TEST REPORT

For

P.Q.L., Inc.

2285 Ward Avenue / Simi Valley, CA 93065

Model Number:	55684	
Report Type:	Electrical, Photometric and ISTMT tests according to the following standards and show the compliance to DLC Program SSL Technical Requirements V5.1	
Standards:	ANSI/IES LM-79-19: Approved Method: Optical and Electrical Measurements of Solid-State Lighting Products ANSI C82.77-10-2014: Harmonic Emission Limits – Related Power Quality Requirements for Lighting ANSI/UL 1598-2008: Standard for Safety of Luminaires CIE 190:2010 Calculation and presentation of unified glare rating tables for indoor lighting luminaires IES TM-30-18 : IES Method for Evaluating Light Source Color Rendition	
Project Engineer:	Bay Wang	
Report Number:	RKSB230425008-10	
Sample Size:	One sample was received on 2023-04-25 and used for testing.	
Test Date:	2023-05-19 to 2023-05-25	
Report Date:	2023-05-26	
Reviewed By:	Seven Xia/ EE Engineer	
Prepared By:	Bay Area Compliance Laboratories Corp. (Kunshan). No. 248 Chenghu Road, Kunshan, Jiangsu, People's Republic of China Tel: +86-0512-86175000 Fax: +86-0512-88934268	

1. Product Information and Description

Product Primary Use:	Direct Linear Ambient Luminaires
Voltage and Frequency:	120-277VAC, 50/60Hz
LED Source Manufacturer:	Bridgelux Lnc.
LED Source Model:	BXEN-(A)E-21L-3A
Driver Model:	SIL50-I650 120-277 W D1S+D3 R
Luminaire length:	4ft
Auxiliary Ballast Model:	NA
Auxiliary Housing Model:	NA
White Tunable:	Yes
Field-Adjustable Light Output:	Yes

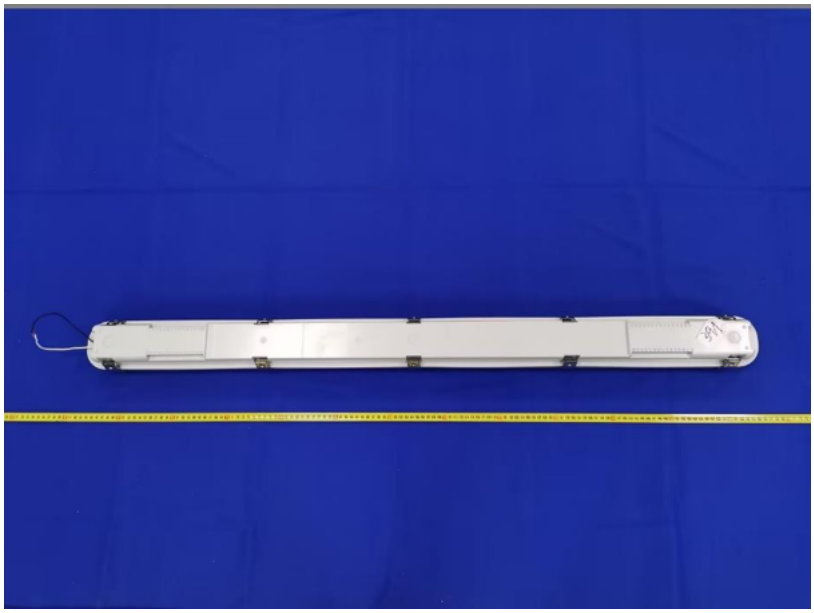
2. Product Rated Values#

Test Model	CCT(K)	Light Output (lm)	Power(W)	Luminous Efficacy (lm/W)
55684-35K	3500	3990	30	133
		3375	25	135
		2484	18	138
55684-40K	4000	4290	30	143
		3625	25	145
		2664	18	148
55684-50K	5000	4050	30	135
		3425	25	137
		2520	18	140

3. Test List

Test Model	Power(W)	Test Item			
		Goniophotometer Test	Integrating Sphere Test	THDi and PF Test	In-Situ Temperature Measurement Test
55684-35K	30	Yes	Yes	Yes	Yes
	25	NA	Yes	Yes	NA
	18	NA	Yes	Yes	NA
55684-40K	30	NA	Yes	Yes	NA
55684-50K	30	Yes	Yes	Yes	NA

4. Product Photo



LED Driver Photo

5. Test Result

Test Model: 55684-35K
Control setting: 30W

Integrating Sphere Test; Orientation: Downward; Test Voltage: 120V 60Hz;

Test Item	Test Result	DLC Requirements	DLC Requirements(With tolerances only)	Conclusion
Light Output(lm)	3961.2	≥1500	≥1350	Pass
Power(W)	29	None.	None.	N/A
Total Efficacy(lm/W)	136.59	≥115	≥111.55	Pass
CCT(K)	3392	None [i]	None.	N/A
Duv	-0.00135	None [i]	None.	N/A
IES R_f	82	70	69	Pass
IES R_g	98	89	88	
IES Rcs,h1	-12%	-12%~23%	-13%~24%	
R_a	81.3	≥80	≥79	
R9	7	≥0	≥-1	

Note:
i. White-tunable products are not required to meet the chromaticity requirements in DLC V5.1.

Goniophotometer Test; Orientation: Downward; Test Voltage: 120V 60Hz;

Test Item	Test Result	DLC Requirements	DLC Requirements(With tolerances only)	Conclusion
Light Output(lm)	3961.5	≥1500	≥1350	Pass
Power(W)	29.01	None.	None.	N/A
Total Efficacy(lm/W)	136.61	≥115	≥111.55	Pass
Zonal Lumen Distribution(0-60°)	70.29%	0-60°≥40%	0-60°≥37%	Pass

Goniophotometer THDi、PF Test; Orientation: Downward;

Test Voltage	Test Item	Test Result	DLC Requirements	DLC Requirements(With tolerances and/or allowances)	Conclusion
120	Power Factor	0.9988	≥0.9	≥0.87	Pass
120	THDi	4.16%	≤20%	≤25%	Pass
277	Power Factor	0.9671	≥0.9	≥0.87	Pass
277	THDi	5.61%	≤20%	≤25%	Pass

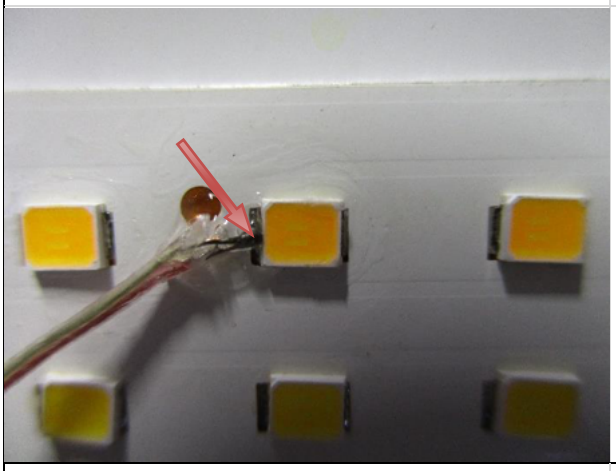
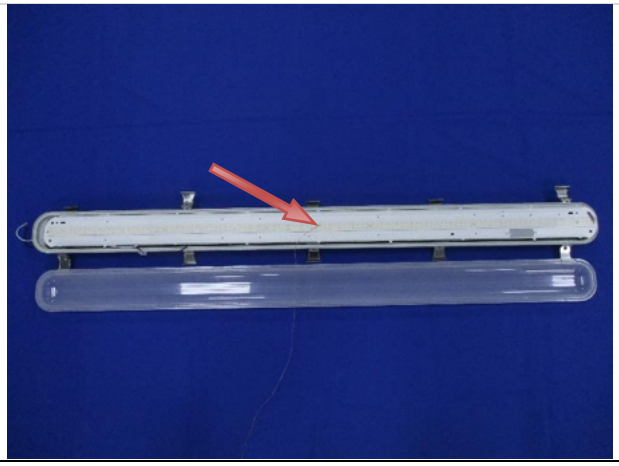
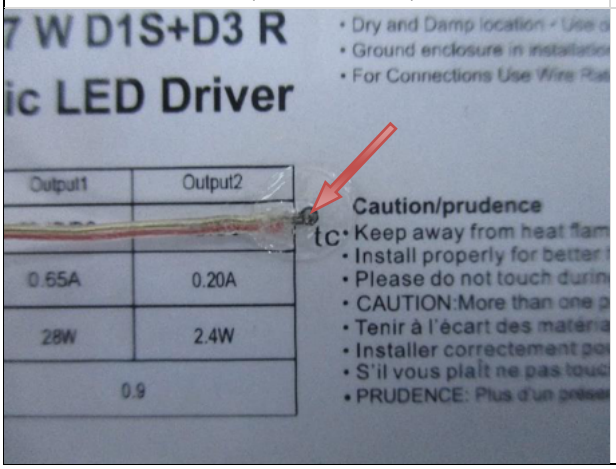
Integrating Sphere THDi、PF Test; Orientation: Downward;

Test Voltage	Test Item	Test Result	DLC Requirements	DLC Requirements(With tolerances and/or allowances)	Conclusion
120	Power Factor	0.9963	≥0.9	≥0.87	Pass
120	THDi	3.97%	≤20%	≤25%	Pass
277	Power Factor	0.9599	≥0.9	≥0.87	Pass
277	THDi	5.36%	≤20%	≤25%	Pass

In-Situ Temperature Measurement Test: Test Voltage: 120V 60Hz;

Test Item	Test Result	DLC Requirements	DLC Requirements(With tolerances and/or allowances)	Conclusion
TMP_{LED}(°C)	48.1	≤105	With tolerance of ≤ 1.1°C or 0.4%, whichever is greater due to thermocouple tolerance	Pass
TMP_c(°C)	51.7	≤90	With tolerance of ≤ 1.1°C or 0.4%, whichever is greater due to thermocouple tolerance	Pass
Drive Current/Individual LED source(mA)	80.3	≤150	With +5% tolerance	Pass
L_{70} Lumen Maintenance Life (Hours)	＞72000	⩾50000	None.	Pass
Color Maintenance	0.0012	≤0.004	≤0.0044	Pass

Note:
1. The test results were measured directly from the test equipment.
2. The DLC requirements were listed according to DLC Technical Requirements V5.1.
3. The conclusion is for reference only. Test report that indicate product performance meets DLC Technical Requirements do not represent official DLC product qualification. All decisions regarding product qualification are made by the DLC.

TMP_{LED}(Zoomed-in View)	TMP_{LED}(Bird's-eye View)
	
TMP_c(Zoomed-in View)	TMP_c (Bird's-eye View)
	

Test Data

[Integrating Sphere System]

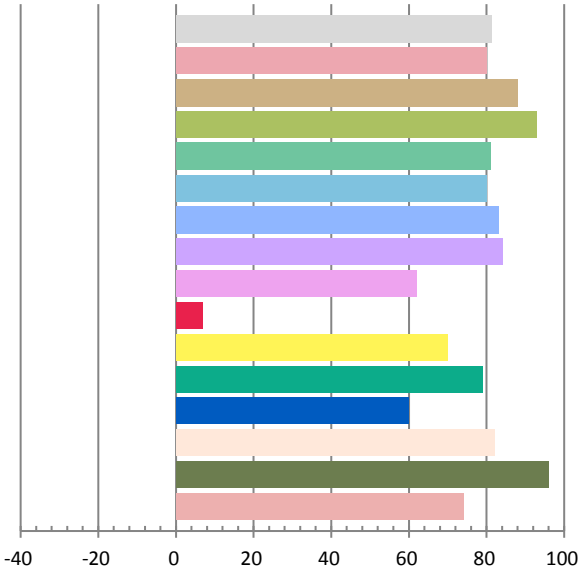
Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.0	60	0.2426	29	0.9962	3961.2	136.59

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
11.872	3392	-0.00135	0.4100	0.3899	0.2391	0.5116

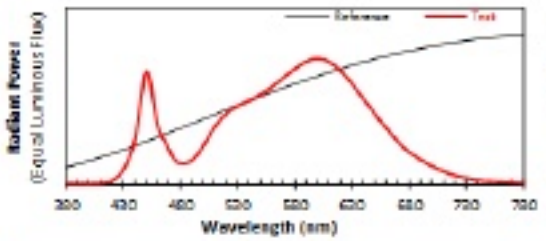
Color Rendering Index

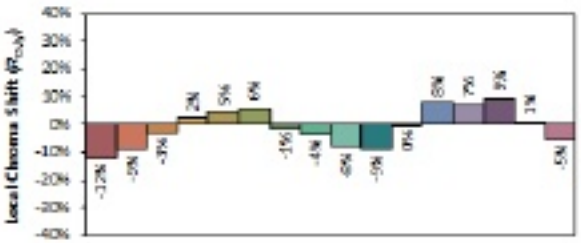
Ra			
81.3			
R1	R2	R3	R4
80	88	93	81
R5	R6	R7	R8
80	83	84	62
R9	R10	R11	R12
7	70	79	60
R13	R14	R15	
82	96	74	

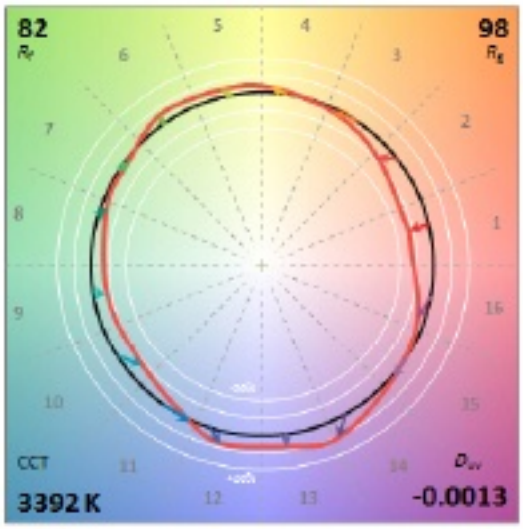


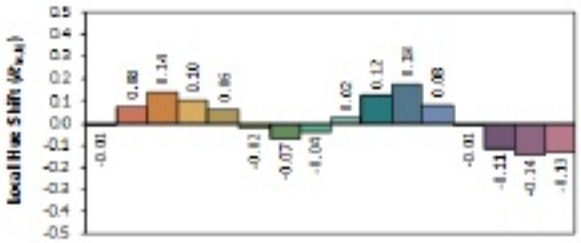
ANSI/IES TM-30-18 Color Rendition Report

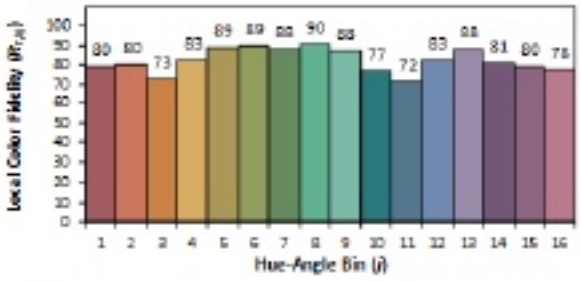
Source: User SPD
Manufacturer: P.Q.L.,Inc.
Date: 2023/3/23
Model: 55684-35K

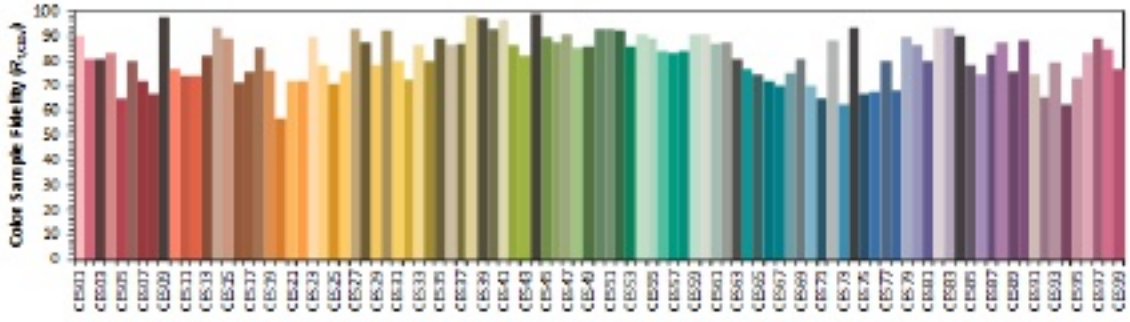












Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

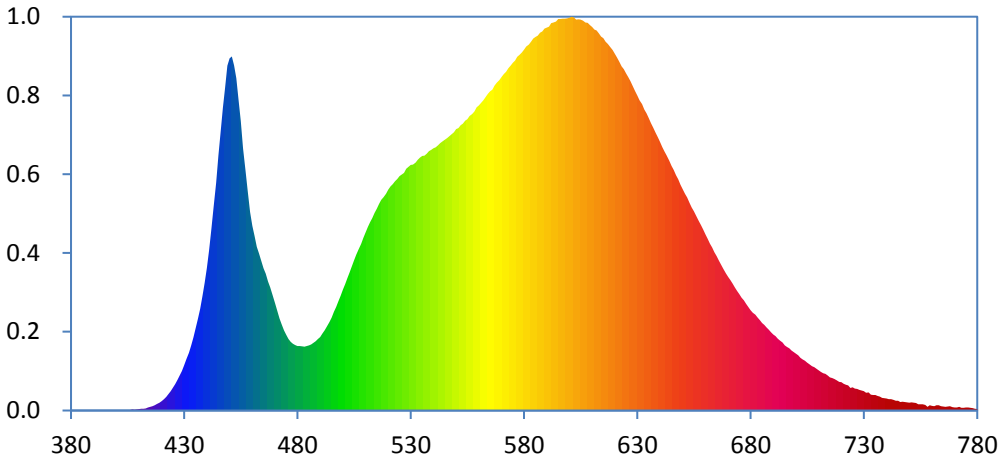
x	0.4100
y	0.3899
u'	0.2391
v'	0.5116

CIE 13.3-1995 (CRI)

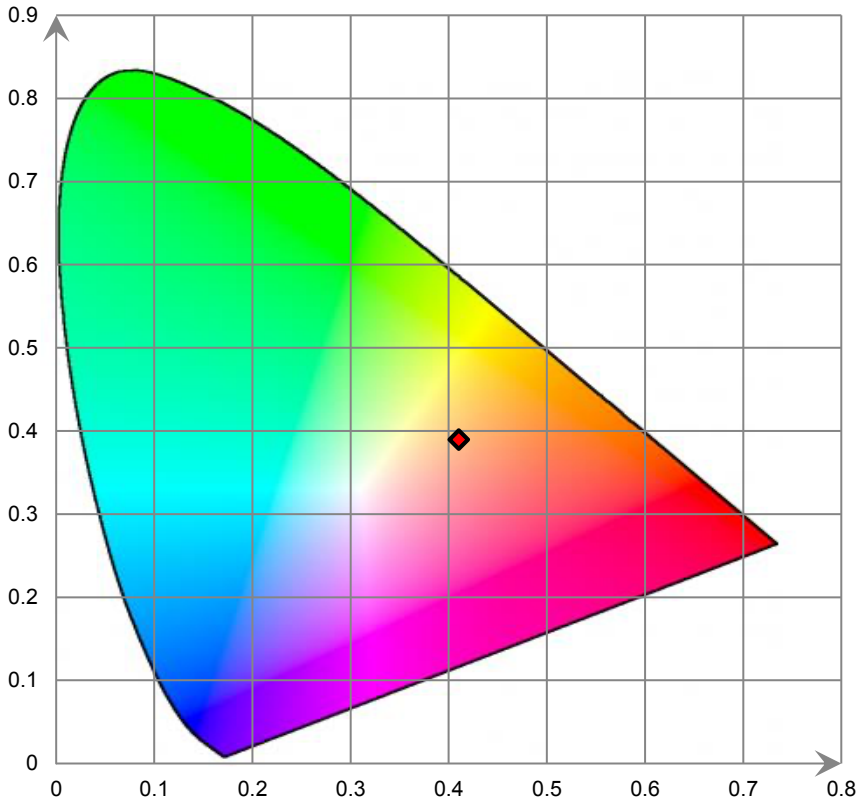
R_a	81
R_9	7

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

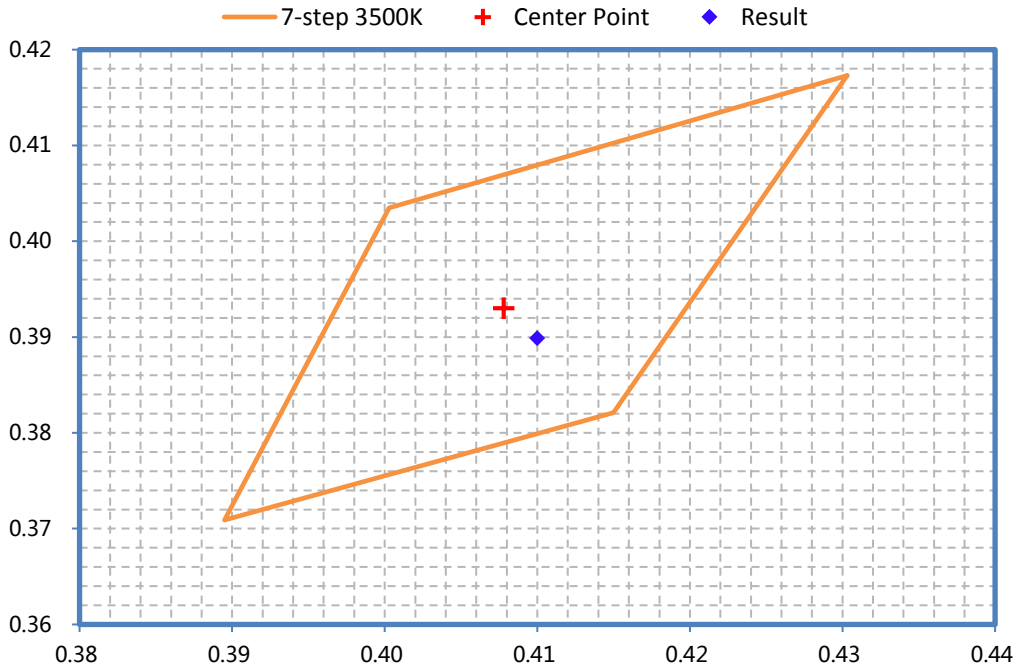
Relative Spectral Power Distribution



CIE 1931 x y Chromaticity Diagram



ANSI C78.377-2017 Chromaticity Quadrangles



[Goniophotometer System]

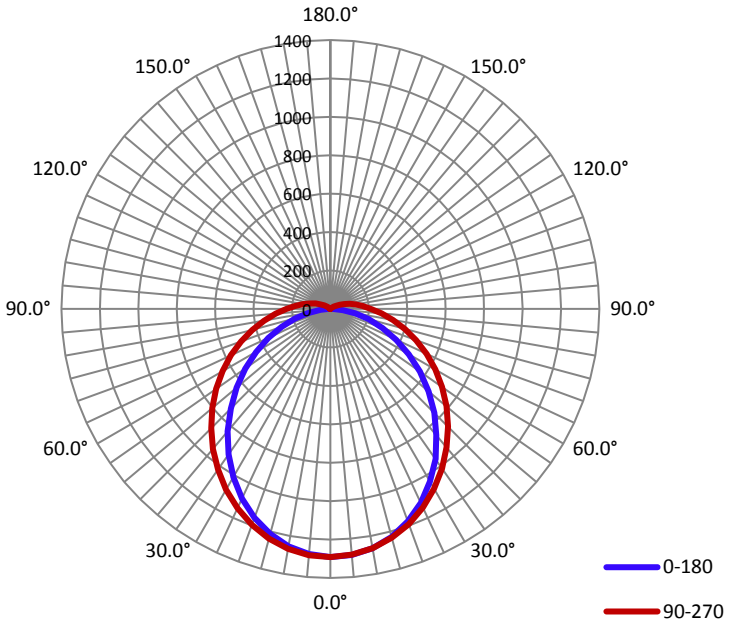
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60	0.242	29.01	0.999

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I_{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
3961.5	136.61	1291.8	1.18	1.25

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I_{max}):	100.7	107.9	119.2	108.5	109.1
Field Angle (10% I_{max}):	159.3	180.7	203.0	181.8	181.2

Luminous Intensity (cd) Distribution Data

C / γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	1291.3	1291.3	1291.3	1291.3	1291.3	1291.3	1291.3	1291.3
5.0°	1285.8	1286.1	1284.8	1284.7	1283.9	1283.2	1282.5	1282.4
10.0°	1264.7	1264.6	1264.0	1264.6	1263.9	1263.3	1259.3	1258.1
15.0°	1228.0	1229.2	1229.4	1232.6	1232.7	1229.2	1222.9	1219.0
20.0°	1176.9	1179.8	1182.3	1189.2	1191.6	1186.4	1174.1	1168.3
25.0°	1113.7	1117.2	1122.2	1134.3	1140.0	1130.4	1113.5	1102.7
30.0°	1037.1	1041.9	1055.6	1070.2	1080.4	1068.6	1044.0	1027.0
35.0°	953.7	958.5	976.8	999.2	1012.9	998.0	966.2	941.2
40.0°	857.4	868.4	892.4	924.5	940.8	923.4	884.0	854.2
45.0°	764.9	777.5	805.6	844.7	865.9	844.1	797.9	757.8
50.0°	666.4	683.3	717.5	763.3	787.9	762.5	710.7	664.6
55.0°	569.4	586.6	627.9	682.1	708.8	680.7	623.6	570.9
60.0°	471.8	491.9	540.1	601.2	630.0	598.2	537.2	478.5
65.0°	379.1	402.0	457.1	522.5	552.6	519.4	454.9	390.9
70.0°	289.3	316.5	375.9	443.2	474.8	443.5	374.7	306.4
75.0°	206.7	236.5	301.5	368.5	401.0	368.4	300.7	229.9
80.0°	131.8	166.5	234.9	299.6	331.3	298.6	234.2	161.4
85.0°	64.2	105.5	175.7	236.2	267.1	234.7	175.0	102.8
90.0°	11.0	59.6	125.6	181.4	209.8	179.9	124.4	57.9
95.0°	8.4	38.2	95.6	145.7	169.4	144.4	94.7	37.0
100.0°	5.9	22.4	70.4	114.8	133.3	114.0	70.2	22.1
105.0°	3.8	10.0	49.0	87.3	102.7	86.1	49.0	9.8
110.0°	2.1	3.4	32.4	63.5	76.2	62.5	32.5	2.9
115.0°	0.0	2.4	18.1	43.6	54.5	43.1	17.4	2.1
120.0°	0.0	1.2	7.1	27.0	35.8	26.7	7.2	1.9
125.0°	0.0	1.0	2.7	12.8	20.0	13.4	2.7	0.0
130.0°	0.0	0.7	2.1	4.2	8.2	3.9	2.8	0.8
135.0°	0.0	1.1	2.6	3.8	4.9	3.7	2.4	1.5
140.0°	0.0	1.4	3.2	4.1	4.2	3.8	2.7	1.9
145.0°	1.7	2.5	3.1	4.3	4.4	4.4	3.4	2.1
150.0°	2.1	2.5	3.8	4.2	4.7	4.1	3.6	2.7
155.0°	2.0	3.5	4.5	4.9	4.8	4.3	3.6	2.9
160.0°	3.0	3.9	4.2	4.8	5.0	4.2	3.7	3.6
165.0°	3.4	4.0	4.2	4.3	4.4	4.2	4.1	4.0
170.0°	3.9	4.1	4.3	4.2	4.0	4.0	4.0	4.5
175.0°	4.3	4.3	4.8	4.4	4.7	4.6	4.5	3.9
180.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Luminous Intensity (cd) Distribution Data (cont.)

C / γ	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	1291.3	1291.3	1291.3	1291.3	1291.3	1291.3	1291.3	1291.3
5.0°	1280.6	1282.7	1283.4	1284.8	1286.1	1285.6	1285.2	1285.5
10.0°	1254.2	1258.6	1261.3	1264.6	1267.8	1266.5	1265.6	1264.6
15.0°	1211.7	1218.8	1224.7	1231.8	1237.7	1235.1	1231.1	1227.8
20.0°	1156.3	1166.0	1175.0	1187.4	1196.1	1192.0	1184.1	1177.5
25.0°	1088.7	1100.7	1112.9	1131.8	1144.8	1138.1	1124.3	1114.3
30.0°	1010.6	1024.7	1043.9	1068.2	1085.0	1076.1	1054.9	1039.9
35.0°	924.6	940.5	965.5	998.4	1020.1	1005.5	978.3	957.5
40.0°	832.5	852.4	883.1	924.8	950.5	932.2	896.8	867.6
45.0°	733.9	758.5	799.6	848.5	877.0	856.4	814.1	775.3
50.0°	637.3	666.4	713.3	767.7	801.7	777.6	728.7	681.0
55.0°	541.2	573.6	627.6	689.0	725.6	699.7	642.2	587.4
60.0°	447.2	483.1	541.8	610.5	649.3	620.3	558.4	496.5
65.0°	356.3	396.1	460.3	531.9	571.6	541.6	477.4	409.2
70.0°	269.1	311.2	383.2	454.8	494.5	463.2	398.5	323.8
75.0°	189.5	235.3	310.8	381.7	420.2	387.3	325.0	246.8
80.0°	116.8	167.2	243.9	312.5	350.6	316.4	256.7	177.5
85.0°	52.3	107.9	184.4	249.9	285.8	255.5	195.3	117.3
90.0°	8.2	62.9	137.3	197.5	229.1	202.1	146.4	72.1
95.0°	5.8	39.1	104.3	157.3	184.7	161.4	111.9	46.4
100.0°	4.2	21.6	76.5	123.4	144.7	126.3	82.9	27.8
105.0°	2.8	7.8	52.9	93.6	110.7	96.0	58.0	12.5
110.0°	1.2	2.8	34.1	67.7	82.3	70.4	38.0	4.1
115.0°	0.0	1.5	16.8	45.5	58.0	47.8	20.6	2.7
120.0°	0.0	0.7	4.2	26.9	37.3	29.4	7.6	2.0
125.0°	0.0	0.0	2.2	12.3	20.1	13.5	2.9	0.0
130.0°	0.0	0.0	1.7	3.7	5.7	3.7	2.7	0.0
135.0°	0.0	0.0	1.9	3.6	4.1	3.8	2.5	1.0
140.0°	0.0	0.0	2.2	3.2	4.1	3.5	2.7	1.6
145.0°	0.0	1.0	2.3	3.4	3.5	3.4	2.9	1.1
150.0°	1.2	1.1	2.1	3.5	3.6	3.4	2.9	2.0
155.0°	1.5	1.9	2.7	3.5	4.0	3.8	3.3	3.0
160.0°	2.7	2.2	2.4	3.9	3.8	4.0	3.6	2.7
165.0°	2.7	2.8	3.2	3.8	3.6	4.4	4.0	3.7
170.0°	3.2	3.7	3.6	4.2	4.3	3.9	3.9	4.1
175.0°	3.8	4.0	4.7	4.4	4.7	4.6	5.1	4.6
180.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Test Model: 55684-35K
Control setting: 25W

THDi、PF Test; Orientation: Downward;

Test Voltage	Test Item	Test Result	DLC Requirements	DLC Requirements(With tolerances and/or allowances)	Conclusion
120	Power Factor	0.9956	≥0.9	≥0.87	Pass
120	THDi	3.99%	≤20%	≤25%	Pass
277	Power Factor	0.9469	≥0.9	≥0.87	Pass
277	THDi	6.47%	≤20%	≤25%	Pass

Note:
1. The test results were measured directly from the test equipment.
2. The DLC requirements were listed according to DLC Technical Requirements V5.1.
3. The conclusion is for reference only. Test report that indicate product performance meets DLC Technical Requirements do not represent official DLC product qualification. All decisions regarding product qualification are made by the DLC.

Test Data

[Integrating Sphere System]

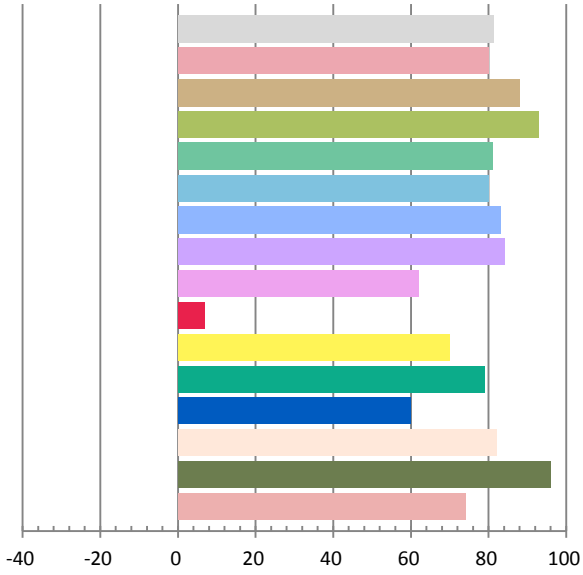
Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.0	60	0.2021	24.14	0.9954	3352.6	138.89

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
10.031	3396	-0.00122	0.4099	0.3902	0.2389	0.5117

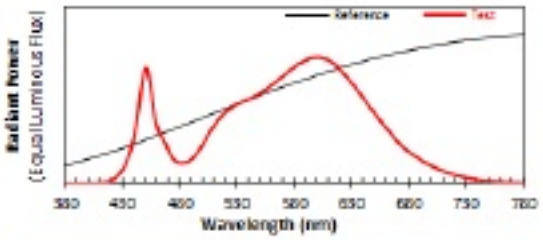
Color Rendering Index

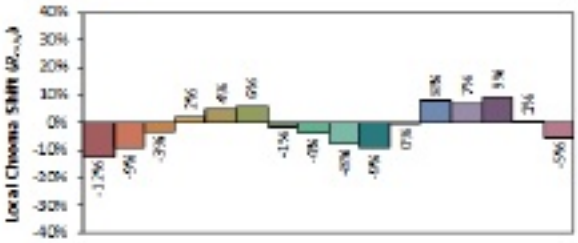
Ra			
81.3			
R1	R2	R3	R4
80	88	93	81
R5	R6	R7	R8
80	83	84	62
R9	R10	R11	R12
7	70	79	60
R13	R14	R15	
82	96	74	

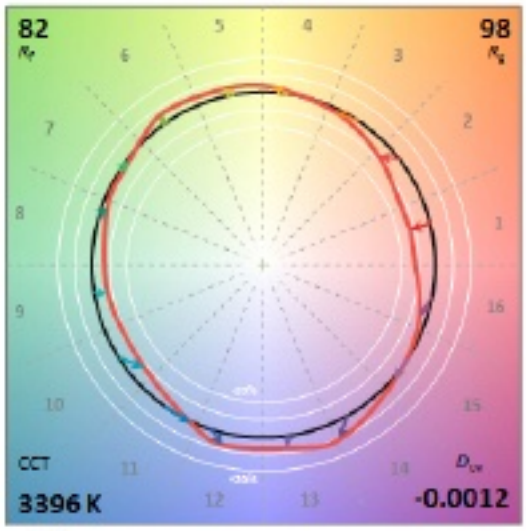


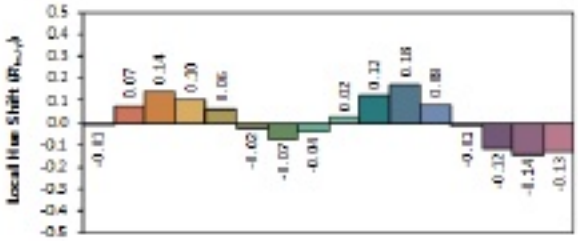
ANSI/IES TM-30-18 Color Rendition Report

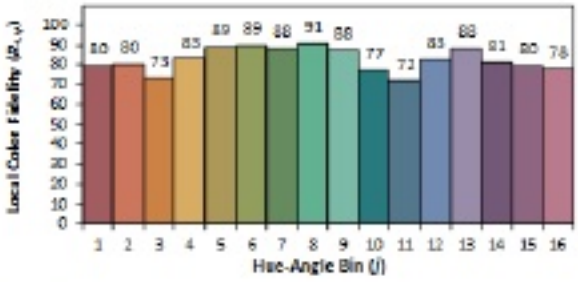
Source: Test SPD
Manufacturer: P.Q.L.,Inc
Date: 2023/3/23
Model: 55684-35K

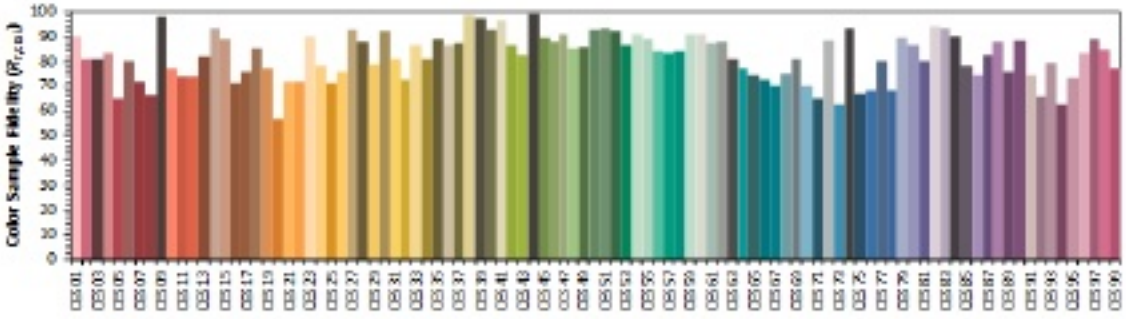












Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

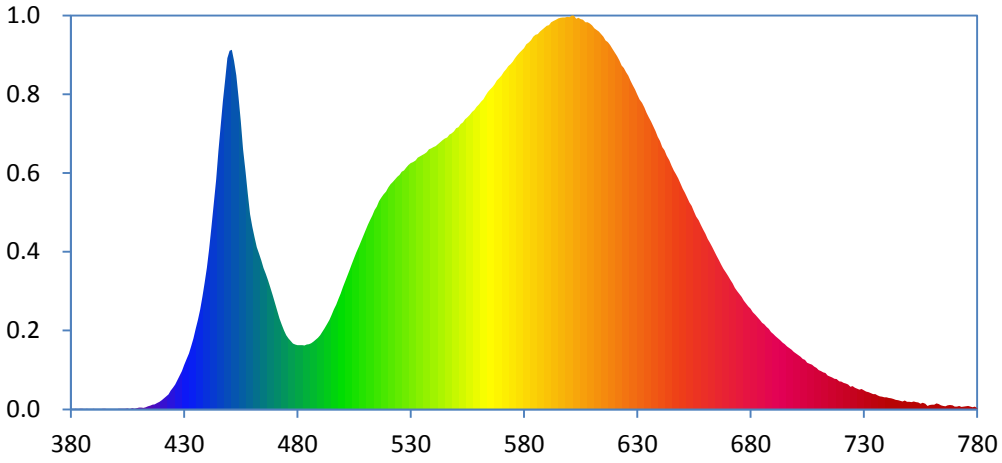
x	0.4099
y	0.3902
u'	0.2389
v'	0.5117

CIE 13.3-1995 (CRI)

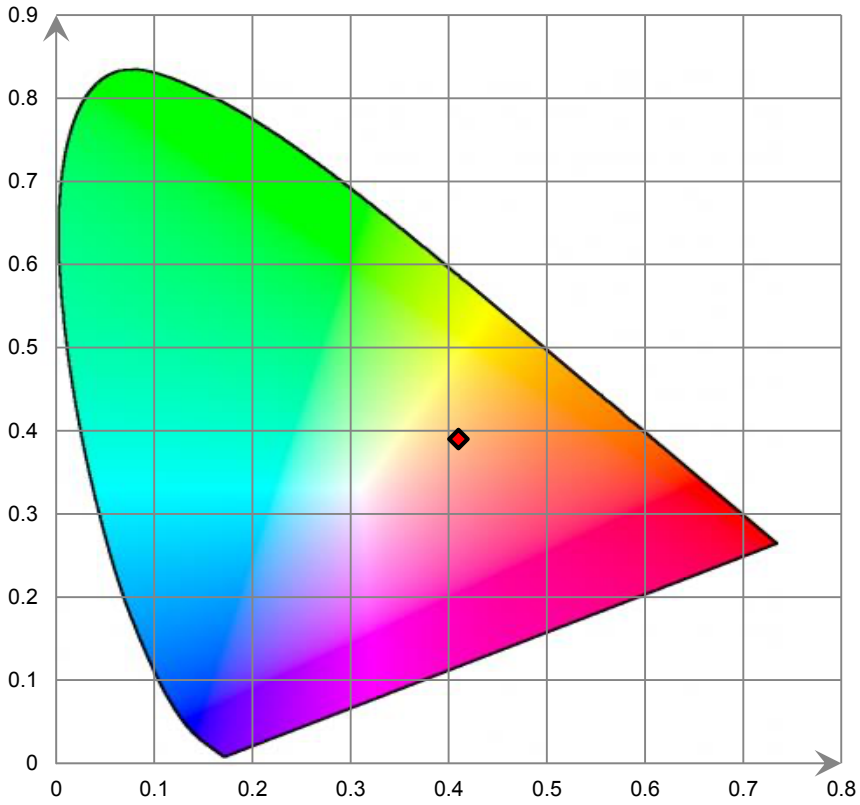
R_a	81
R_9	7

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

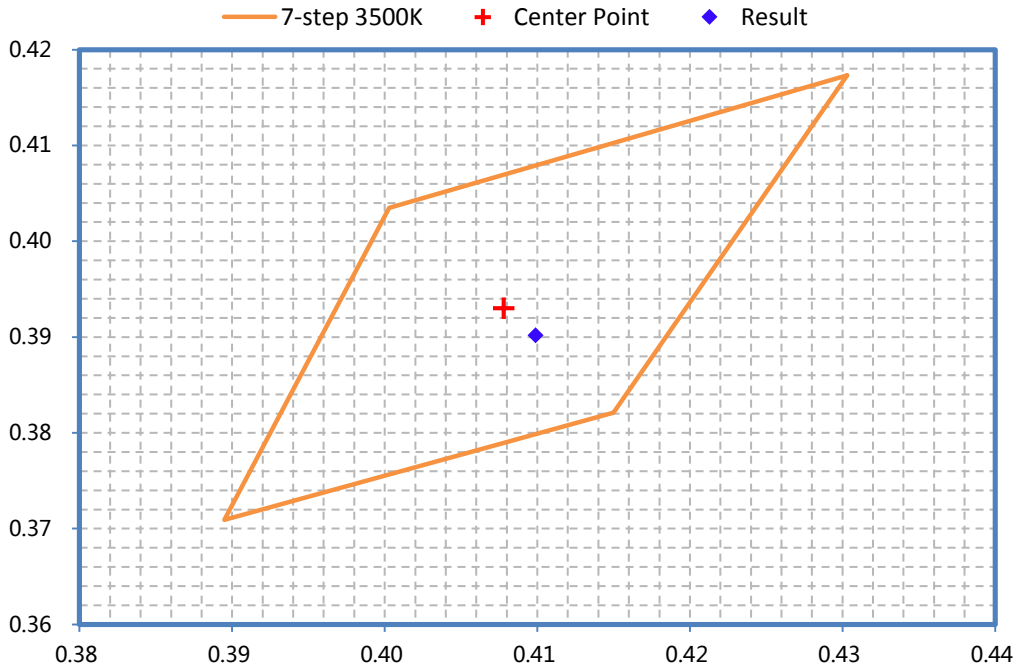
Relative Spectral Power Distribution



CIE 1931 x y Chromaticity Diagram



ANSI C78.377-2017 Chromaticity Quadrangles



Test Model: 55684-35K
Control setting: 18W

THDi、PF Test; Orientation: Downward;

Test Voltage	Test Item	Test Result	DLC Requirements	DLC Requirements(With tolerances and/or allowances)	Conclusion
120	Power Factor	0.9937	≥0.9	≥0.87	Pass
120	THDi	4.84%	≤20%	≤25%	Pass
277	Power Factor	0.9235	≥0.9	≥0.87	Pass
277	THDi	8.54%	≤20%	≤25%	Pass

Note:
1. The test results were measured directly from the test equipment.
2. The DLC requirements were listed according to DLC Technical Requirements V5.1.
3. The conclusion is for reference only. Test report that indicate product performance meets DLC Technical Requirements do not represent official DLC product qualification. All decisions regarding product qualification are made by the DLC.

Test Data

[Integrating Sphere System]

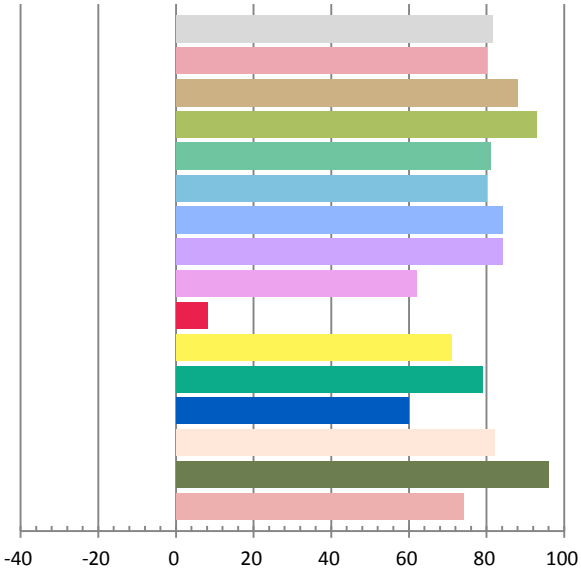
Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.0	60	0.1565	18.66	0.9936	2656.9	142.4

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
7.959	3384	-0.00118	0.4106	0.3906	0.2392	0.5120

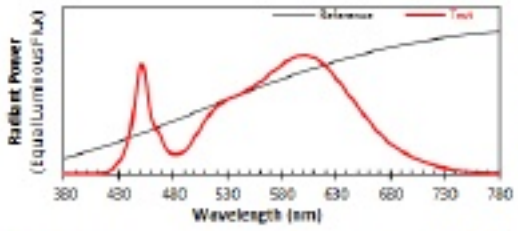
Color Rendering Index

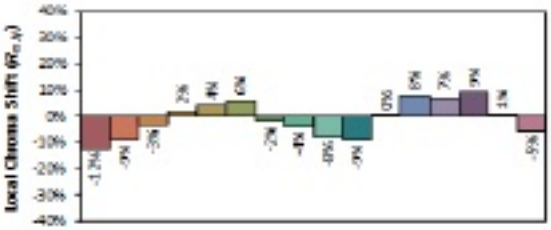
Ra			
81.5			
R1	R2	R3	R4
80	88	93	81
R5	R6	R7	R8
80	84	84	62
R9	R10	R11	R12
8	71	79	60
R13	R14	R15	
82	96	74	

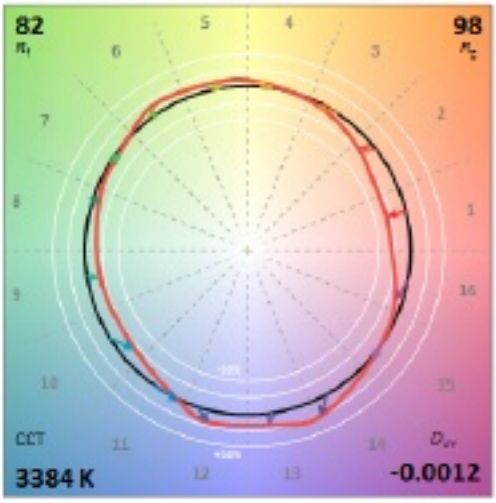


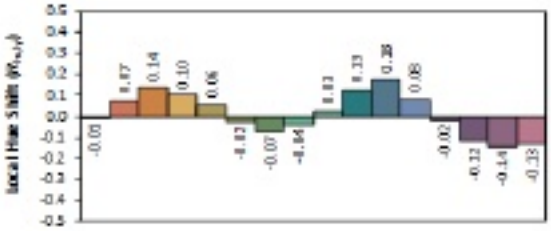
ANSI/IES TM-30-18 Color Rendition Report

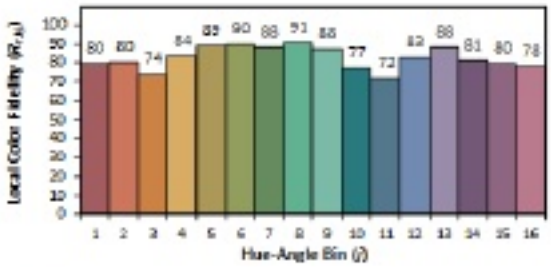
Source: User SPD
Manufacturer: P.Q.L.,Inc.
Date: 2023/5/23
Model: 55684-35K

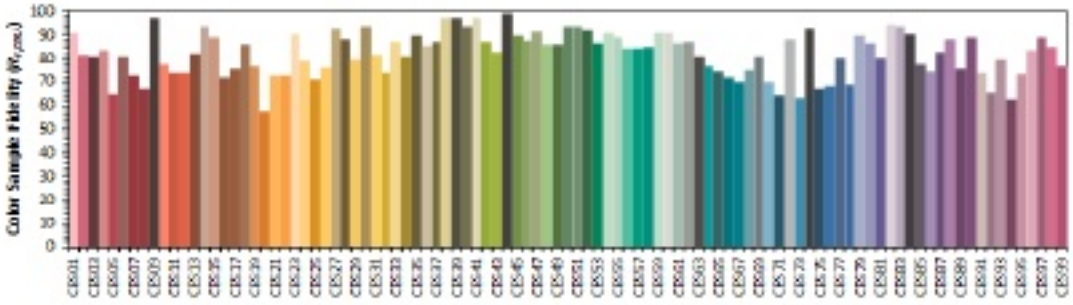












Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

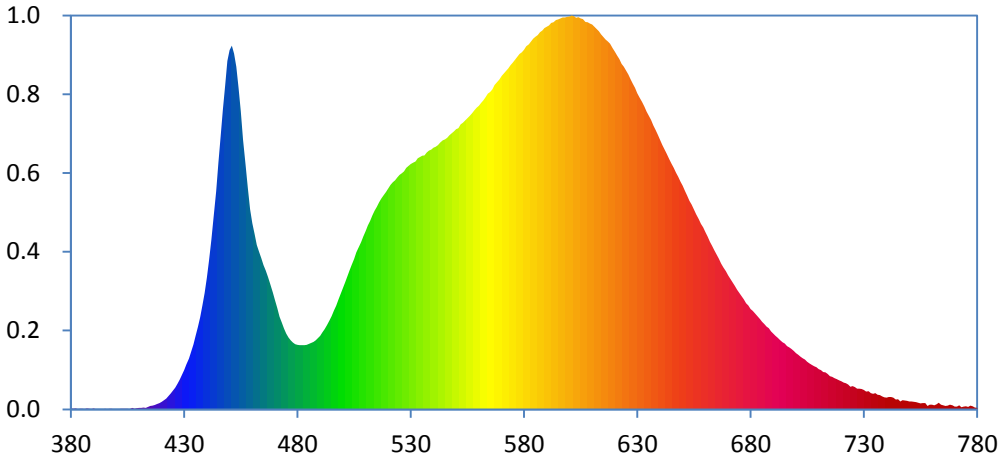
x	0.4106
y	0.3906
u'	0.2392
v'	0.5120

CIE 13.3-1995 (CRI)

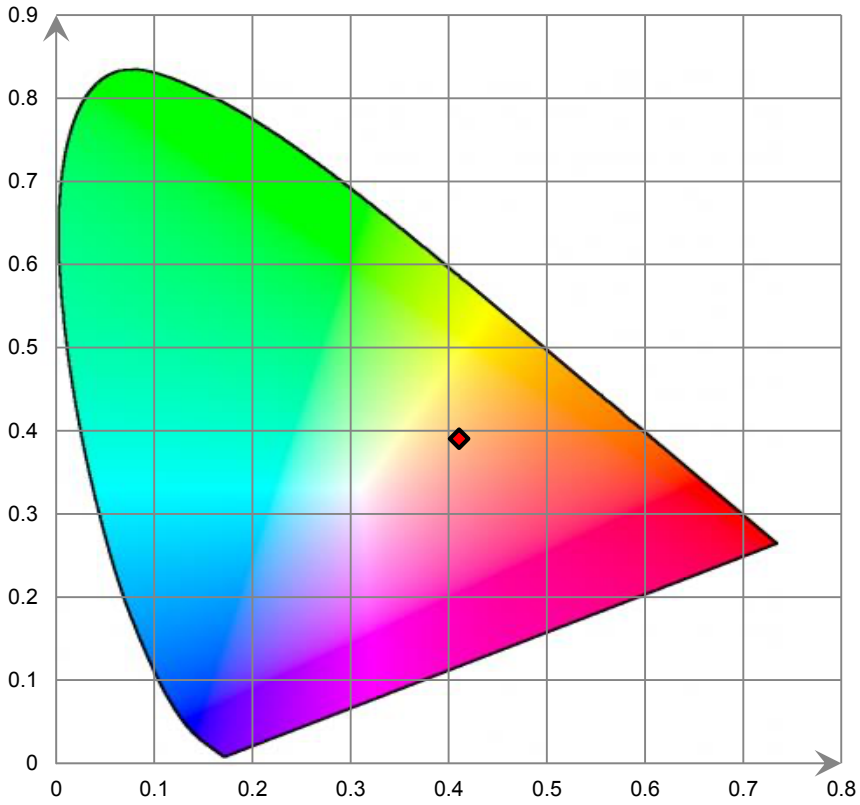
R_a	82
R_9	8

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

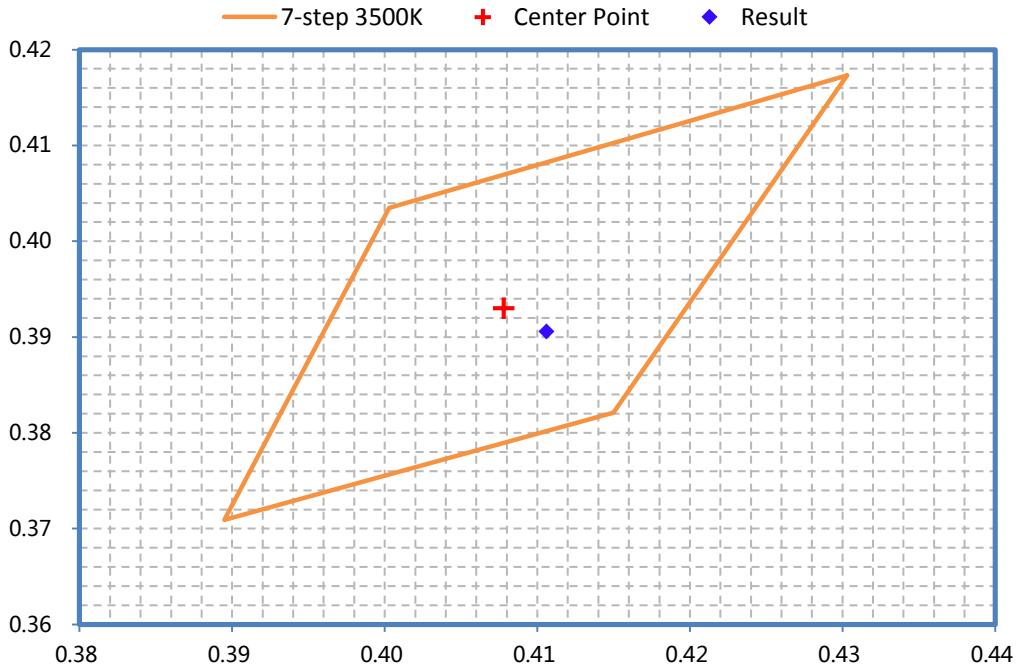
Relative Spectral Power Distribution



CIE 1931 x y Chromaticity Diagram



ANSI C78.377-2017 Chromaticity Quadrangles



Test Model: 55684-40K
Control setting: 30W

Integrating Sphere Test; Orientation: Downward; Test Voltage: 120V 60Hz;

Test Item	Test Result	DLC Requirements	DLC Requirements(With tolerances only)	Conclusion
Light Output(lm)	4139.1	≥1500	≥1350	Pass
Power(W)	28.05	None.	None.	N/A
Total Efficacy(lm/W)	147.56	≥115	≥111.55	Pass
CCT(K)	4059	None [i]	None.	N/A
Duv	-0.00098	None [i]	None.	N/A
IES R_f	83	70	69	Pass
IES R_g	96	89	88	
IES Rcs,h1	-11%	-12%~23%	-13%~24%	
R_a	83.5	≥80	≥79	
R_9	14	≥0	≥-1	

Note:
i. White-tunable products are not required to meet the chromaticity requirements in DLC V5.1.

THDi、PF Test; Orientation: Downward;

Test Voltage	Test Item	Test Result	DLC Requirements	DLC Requirements(With tolerances and/or allowances)	Conclusion
120	Power Factor	0.996	≥0.9	≥0.87	Pass
120	THDi	4.18%	≤20%	≤25%	Pass
277	Power Factor	0.9582	≥0.9	≥0.87	Pass
277	THDi	5.46%	≤20%	≤25%	Pass

Note:
1. The test results were measured directly from the test equipment.
2. The DLC requirements were listed according to DLC Technical Requirements V5.1.
3. The conclusion is for reference only. Test report that indicate product performance meets DLC Technical Requirements do not represent official DLC product qualification. All decisions regarding product qualification are made by the DLC.

Test Data

[Integrating Sphere System]

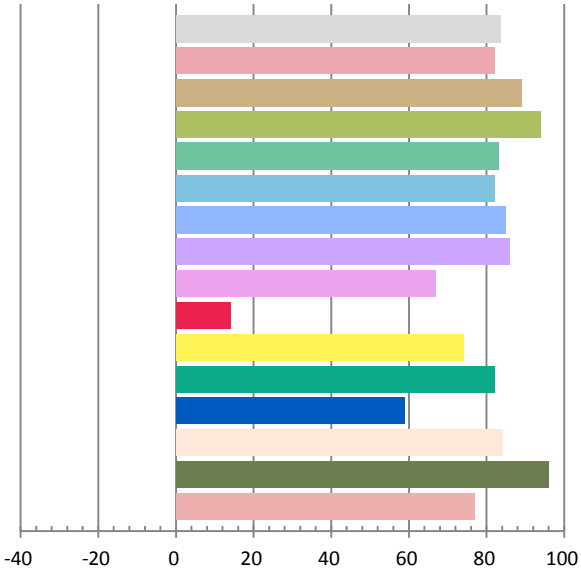
Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.0	60	0.2347	28.05	0.996	4139.1	147.56

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
12.570	4059	-0.00098	0.3772	0.3727	0.2246	0.4993

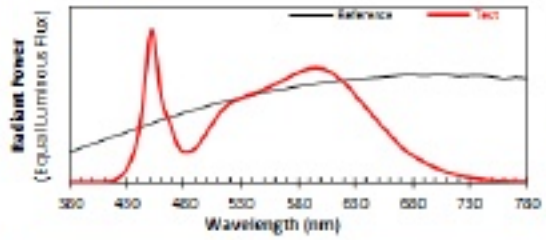
Color Rendering Index

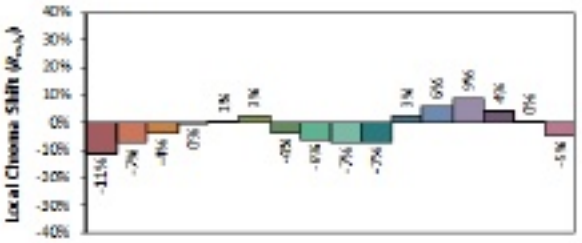
Ra			
83.5			
R1	R2	R3	R4
82	89	94	83
R5	R6	R7	R8
82	85	86	67
R9	R10	R11	R12
14	74	82	59
R13	R14	R15	
84	96	77	

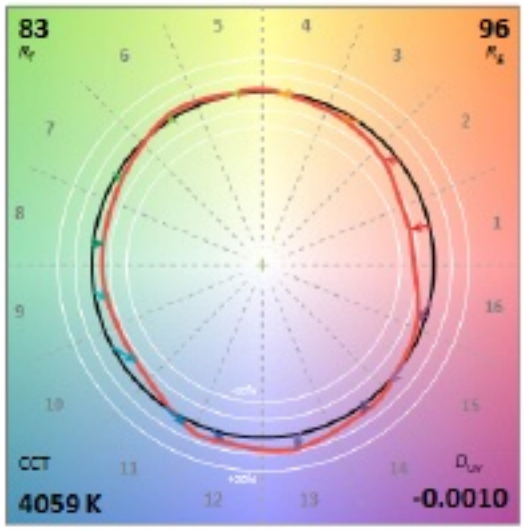


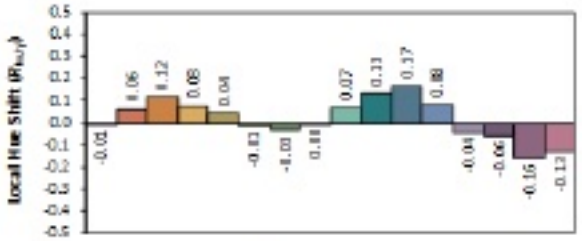
ANSI/IES TM-30-18 Color Rendition Report

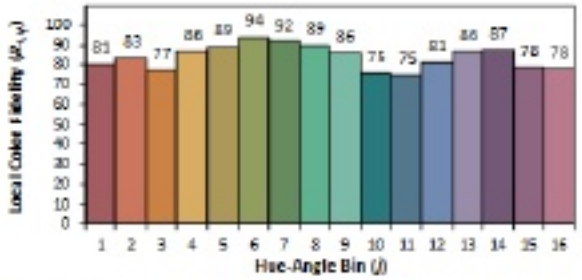
Source: Test SPD
Manufacturer: P.Q.L.,Inc
Date: 2023/3/23
Model: 55684-40K

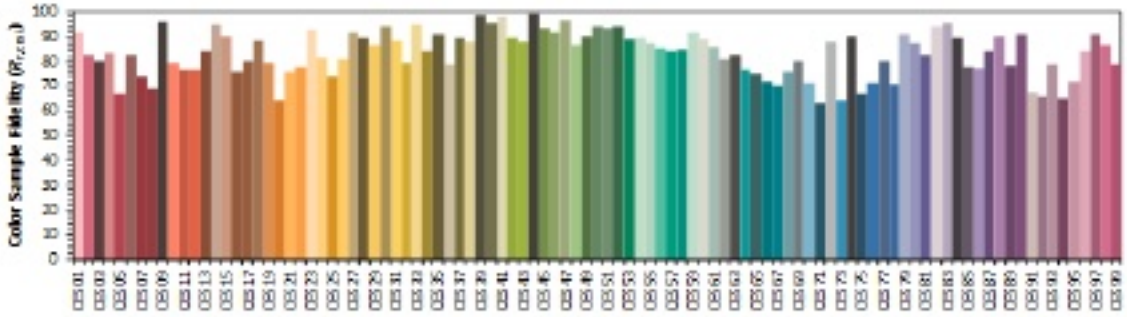












Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

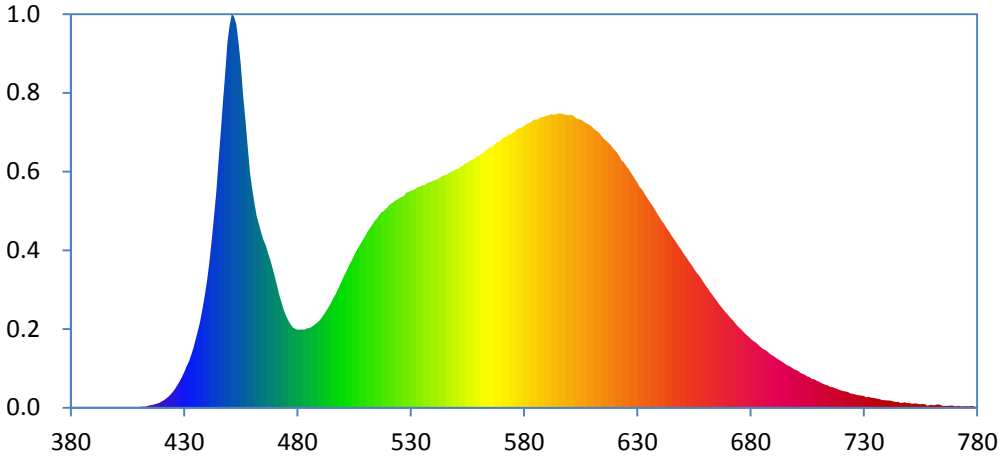
x	0.3773
y	0.3727
u'	0.2246
v'	0.4993

CIE 13.3-1995 (CRI)

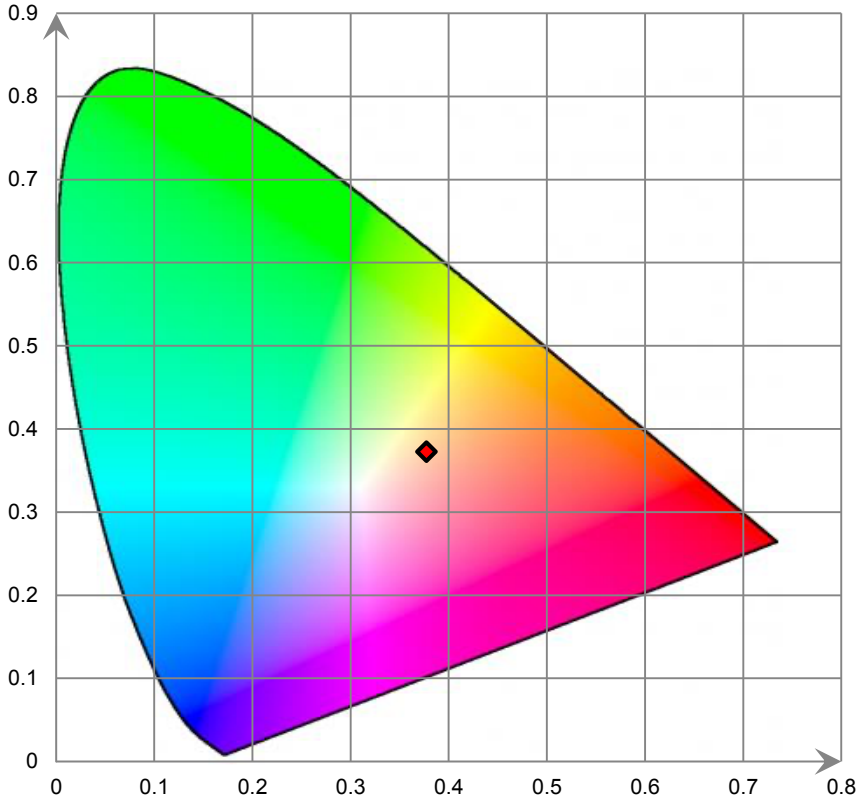
R_a	83
R_9	13

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

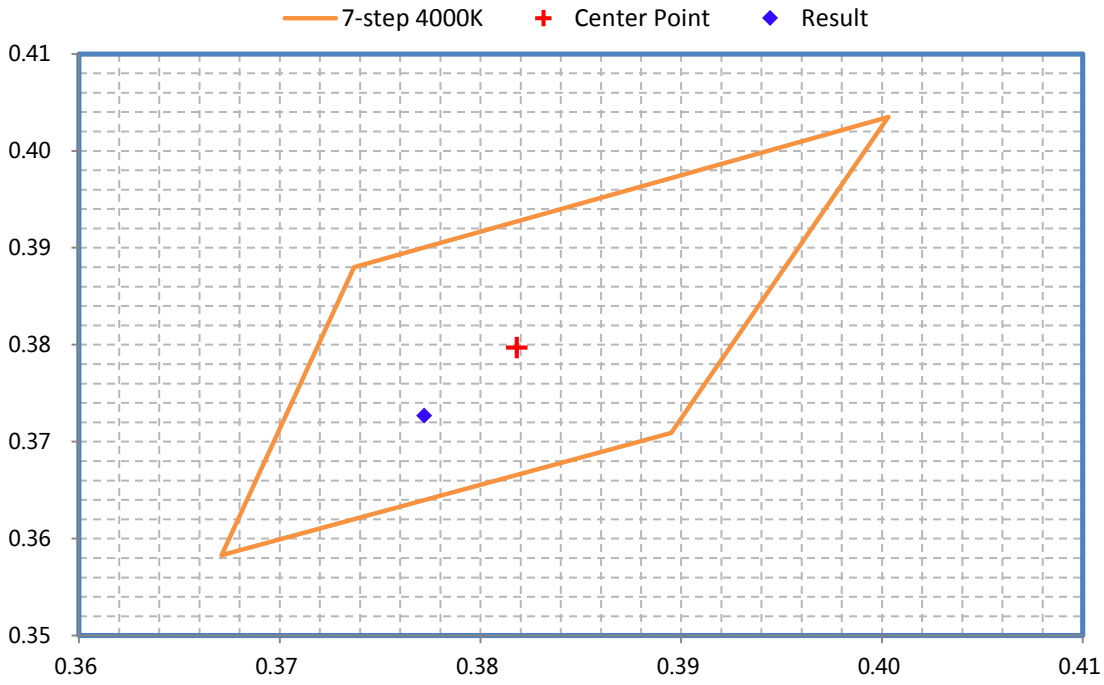
Relative Spectral Power Distribution



CIE 1931 x y Chromaticity Diagram



ANSI C78.377-2017 Chromaticity Quadrangles



Test Model: 55684-50K
Control setting: 30W

Integrating Sphere Test; Orientation: Downward; Test Voltage: 120V 60Hz;

Test Item	Test Result	DLC Requirements	DLC Requirements(With tolerances only)	Conclusion
Light Output(lm)	4024.1	≥1500	≥1350	Pass
Power(W)	29.01	None.	None.	N/A
Total Efficacy(lm/W)	138.71	≥115	≥111.55	Pass
CCT(K)	4945	None [i]	None.	N/A
Duv	0.00172	None [i]	None.	N/A
IES R_f	84	70	69	Pass
IES R_g	96	89	88	
IES Rcs,h1	-12%	-12%~23%	-13%~24%	
R_a	83.3	≥80	≥79	
R9	11	≥0	≥-1	

Note:
i. White-tunable products are not required to meet the chromaticity requirements in DLC V5.1.

Goniophotometer Test; Orientation: Downward; Test Voltage: 120V 60Hz;

Test Item	Test Result	DLC Requirements	DLC Requirements(With tolerances only)	Conclusion
Light Output(lm)	4024.1	≥1500	≥1350	Pass
Power(W)	29.02	None.	None.	N/A
Total Efficacy(lm/W)	138.72	≥115	≥111.55	Pass
Zonal Lumen Distribution(0-60°)	70.23%	0-60°≥40%	0-60°≥37%	Pass

Goniophotometer THDi、PF Test; Orientation: Downward;

Test Voltage	Test Item	Test Result	DLC Requirements	DLC Requirements(With tolerances and/or allowances)	Conclusion
120	Power Factor	0.9988	≥0.9	≥0.87	Pass
120	THDi	4.13%	≤20%	≤25%	Pass
277	Power Factor	0.9671	≥0.9	≥0.87	Pass
277	THDi	0.9988	≤20%	≤25%	Pass

Integrating Sphere THDi、PF Test; Orientation: Downward;

Test Voltage	Test Item	Test Result	DLC Requirements	DLC Requirements(With tolerances and/or allowances)	Conclusion
120	Power Factor	0.9963	≥0.9	≥0.87	Pass
120	THDi	3.96%	≤20%	≤25%	Pass
277	Power Factor	0.9604	≥0.9	≥0.87	Pass
277	THDi	5.45%	≤20%	≤25%	Pass

Note:
1. The test results were measured directly from the test equipment.
2. The DLC requirements were listed according to DLC Technical Requirements V5.1.
3. The conclusion is for reference only. Test report that indicate product performance meets DLC Technical Requirements do not represent official DLC product qualification. All decisions regarding product qualification are made by the DLC.

Test Data

[Integrating Sphere System]

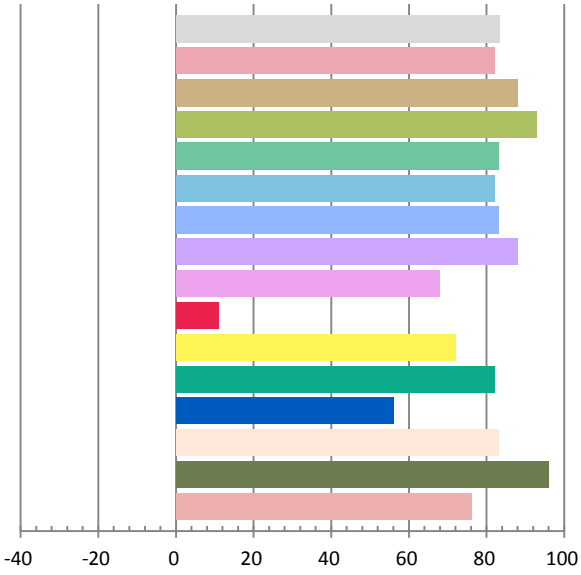
Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.0	60	0.2426	29.01	0.9963	4024.1	138.71

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
12.380	4945	0.00172	0.3471	0.3566	0.2108	0.4874

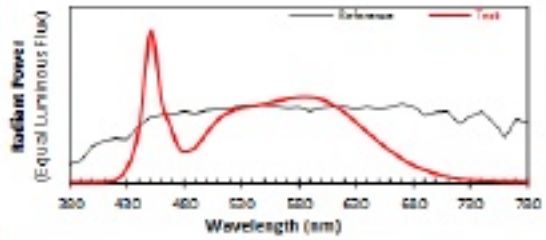
Color Rendering Index

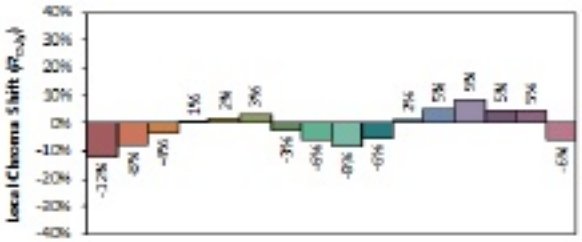
Ra			
83.3			
R1	R2	R3	R4
82	88	93	83
R5	R6	R7	R8
82	83	88	68
R9	R10	R11	R12
11	72	82	56
R13	R14	R15	
83	96	76	

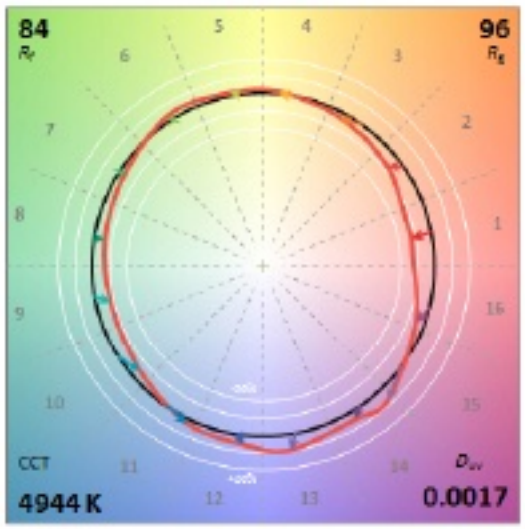


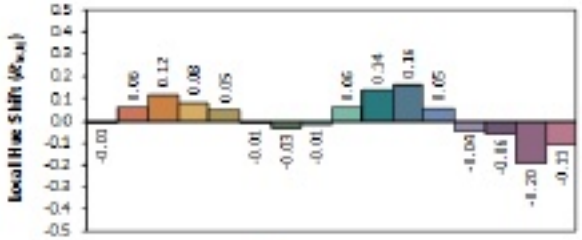
ANSI/IES TM-30-18 Color Rendition Report

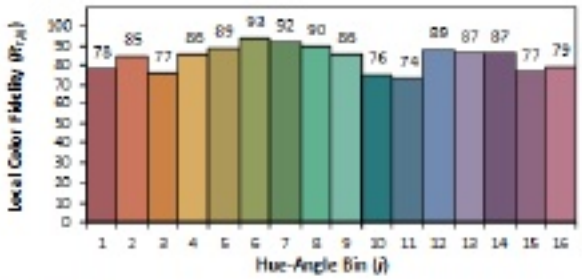
Source: User SPD
Manufacturer: P.Q.L.,Inc
Date: 2023/3/23
Model: 55684-50K

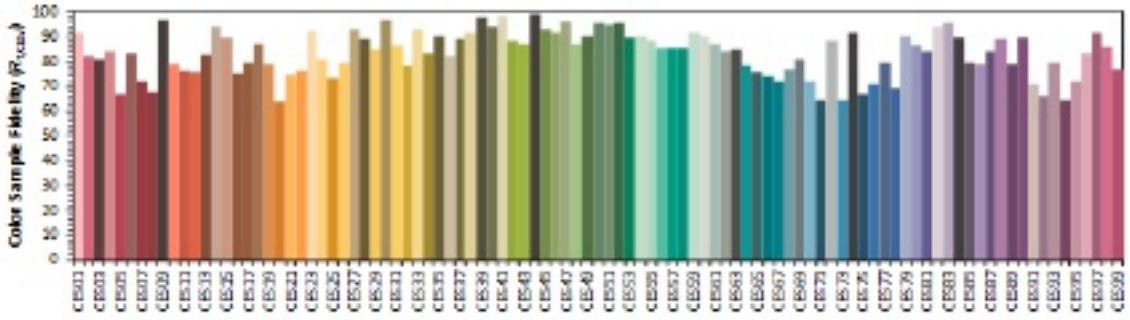












Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

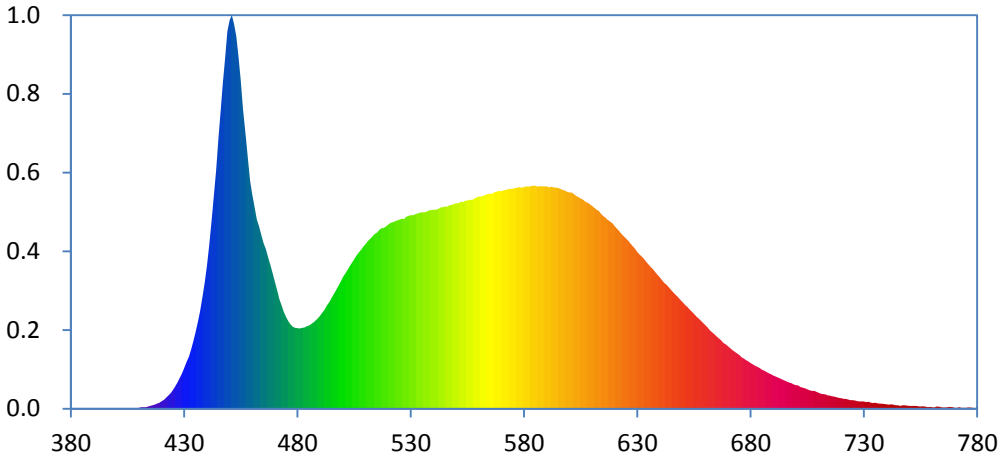
x	0.3471
y	0.3566
u'	0.2108
v'	0.4874

CIE 13.3-1995 (CRI)

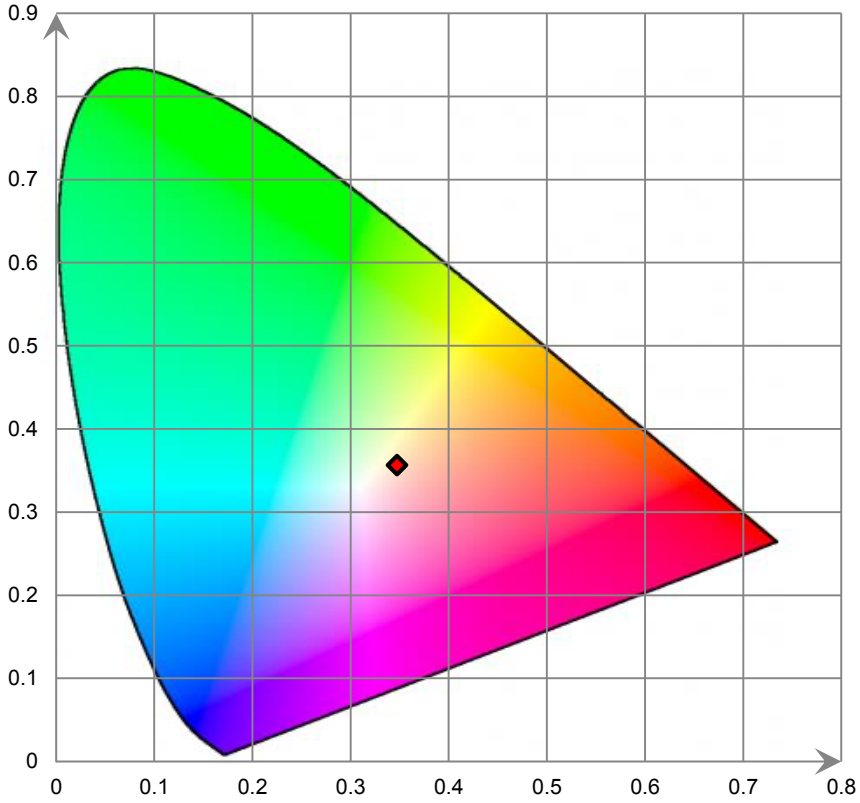
R_a	83
R_9	9

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

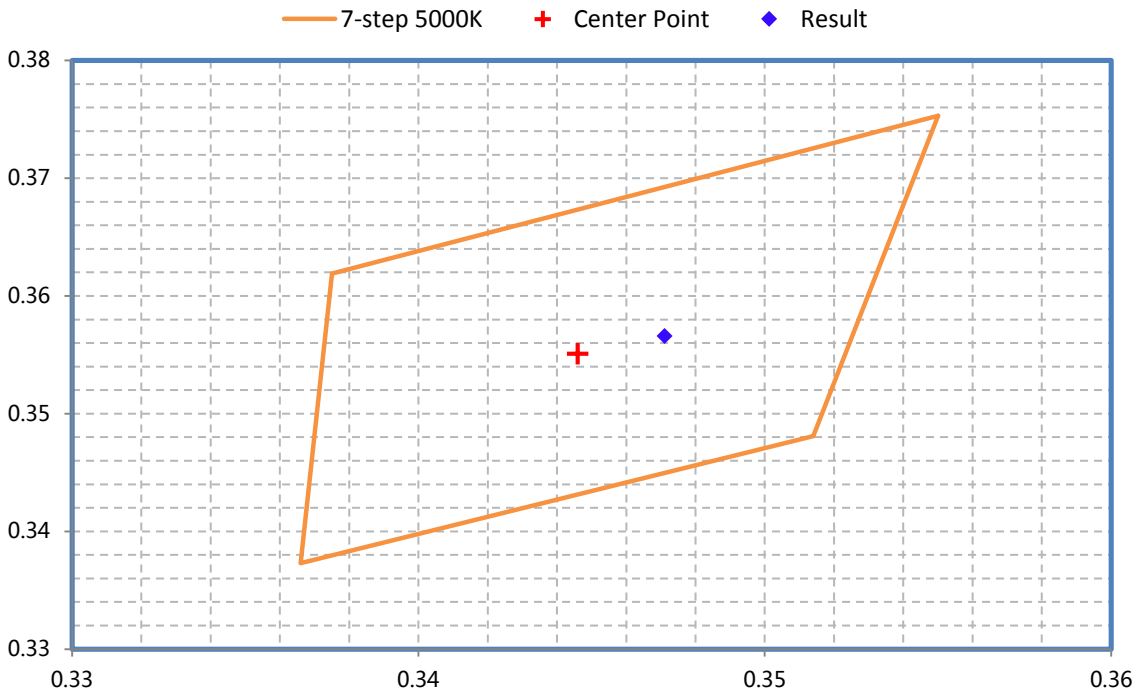
Relative Spectral Power Distribution



CIE 1931 x y Chromaticity Diagram



ANSI C78.377-2017 Chromaticity Quadrangles



[Goniophotometer System]

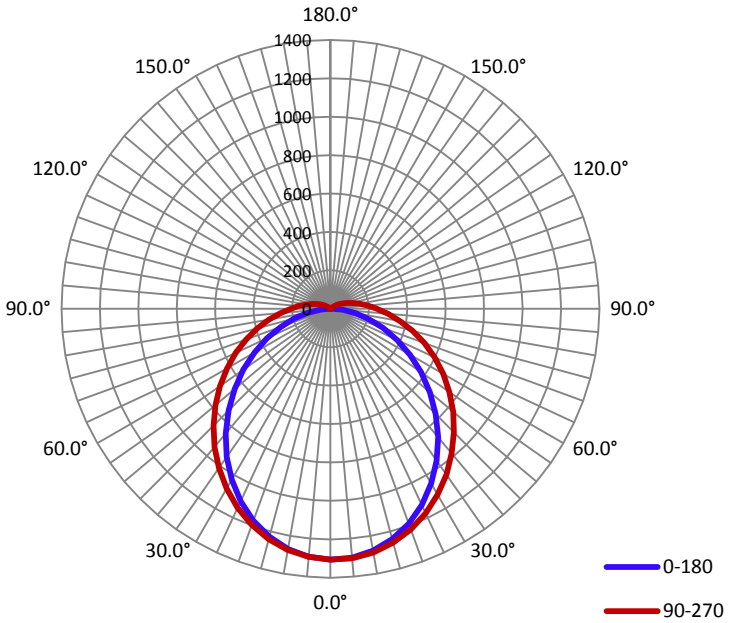
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60	0.242	29.02	0.999

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I_{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
4024.1	138.72	1306.5	1.19	1.25

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I_{max}):	101.0	108.6	119.7	108.7	109.5
Field Angle (10% I_{max}):	159.4	181.6	203.1	181.2	181.3

Luminous Intensity (cd) Distribution Data

C / γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	1305.7	1305.7	1305.7	1305.7	1305.7	1305.7	1305.7	1305.7
5.0°	1300.1	1301.2	1302.2	1302.3	1303.3	1302.0	1300.4	1299.1
10.0°	1278.3	1282.1	1284.2	1286.2	1287.8	1285.4	1280.1	1277.2
15.0°	1241.9	1247.4	1252.4	1257.4	1261.0	1255.4	1246.3	1239.8
20.0°	1191.6	1198.7	1208.3	1216.2	1223.0	1213.6	1199.6	1189.5
25.0°	1126.1	1136.1	1152.3	1163.0	1173.8	1161.1	1140.1	1125.2
30.0°	1050.5	1063.0	1083.5	1101.7	1117.1	1100.4	1073.5	1050.5
35.0°	965.0	982.8	1008.8	1034.3	1053.3	1031.5	997.5	966.2
40.0°	872.4	892.3	925.5	961.9	983.0	959.9	914.5	876.6
45.0°	775.6	801.2	840.6	883.1	908.5	881.7	830.4	785.1
50.0°	675.4	707.3	753.3	806.0	833.7	804.3	744.4	689.8
55.0°	576.7	612.3	665.1	726.5	756.9	724.2	658.0	595.6
60.0°	478.2	516.3	578.3	646.7	678.8	641.7	572.2	502.6
65.0°	384.0	426.4	493.6	567.4	599.6	562.1	489.6	414.7
70.0°	292.6	340.1	413.3	486.3	521.0	484.7	408.7	328.9
75.0°	209.2	259.5	337.9	409.4	442.9	408.6	332.8	250.5
80.0°	132.9	187.5	268.8	337.5	369.3	334.1	263.7	179.3
85.0°	64.3	123.6	205.7	271.0	301.7	267.2	201.3	117.3
90.0°	10.5	74.2	152.1	212.4	240.7	207.8	147.3	69.4
95.0°	8.1	47.7	116.9	170.5	194.6	166.7	112.4	43.5
100.0°	4.8	28.5	86.8	134.9	153.9	131.5	82.9	25.3
105.0°	3.5	13.0	61.4	102.7	118.4	100.4	58.1	10.7
110.0°	1.8	4.0	40.1	75.7	88.6	73.6	38.2	3.3
115.0°	0.0	2.2	22.5	52.2	63.2	50.4	20.5	2.0
120.0°	0.0	1.5	9.3	32.8	42.3	31.3	7.5	1.7
125.0°	0.0	0.7	3.4	16.4	24.0	15.3	3.1	1.2
130.0°	0.0	0.9	2.8	4.5	9.6	4.9	2.9	1.1
135.0°	0.0	1.4	3.4	4.5	4.9	4.2	2.8	1.2
140.0°	0.0	1.8	3.7	4.5	5.2	4.7	3.0	1.9
145.0°	1.5	2.4	3.3	4.6	4.9	4.8	3.9	2.7
150.0°	1.7	2.7	3.9	4.7	5.1	4.4	3.7	3.1
155.0°	2.4	3.3	4.1	4.5	5.1	4.8	3.4	3.9
160.0°	3.1	3.7	4.4	4.9	5.0	4.2	3.9	3.2
165.0°	3.6	4.2	4.3	4.5	4.5	4.2	4.0	4.3
170.0°	3.9	3.7	4.2	4.2	4.8	4.3	4.6	4.8
175.0°	3.8	4.3	4.3	5.0	4.5	5.2	4.8	4.6
180.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Luminous Intensity (cd) Distribution Data (cont.)

C / γ	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	1305.7	1305.7	1305.7	1305.7	1305.7	1305.7	1305.7	1305.7
5.0°	1295.2	1296.1	1295.5	1295.7	1296.3	1296.6	1297.2	1298.3
10.0°	1269.6	1270.2	1271.4	1273.0	1274.4	1274.5	1274.1	1275.1
15.0°	1228.0	1230.7	1233.8	1238.5	1241.3	1240.2	1237.4	1236.8
20.0°	1172.8	1177.1	1182.7	1191.7	1196.9	1194.7	1187.9	1184.9
25.0°	1105.3	1110.4	1120.9	1133.6	1143.6	1138.5	1125.6	1120.2
30.0°	1027.2	1033.0	1049.3	1067.6	1081.1	1073.6	1055.4	1044.1
35.0°	941.0	947.9	968.4	995.6	1012.2	1001.8	974.3	959.9
40.0°	848.6	859.3	882.9	917.4	938.1	923.8	889.6	867.9
45.0°	748.3	761.9	796.2	836.9	859.6	841.3	803.1	772.6
50.0°	650.0	667.4	706.4	754.3	780.6	757.8	713.4	675.6
55.0°	552.5	572.1	617.0	670.4	701.3	675.7	624.9	579.9
60.0°	456.5	476.6	528.3	588.9	622.3	594.8	536.2	486.1
65.0°	363.8	387.0	444.1	508.6	544.0	514.6	452.8	396.0
70.0°	275.0	301.7	364.9	432.7	466.5	434.6	372.1	308.5
75.0°	193.4	224.3	291.4	357.2	392.8	359.4	297.4	230.2
80.0°	119.6	155.2	224.0	288.4	324.1	288.9	230.3	160.9
85.0°	53.9	97.3	165.5	227.1	260.9	229.3	170.4	101.4
90.0°	7.9	54.9	120.7	176.7	205.4	178.2	124.4	58.8
95.0°	5.8	34.6	91.3	140.7	165.2	142.0	94.1	37.9
100.0°	3.9	19.3	67.5	110.2	129.9	110.6	69.7	22.4
105.0°	2.5	7.7	45.8	83.0	99.2	84.1	48.3	9.8
110.0°	0.8	2.5	29.8	60.0	72.7	60.8	31.4	3.3
115.0°	0.0	1.5	15.0	40.5	51.3	40.9	16.3	2.3
120.0°	0.0	0.7	4.2	23.8	32.5	24.3	5.4	1.3
125.0°	0.0	0.0	2.1	10.5	16.8	11.2	2.4	0.7
130.0°	0.0	0.0	1.5	3.0	4.4	3.3	2.0	0.7
135.0°	0.0	0.0	1.6	2.9	3.3	3.1	1.9	0.7
140.0°	0.0	0.0	1.9	2.8	3.4	2.7	2.2	1.2
145.0°	0.0	1.3	1.9	3.0	3.3	3.4	2.7	1.4
150.0°	0.9	1.3	2.3	3.6	3.3	2.8	2.8	2.0
155.0°	1.5	1.9	2.5	3.6	3.5	3.4	2.9	2.5
160.0°	2.5	1.9	2.9	3.3	3.5	3.9	3.4	3.3
165.0°	2.7	2.9	3.0	3.2	4.1	3.9	4.0	3.5
170.0°	3.0	3.3	4.0	4.2	4.4	4.4	4.3	4.5
175.0°	3.7	4.1	4.4	4.8	5.0	4.6	4.5	4.7
180.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

6. Description of Test Equipment

Device	Manufacture	Model No	Serial No	Calibration date	Calibration due date
Integrating Sphere	INVENTFINE	Dia 1.5m	JWWCV090112	2022-06-21	2023-06-20
Power Meter	INVENTFINE	WT500	GSJWQ20009	2022-11-03	2023-11-02
Spectral photometer	INVENTFINE	CMS-3S	GSGSE100017	2022-06-21	2023-06-20
AC Power Supply	INVENTFINE	CHP500	JWJSD010071	2022-06-21	2023-06-20
Standard Light Source	Osram	24V/50W	JWWCR020104	2021-09-15	2023-09-14
Thermal Meter	ANYMETRE	TH-20E	N/A	2022-11-11	2023-11-10
DC Power Supply	INVENTFINE	WL3005	JWWCP020069	2022-06-21	2023-06-20
AC Power Supply	INVENTFINE	CHP-5KVA	900511765	2022-06-21	2023-06-20
DC Power Supply	INVENTFINE	WL3010	JWDMP030001	2022-06-21	2023-06-20
Power Meter	INVENTFINE	WT500	GSDSQ200007	2022-11-03	2023-11-02
Goniophotometer	INVENTFINE	GPM-1900	YWGCF120001	2022-11-14	2023-11-13
Wireless Weather Station	ZHONGXING	KG218	N/A	2022-06-21	2023-06-20
Standard Light Source	INVENTFINE	N/A	JWBYR040008	2021-12-23	2023-12-22
Digital Multimeter	FLUKE	115C	37840512WS	2022-06-22	2023-06-21
Hybrid Recorder	YOKOGAWA	DR230	47JH0903	2022-06-22	2023-06-21
Power Supply	SC	SC/BP-11003	1608110030553	2022-06-21	2023-06-20

Statement of Traceability: Bay Area Compliance Laboratories Corp. (Kunshan) attested that all calibration has been performed using suitable standards traceable to National Primary Standards and International System of Units (SI).

7. Test Method

Product was tested with no seasoning. All stabilization and measurements were made in compliance with IES LM-79-19. The ambient temperature of the sample was maintained at 25°C±1°C during measurement. And relative humidity is less than 65%. The product was operated in its intended orientation in application during all testing.

Integrating Sphere System
The system includes AC power source, digital power meter, DC power supply, Spectroradiometer, and integrating sphere. The integrating sphere system is calibrated by standard spectrum light source before measurement. 4π geometry was used during measurement.

Goniophotometer System
Type C goniophotometer was used for measuring luminous intensity distribution. The vertical angle (γ) test intervals were set no more than 1 degree while data for 5 degree intervals is reported. The horizontal angle (C plane) test intervals were set no more than 22.5 degree.

ISTMT Test
The LED which has the highest temperature was measured at the location of LED case which is specified by LED source manufacturer and detailed by LM-80 report. The drive current of LED package/module/ array was calculated as the total output current of the driver measured by multimeter, divided by the number of branches in parallel of LEDs.

Directions

1. The information marked "superscript #" is provided by the applicant, the laboratory is not responsible for its authenticity and this information can affect the validity of the result in the test report.
2. This report may contain data that are not covered by the accreditation scope and shall be marked with an asterisk "★".
3. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.
4. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.
5. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.
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**********END OF REPORT**********