/W)	138.22
Ra	85	R1	83.0
R2	90.0	R3	95.0
R4	84.0	R5	83.0
R6	86.0	R7	87.0
R8	68.0	R9	15.0
R10	76.0	R11	84.0
R12	64.0	R13	85.0
R14	97.0	R15	77.0
Rf	85	Rg	97
Rcs,h1	-11%		



Integrating Sphere Test (Cont'd)

TM-30 Report





Integrating Sphere Test

Model No.	55751-30W-50K	Sample ID.	5550477,5580366
Operate time (Min.)	90	Stabilization time (Min.)	45

Test Method

1. The sample was tested according to the IES LM-79-2008, and the product is assumed to be brand new without seasoning.

2. Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$. The reference standard lamp is rated current 2.679A omni-directional Incandescent lamp and was calibrated by National Institute of Metrology P.R.China.

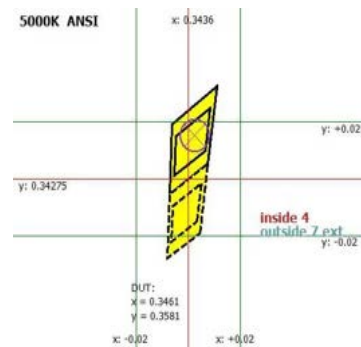
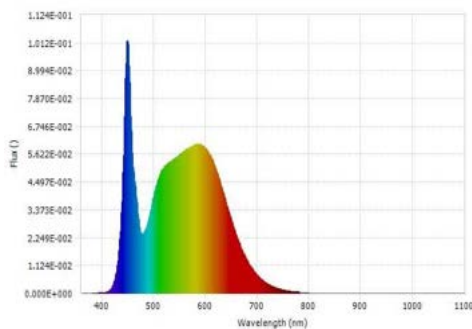
3. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. Coating reflectance of the integrating sphere was 90% to 98%. Photometric measurement conditions were using 4π geometry. The self-absorption factor is applied in the final test result. The sample was operated at rated voltage and was stabilized before measurement. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780 nm.

Integrating Sphere Test Conditions

Temperature ($^{\circ}\text{C}$)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
24.8	120.01	60	0.2719	29.724	0.9109	Horizontal

Test Results

CCT (K)	CRI (Ra)	R9	Duv	Flux (lm)	Luminous Efficacy (lm/W)	Efficacy(lm/ft)
4984	84	13.0	0.0029	3822.44	128.60	N/A

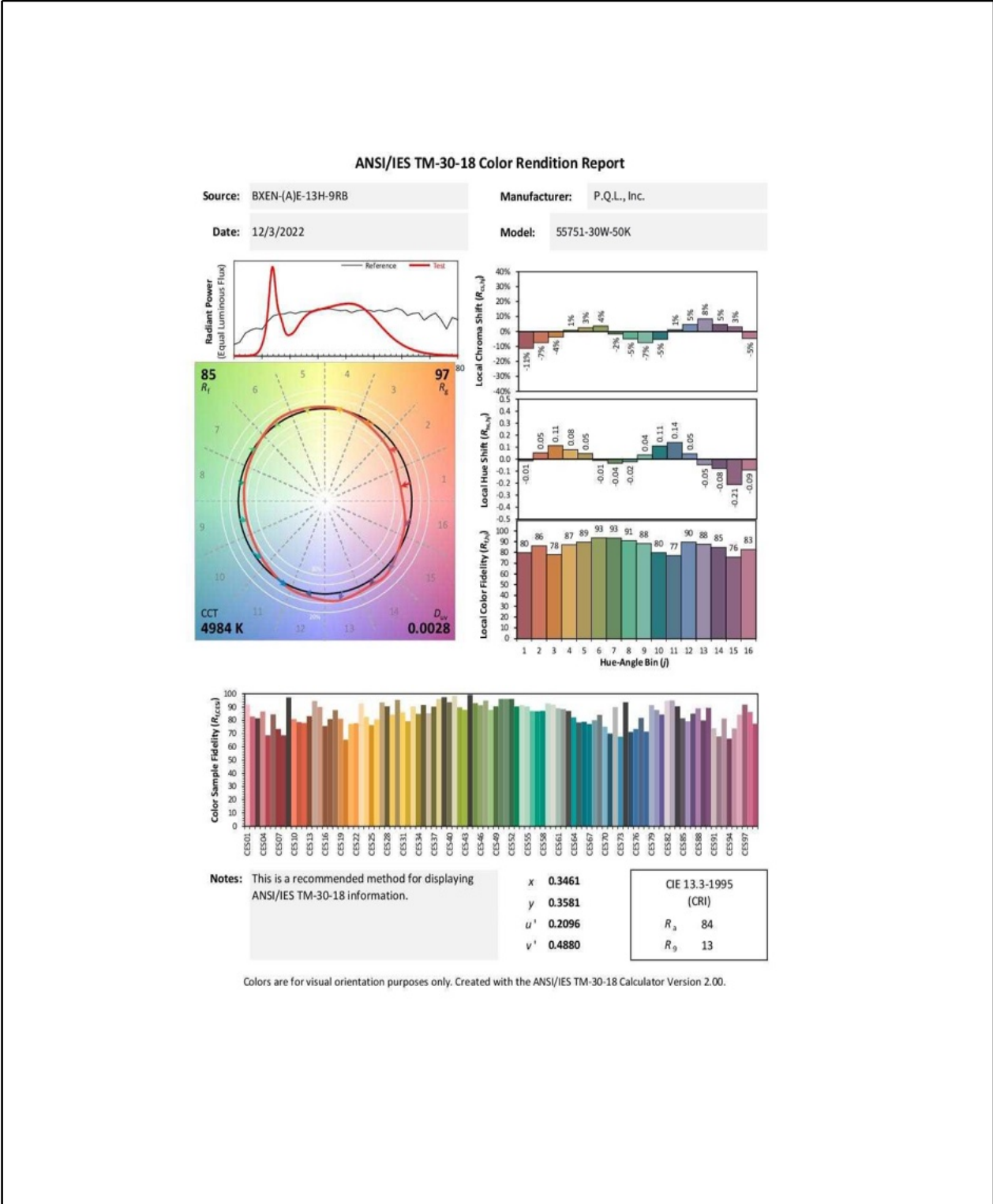


Luminous Flux (lm)	3822.44	Chrom x	0.3461
Chrom y	0.3581	Chrom u	0.2096
Chrom v	0.3253	Duv	0.0029
Chrom u'	0.2096	Chrom v'	0.4880
CCT (K)	4984	Luminous Efficacy (lm/W)	128.60
Ra	84	R1	82.0
R2	89.0	R3	93.0
R4	84.0	R5	83.0
R6	84.0	R7	89.0
R8	70.0	R9	13.0
R10	73.0	R11	83.0
R12	60.0	R13	84.0
R14	97.0	R15	76.0
Rf	85	Rg	97
Rcs,h1	-11%		



Integrating Sphere Test (Cont'd)

TM-30 Report





Integrating Sphere Test

Model No.	55751-25W-35K	Sample ID.	5550477,5580366
Operate time (Min.)	90	Stabilization time (Min.)	45

Test Method

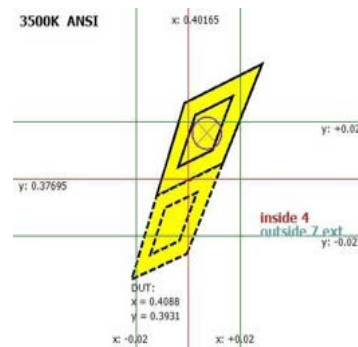
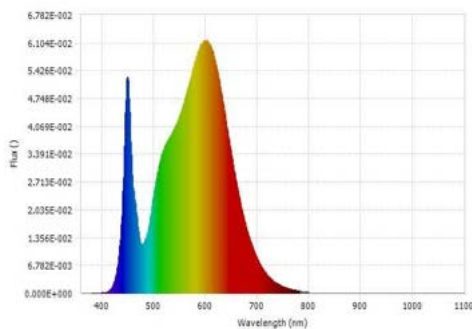
1. The sample was tested according to the IES LM-79-2008, and the product is assumed to be brand new without seasoning.
 2. Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25 °C ± 1 °C. The reference standard lamp is rated current 2.679A omni-directional Incandescent lamp and was calibrated by National Institute of Metrology P.R.China.
 3. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. Coating reflectance of the integrating sphere was 90% to 98%. Photometric measurement conditions was using 4π geometry. The self-absorption factor is applied in the final test result. The sample was operated at rated voltage and was stabilized before measurement. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780 nm.

Integrating Sphere Test Conditions

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
24.9	120.04	60	0.2092	24.628	0.9808	Horizontal

Test Results

CCT (K)	CRI (Ra)	R9	Duv	Flux (lm)	Luminous Efficacy (lm/W)	Efficacy(lm/ft)
3443	83	7.0	0.0003	3254.36	132.14	N/A



Luminous Flux (lm)	3254.36	Chrom x	0.4088
Chrom y	0.3931	Chrom u	0.2370
Chrom v	0.3418	Duv	0.0003
Chrom u'	0.2370	Chrom v'	0.5128
CCT (K)	3443	Luminous Efficacy (lm/W)	132.14
Ra	83	R1	81.0
R2	89.0	R3	96.0
R4	82.0	R5	81.0
R6	86.0	R7	85.0
R8	62.0	R9	7.0
R10	75.0	R11	82.0
R12	66.0	R13	83.0
R14	98.0	R15	74.0
Rf	84	Rg	97
Rcs,h1	-12%		

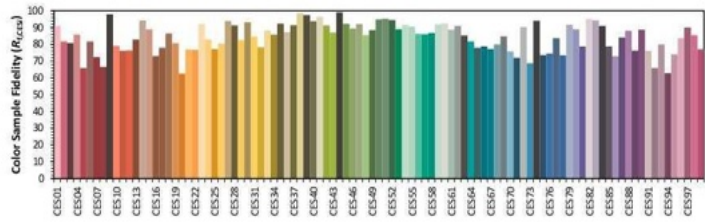
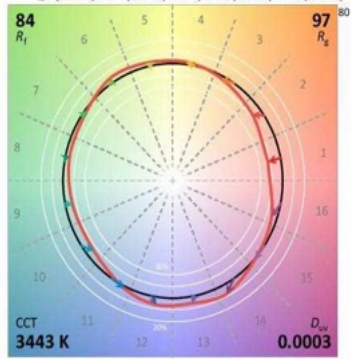
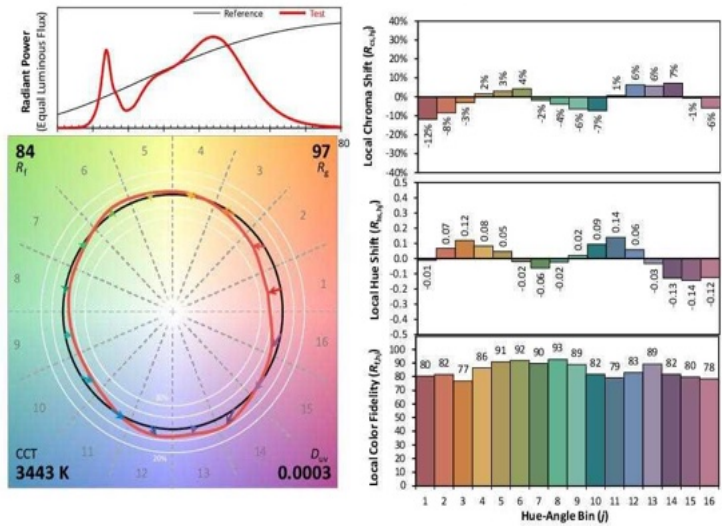


Integrating Sphere Test (Cont'd)

TM-30 Report

ANSI/IES TM-30-18 Color Rendition Report

Source: BXEN-(A)E-13H-9RB Manufacturer: P.Q.L., Inc.
 Date: 12/5/2022 Model: 55751-25W-35K



Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x	0.4088	CIE 13.3-1995 (CRI)
y	0.3931	
u'	0.2370	
v'	0.5128	

R_a 83
 R_g 7

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.



Integrating Sphere Test

Model No.	55751-20W-35K	Sample ID.	5550477,5580366
Operate time (Min.)	90	Stabilization time (Min.)	45

Test Method

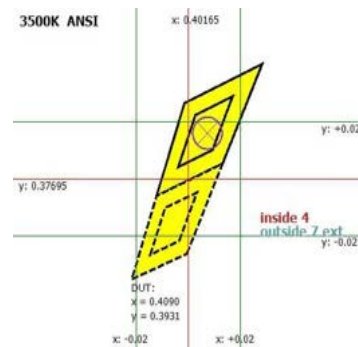
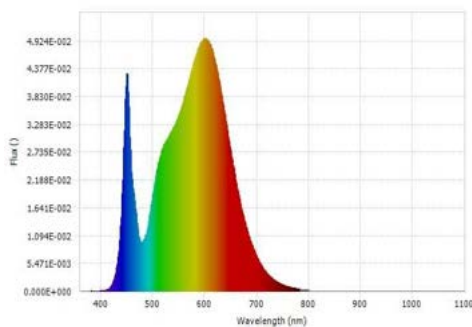
1. The sample was tested according to the IES LM-79-2008, and the product is assumed to be brand new without seasoning.
 2. Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25 °C ± 1 °C. The reference standard lamp is rated current 2.679A omni-directional Incandescent lamp and was calibrated by National Institute of Metrology P.R.China.
 3. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. Coating reflectance of the integrating sphere was 90% to 98%. Photometric measurement conditions were using 4π geometry. The self-absorption factor is applied in the final test result. The sample was operated at rated voltage and was stabilized before measurement. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780 nm.

Integrating Sphere Test Conditions

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
24.9	120.07	60	0.1661	19.287	0.9673	Horizontal

Test Results

CCT (K)	CRI (Ra)	R9	Duv	Flux (lm)	Luminous Efficacy (lm/W)	Efficacy(lm/ft)
3440	83	8.0	0.0002	2621.49	135.92	N/A

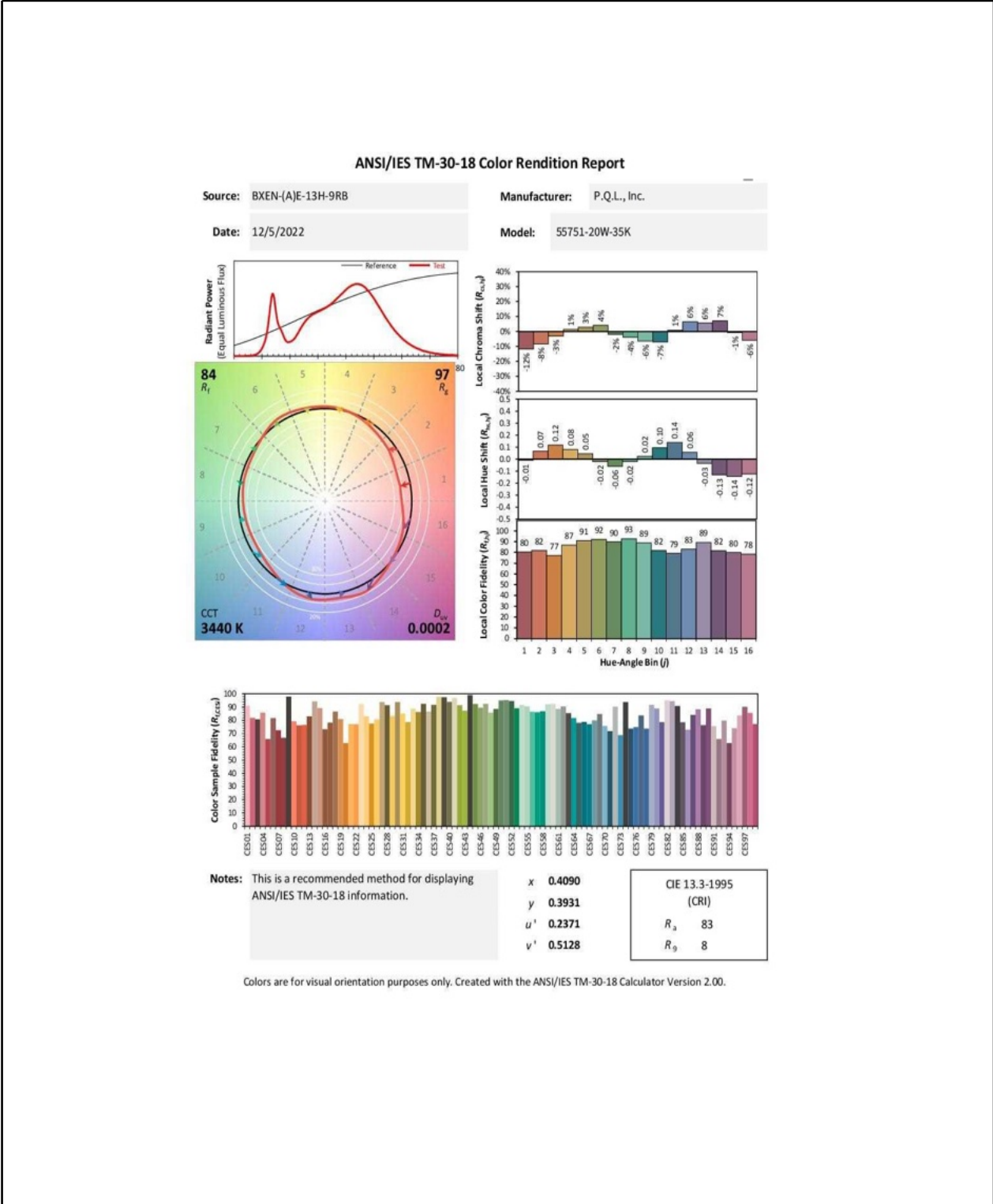


Luminous Flux (lm)	2621.49	Chrom x	0.4090
Chrom y	0.3931	Chrom u	0.2371
Chrom v	0.3419	Duv	0.0002
Chrom u'	0.2371	Chrom v'	0.5128
CCT (K)	3440	Luminous Efficacy (lm/W)	135.92
Ra	83	R1	81.0
R2	89.0	R3	96.0
R4	82.0	R5	81.0
R6	86.0	R7	85.0
R8	62.0	R9	8.0
R10	75.0	R11	82.0
R12	66.0	R13	83.0
R14	98.0	R15	74.0
Rf	84	Rg	97
Rcs,h1	-12%		



Integrating Sphere Test (Cont'd)

TM-30 Report





Goniophotometer Test

Model No.	55751-30W-35K	Sample ID.	5550477,5580366
Operate time (Min.)	90	Stabilization time (Min.)	45

Test Method

- 1.The sample was tested according to the IES LM-79-2008, and the product is assume to be brand new without seasoning.
- 2.Photometric parameters were measured using a type C goniophotometer and software.
- 3.The ambient temperature shall be maintained at 25° C ± 1° C, measured at a point not more than 1 m from the sample and at the same height as the sample. The reference standard lamp is rated current 3.8581A, 3.8558A, 3.8466A omni-directional Incandescent lamp and was calibrated by National Institute of Metrology P.R.China.
- 4.The samples were operated at rated voltage and was stabilized before measurement. Luminous flux, luminaire efficacy, zonallumen were calculated from the software taken at 1° vertical intervals and 22.5° horizontal intervals. Photometric distance was more than five times of the largest dimension of the test SSL product.

Goniophotometer Test Conditions

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Current THD	Orientation
24.4	120.05	60	0.2500	29.63	0.9869	4.91%	Horizontal

Test Results

Luminous Flux (lm)	Zonal Lumen Requirement 1	Zonal Lumen Requirement 2	Beam Angle (50%)		Luminous Efficacy (lm/W)
	0°-60°	N/A	Horizontal Spread	Vertical Spread	
3757.0	78.70%	N/A	114.3	114.4	126.80

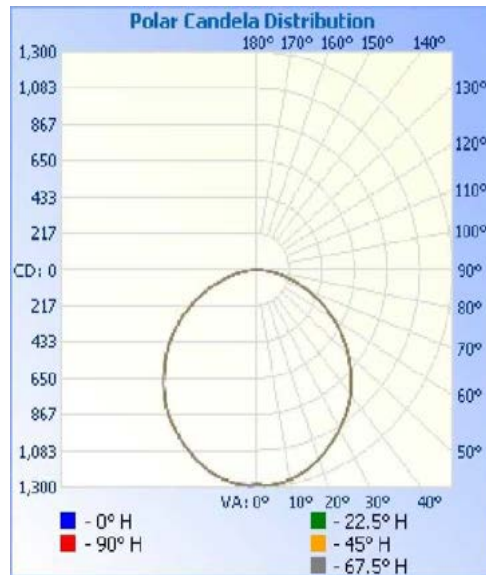
Backlight	Uplight	Glare
N/A	N/A	N/A

UGR		Spacing Criteria (0-180°)	Spacing Criteria (90°-270°)
Crosswise	Endwise		
21.3	21.2	1.28	1.28

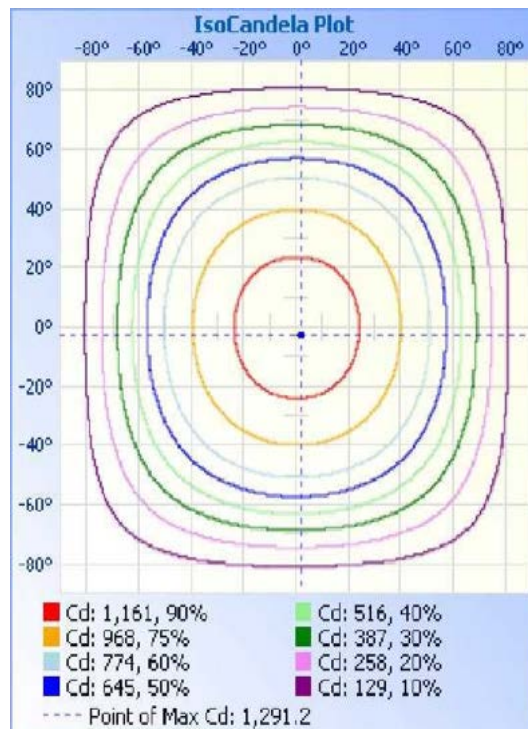


Goniophotometer Test (Cont'd)

Polar Candela Distribution



IsoCandela Plot





Goniophotometer Test (Cont'd)
Zonal Lumen Summary

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1004.4	26.70%
0-40	1653.3	44.00%
0-60	2948.1	78.50%
60-90	798.2	21.20%
70-100	335.1	8.90%
90-120	3.5	0.10%
0-90	3746.3	99.70%
90-180	10.7	0.30%
0-180	3757.0	100.00%

Lumens Per Zone

Lumens Per Zone					
Zone	Lumens	%Total	Zone	Lumens	%Total
0-5	30.8	0.80%	90-95	0.8	0.00%
5-10	91.6	2.40%	95-100	0.7	0.00%
10-15	149.1	4.00%	100-105	0.6	0.00%
15-20	201.5	5.40%	105-110	0.5	0.00%
20-25	246.8	6.60%	110-115	0.4	0.00%
25-30	284.5	7.60%	115-120	0.5	0.00%
30-35	314.6	8.40%	120-125	0.6	0.00%
35-40	334.3	8.90%	125-130	0.6	0.00%
40-45	341.1	9.10%	130-135	0.7	0.00%
45-50	336.7	9.00%	135-140	0.7	0.00%
50-55	322.1	8.60%	140-145	0.7	0.00%
55-60	295.0	7.90%	145-150	0.8	0.00%
60-65	255.8	6.80%	150-155	0.7	0.00%
65-70	208.7	5.60%	155-160	0.7	0.00%
70-75	157.8	4.20%	160-165	0.6	0.00%
75-80	105.3	2.80%	165-170	0.5	0.00%
80-85	55.5	1.50%	170-175	0.3	0.00%
85-90	15.0	0.40%	175-180	0.1	0.00%



Goniophotometer Test (Cont'd)
Intensity Data(cd)

Candela Table - Type C

	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5	360
0	1283	1283	1283	1283	1283	1283	1283	1283	1283	1283	1283	1283	1283	1283	1283	1283	1283
1	1285	1286	1285	1285	1284	1285	1286	1287	1289	1285	1285	1285	1285	1285	1286	1286	1285
2	1288	1290	1288	1287	1288	1288	1288	1289	1290	1288	1288	1287	1287	1288	1289	1287	1288
3	1290	1289	1289	1288	1289	1289	1289	1289	1290	1290	1290	1289	1288	1289	1289	1289	1290
4	1290	1291	1290	1289	1289	1289	1288	1288	1290	1290	1290	1290	1289	1289	1289	1289	1290
5	1290	1291	1288	1288	1288	1288	1288	1288	1288	1288	1289	1289	1288	1288	1289	1288	1290
6	1288	1288	1288	1286	1285	1285	1286	1285	1286	1287	1288	1287	1286	1286	1286	1286	1288
7	1284	1285	1285	1284	1284	1283	1283	1283	1283	1284	1284	1284	1282	1282	1283	1284	1284
8	1280	1282	1282	1282	1279	1279	1279	1280	1280	1280	1281	1280	1279	1279	1280	1281	1280
9	1277	1278	1280	1278	1276	1274	1275	1275	1275	1275	1278	1275	1275	1275	1277	1278	1277
10	1273	1273	1274	1273	1272	1269	1271	1271	1270	1271	1272	1272	1271	1270	1272	1273	1273
11	1268	1268	1268	1269	1265	1265	1266	1266	1265	1266	1266	1266	1266	1266	1267	1266	1268
12	1263	1262	1262	1262	1261	1261	1261	1260	1261	1261	1261	1261	1261	1261	1261	1261	1263
13	1257	1256	1257	1256	1256	1255	1255	1255	1254	1254	1254	1254	1255	1256	1257	1257	1257
14	1251	1250	1250	1251	1250	1250	1249	1248	1249	1249	1248	1248	1249	1250	1250	1251	1251
15	1245	1245	1244	1243	1244	1243	1243	1242	1242	1242	1241	1241	1242	1242	1244	1245	1245
16	1238	1238	1238	1237	1237	1236	1235	1234	1235	1234	1233	1233	1235	1236	1238	1238	1238
17	1230	1231	1230	1229	1229	1228	1228	1226	1227	1226	1226	1225	1227	1227	1230	1230	1230
18	1222	1223	1222	1220	1220	1219	1219	1219	1219	1217	1218	1218	1220	1220	1221	1223	1222
19	1214	1214	1214	1212	1211	1211	1211	1210	1209	1209	1209	1210	1211	1211	1213	1214	1214
20	1205	1204	1204	1202	1201	1202	1201	1201	1199	1201	1201	1202	1200	1202	1204	1204	1205
25	1152	1155	1155	1154	1152	1151	1150	1150	1149	1149	1149	1150	1151	1152	1154	1154	1152
30	1101	1101	1100	1099	1097	1098	1096	1096	1093	1095	1095	1096	1098	1098	1099	1100	1101
35	1040	1041	1042	1041	1038	1038	1037	1035	1033	1034	1035	1035	1037	1040	1040	1040	1040
40	969	969	969	967	965	964	963	960	959	960	961	962	963	966	967	968	969
45	883	883	882	881	879	879	876	875	872	873	875	878	878	880	880	881	883
50	793	793	792	791	790	789	786	785	780	783	785	788	789	791	790	792	793
55	698	698	698	696	694	691	688	686	686	687	688	689	690	692	696	697	698
60	589	590	589	588	584	583	580	579	579	576	578	580	583	585	588	589	589
65	475	474	473	472	471	470	466	464	462	462	464	467	470	472	470	473	475
70	363	362	362	361	359	357	352	351	347	349	351	354	356	359	359	362	363
75	254	254	254	253	250	247	244	242	242	241	242	244	247	249	252	254	254
80	153	152	152	150	150	148	144	143	141	141	142	146	148	150	149	151	153
85	65	64	64	63	62	60	57	56	54	56	56	58	60	62	61	63	65
90	3	3	4	3	3	2	2	1	1	2	2	2	2	2	2	3	3
95	1	2	2	1	1	2	2	2	1	2	2	1	1	1	1	2	1
100	2	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	2
105	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
110	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
115	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
120	1	1	1	1	1	2	2	1	1	1	1	1	1	1	2	1	1
125	2	1	2	2	2	1	2	2	2	2	1	1	1	1	2	1	2
130	2	1	2	1	2	1	1	2	2	2	2	1	2	2	1	1	2
135	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
140	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
145	3	3	2	2	2	2	3	2	3	2	3	2	2	2	3	2	3
150	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
155	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
160	3	4	3	3	3	3	4	3	4	3	4	4	4	4	4	4	3
165	4	4	5	4	4	4	4	4	4	4	5	4	5	4	4	4	4
170	5	5	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5
175	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	5	5
180	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5



Goniophotometer Test

Model No.	55751-30W-50K	Sample ID.	5550477,5580366
Operate time (Min.)	90	Stabilization time (Min.)	45

Test Method

- 1.The sample was tested according to the IES LM-79-2008, and the product is assume to be brand new without seasoning.
- 2.Photometric parameters were measured using a type C goniophotometer and software.
- 3.The ambient temperature shall be maintained at 25° C ± 1° C, measured at a point not more than 1 m from the sample and at the same height as the sample. The reference standard lamp is rated current 3.8581A, 3.8558A, 3.8466A omni-directional Incandescent lamp and was calibrated by National Institute of Metrology P.R.China.
- 4.The samples were operated at rated voltage and was stabilized before measurement. Luminous flux, luminaire efficacy, zonallumen were calculated from the software taken at 1° vertical intervals and 22.5° horizontal intervals. Photometric distance was more than five times of the largest dimension of the test SSL product.

Goniophotometer Test Conditions

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Current THD	Orientation
24.6	120.06	60	0.2507	29.70	0.9868	4.70%	Horizontal

Test Results

Luminous Flux (lm)	Zonal Lumen Requirement 1	Zonal Lumen Requirement 2	Beam Angle (50%)		Luminous Efficacy (lm/W)
	0°-60°	N/A	Horizontal Spread	Vertical Spread	
3796.7	78.10%	N/A	115.0	114.9	127.84

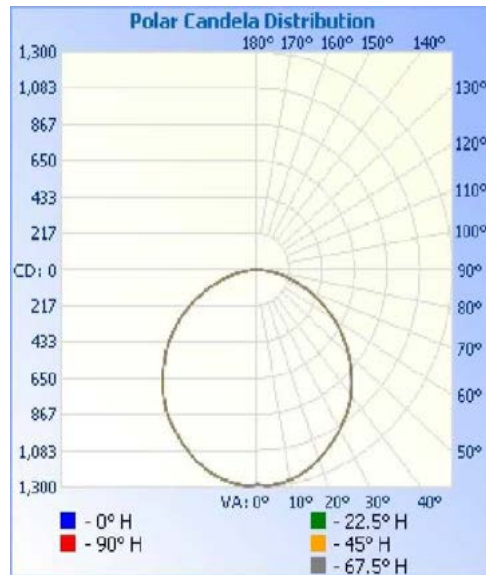
Backlight	Uplight	Glare
N/A	N/A	N/A

UGR		Spacing Criteria (0-180°)	Spacing Criteria (90°-270°)
Crosswise	Endwise		
21.3	21.3	1.28	1.28

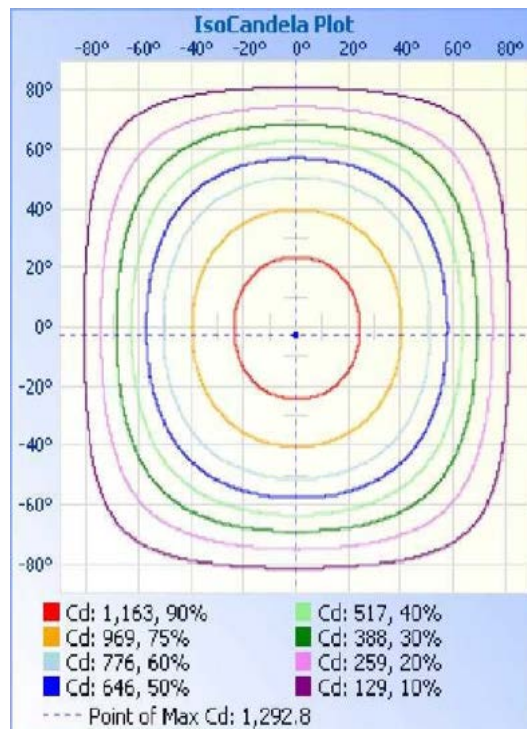


Goniophotometer Test (Cont'd)

Polar Candela Distribution



IsoCandela Plot





Goniophotometer Test (Cont'd)
Zonal Lumen Summary

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1007.2	26.50%
0-40	1659.3	43.70%
0-60	2966.3	78.10%
60-90	819.4	21.60%
70-100	348.3	9.20%
90-120	3.8	0.10%
0-90	3785.7	99.70%
90-180	10.9	0.30%
0-180	3796.7	100.00%

Lumens Per Zone

Lumens Per Zone					
Zone	Lumens	%Total	Zone	Lumens	%Total
0-5	30.9	0.80%	90-95	1.0	0.00%
5-10	91.8	2.40%	95-100	0.7	0.00%
10-15	149.5	3.90%	100-105	0.7	0.00%
15-20	202.0	5.30%	105-110	0.5	0.00%
20-25	247.6	6.50%	110-115	0.4	0.00%
25-30	285.6	7.50%	115-120	0.5	0.00%
30-35	316.0	8.30%	120-125	0.6	0.00%
35-40	336.1	8.90%	125-130	0.6	0.00%
40-45	343.7	9.10%	130-135	0.7	0.00%
45-50	339.7	8.90%	135-140	0.8	0.00%
50-55	325.3	8.60%	140-145	0.8	0.00%
55-60	298.3	7.90%	145-150	0.7	0.00%
60-65	259.8	6.80%	150-155	0.8	0.00%
65-70	213.0	5.60%	155-160	0.7	0.00%
70-75	161.8	4.30%	160-165	0.6	0.00%
75-80	109.1	2.90%	165-170	0.5	0.00%
80-85	58.8	1.50%	170-175	0.3	0.00%
85-90	17.0	0.40%	175-180	0.1	0.00%



Goniophotometer Test (Cont'd)
Intensity Data(cd)

Candela Table - Type C

	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5	360
0	1284	1284	1284	1284	1284	1284	1284	1284	1284	1284	1284	1284	1284	1284	1284	1284	1284
1	1286	1286	1287	1287	1286	1286	1288	1287	1291	1288	1288	1286	1287	1288	1288	1287	1286
2	1290	1290	1289	1288	1289	1289	1289	1290	1289	1292	1291	1291	1289	1290	1289	1290	1290
3	1291	1291	1291	1291	1291	1291	1292	1291	1293	1291	1292	1290	1292	1292	1292	1291	1291
4	1292	1291	1292	1292	1292	1292	1292	1292	1293	1292	1293	1291	1291	1292	1292	1291	1292
5	1291	1291	1292	1290	1290	1290	1291	1291	1291	1290	1291	1289	1290	1290	1291	1290	1291
6	1288	1287	1290	1289	1288	1288	1290	1288	1288	1289	1290	1288	1288	1288	1289	1289	1288
7	1286	1287	1287	1286	1284	1285	1287	1285	1284	1286	1287	1284	1284	1285	1286	1286	1286
8	1282	1283	1284	1282	1282	1281	1282	1283	1282	1282	1284	1281	1281	1282	1284	1283	1282
9	1278	1278	1279	1279	1278	1278	1279	1279	1277	1278	1279	1278	1278	1278	1279	1279	1278
10	1275	1275	1275	1275	1274	1273	1275	1275	1274	1273	1275	1274	1273	1274	1274	1274	1275
11	1270	1269	1270	1270	1268	1269	1270	1270	1270	1268	1269	1269	1269	1269	1269	1270	1270
12	1265	1265	1264	1265	1263	1263	1265	1264	1264	1263	1264	1264	1262	1264	1264	1264	1265
13	1259	1259	1260	1259	1259	1258	1258	1258	1258	1257	1257	1258	1258	1258	1258	1258	1259
14	1253	1253	1253	1253	1252	1252	1253	1252	1251	1253	1252	1252	1252	1252	1252	1252	1253
15	1245	1246	1245	1246	1246	1245	1246	1244	1244	1245	1245	1244	1245	1245	1246	1245	1245
16	1238	1240	1238	1239	1238	1239	1238	1238	1237	1237	1238	1237	1238	1238	1238	1238	1238
17	1231	1232	1231	1232	1232	1232	1230	1230	1230	1230	1231	1229	1230	1230	1231	1230	1231
18	1223	1224	1223	1222	1223	1224	1222	1223	1222	1221	1223	1222	1221	1222	1223	1223	1223
19	1214	1215	1215	1215	1214	1215	1215	1215	1215	1213	1214	1214	1214	1214	1214	1215	1214
20	1206	1206	1206	1207	1204	1205	1206	1206	1206	1204	1205	1206	1204	1205	1206	1206	1206
25	1155	1156	1156	1157	1155	1155	1156	1155	1153	1155	1155	1155	1154	1155	1155	1155	1155
30	1103	1104	1104	1104	1104	1104	1104	1103	1103	1101	1102	1102	1102	1102	1102	1104	1103
35	1044	1044	1045	1045	1045	1044	1043	1042	1040	1043	1042	1042	1043	1043	1043	1043	1044
40	972	972	973	972	972	971	972	970	968	968	970	970	968	971	971	971	972
45	885	887	888	888	887	887	886	885	885	883	883	885	886	886	885	886	885
50	797	797	799	798	798	799	796	795	794	793	794	796	796	797	797	796	797
55	699	701	701	702	701	700	698	698	695	698	698	698	699	698	699	699	699
60	592	593	593	594	594	592	590	590	589	589	591	592	592	592	592	592	592
65	479	480	480	480	480	479	477	476	475	473	474	476	477	478	478	478	479
70	366	367	366	367	368	366	364	362	361	361	363	364	364	365	365	365	366
75	256	257	258	258	259	256	254	253	254	254	253	254	254	256	254	255	256
80	155	156	157	158	158	156	153	152	152	151	151	153	154	154	154	155	155
85	67	66	66	68	68	67	65	64	64	63	63	64	65	65	65	65	67
90	4	4	4	4	5	4	4	4	4	4	4	3	3	3	3	4	4
95	2	1	1	2	2	2	2	1	1	1	2	1	2	2	2	2	2
100	1	1	2	2	1	2	1	2	1	1	2	2	1	2	2	1	1
105	1	1	1	1	1	1	1	2	2	1	1	1	1	1	2	1	1
110	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
115	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
120	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1
125	1	1	1	1	1	2	1	1	1	2	2	1	2	2	1	1	1
130	2	2	2	2	1	1	2	2	2	2	2	1	2	1	1	1	2
135	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
140	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
145	2	3	3	2	3	2	2	2	3	3	2	2	2	2	2	2	2
150	2	2	2	2	3	3	2	2	3	2	3	3	3	3	3	3	2
155	3	3	3	3	3	3	3	3	3	4	3	3	3	3	3	3	3
160	4	3	4	3	4	3	3	3	3	4	3	3	4	4	3	3	4
165	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
170	5	5	5	4	5	5	5	5	5	5	5	5	4	5	5	5	5
175	5	4	5	4	5	5	5	5	4	5	5	5	4	5	4	5	5
180	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5



THD and PF Test

Model No.	55751-30W-35K	Sample ID.	5550477,5580366
Operate time (Min.)	90	Stabilization time (Min.)	45

Test Method

1. The samples were tested according to the ANSI C82.77-10-2014.
2. The ambient temperature condition was maintained at 25 °C ± 1 °C. The sample measurement was made using a digital power meter and power supply. The sample was operated at rated voltage and stabilized before measurement. The total harmonic distortion were calculated from the digital power meter.

Test Results

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Current THD	Orientation
24.4	120.05	60	0.2500	29.63	0.9869	4.91%	Horizontal
24.4	277.11	60	0.1125	29.25	0.9381	16.06%	Horizontal



THD and PF Test

Model No.	55751-30W-40K	Sample ID.	5550477,5580366
Operate time (Min.)	90	Stabilization time (Min.)	45

Test Method

1. The samples were tested according to the ANSI C82.77-10-2014.
2. The ambient temperature condition was maintained at 25 °C ± 1 °C. The sample measurement was made using a digital power meter and power supply. The sample was operated at rated voltage and stabilized before measurement. The total harmonic distortion were calculated from the digital power meter.

Test Results

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Current THD	Orientation
24.4	120.04	60	0.2420	28.66	0.9864	4.52%	Horizontal
24.4	277.12	60	0.1094	28.36	0.9352	15.94%	Horizontal



THD and PF Test

Model No.	55751-30W-50K	Sample ID.	5550477,5580366
Operate time (Min.)	90	Stabilization time (Min.)	45

Test Method

1. The samples were tested according to the ANSI C82.77-10-2014.
2. The ambient temperature condition was maintained at 25 °C ± 1 °C. The sample measurement was made using a digital power meter and power supply. The sample was operated at rated voltage and stabilized before measurement. The total harmonic distortion were calculated from the digital power meter.

Test Results

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Current THD	Orientation
24.4	120.05	60	0.2506	29.70	0.9868	4.70%	Horizontal
24.4	277.12	60	0.1127	29.32	0.9383	15.06%	Horizontal



THD and PF Test

Model No.	55751-25W-35K	Sample ID.	5550477,5580366
Operate time (Min.)	90	Stabilization time (Min.)	45

Test Method

1. The samples were tested according to the ANSI C82.77-10-2014.
2. The ambient temperature condition was maintained at 25 °C ± 1 °C. The sample measurement was made using a digital power meter and power supply. The sample was operated at rated voltage and stabilized before measurement. The total harmonic distortion were calculated from the digital power meter.

Test Results

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Current THD	Orientation
24.4	120.09	60	0.2070	24.56	0.9875	5.15%	Horizontal
24.4	277.12	60	0.0969	24.73	0.9223	16.64%	Horizontal



THD and PF Test

Model No.	55751-20W-35K	Sample ID.	5550477,5580366
Operate time (Min.)	90	Stabilization time (Min.)	45

Test Method

1. The samples were tested according to the ANSI C82.77-10-2014.
2. The ambient temperature condition was maintained at 25 °C ± 1 °C. The sample measurement was made using a digital power meter and power supply. The sample was operated at rated voltage and stabilized before measurement. The total harmonic distortion were calculated from the digital power meter.

Test Results

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Current THD	Orientation
24.4	120.11	60	0.1619	19.16	0.9849	6.09%	Horizontal
24.4	277.11	60	0.0808	20.07	0.8968	16.46%	Horizontal



In-Situ Temperature Measurement Test

Model No.	55751-30W-35K	Sample ID.	5550477,5580366
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Test Method

1. In-Situ Temperature Measurement Test is conducted according to the UL 1598-2008, Section 14.
 2. The testing was conducted in a room with ambient temperature of 25 °C ± 5 °C. The apparatus construction followed those described in UL1598-2008 for normal temperature testing. Thermocouples were placed on the LED package in the locations indicated by LM-80 report. Thermocouples were placed on the LED driver case in the locations specified by the manufacture if necessary. The temperature was recorded after the lamp was operated by 7.5 hours.
 3. The data and photos in LM-80 test report is provided by the customer/ The data and photos in driver specification is provided by the customer.

In-Situ Temperature Measurement Test Conditions

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Current THD	Orientation
24.0	120.05	60	0.2500	29.63	0.9869	4.91%	Horizontal

Test Results (LEDs)

Thermocouple Location	Declared Light Source Current (mA)	Temperature for Light Source (°C)		Max Chromaticity Shift (1000-6000h)	LED Model Number	LM-80 Limit Current (mA)	LM-80 Limit Temp (°C)
		Test Result	Test Result (Correct to 25 °C)				
Ambient TEMP	N/A	24.0	25.0				
TMP of Location 1	45	34.8	35.8	0.0016	BXEN-(A)E-13H-9RB	100	105

Test Results (Drivers)

Thermocouple Location	Temperature for Driver (°C)		Driver Model Number	Driver Limit Temp (°C)
	Test Result	Test Result (Correct to 25 °C)		
Ambient TEMP	24.0	25.0		
TMP of Location 1	49.3	50.3	SIF 30-I0800 120-277 W D1-S1S2	90



In-Situ Temperature Measurement Test (Cont'd)

Test Photos for Ts Point of Light Sources & Tc Point of Drivers





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