



## LM-79-08 Test Report

For

**P.Q.L., Inc.**

2285 Ward Avenue / Simi Valley, CA 93065a

**Model name(s):**  
**93784**

**Report Type:** Testing and Report According to IES LM-79-2008  
**Type of Luminaire:** Retrofit Kits for Direct Linear Ambient Luminaires  
**Report Date:** 2022-12-12  
Ningbo TengLi Testing Co., Ltd  
**Prepared By:** 2nd floor, Block B, Ningbo Testing and Certification Base,  
No. 66 Qingyi Road, Ningbo National Hi-Tech Zone,  
Ningbo, Zhejiang

Test & Report By:

*Wat Wang*

Engineer: Wat Wang

Review By:

*Nick Song*

Manager: Nick Song

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 A2LA, or any agency of the Federal Government.



<b>1.1 Product Information:</b>		
Model Number	93784	
Representative (Tested) Model	93784 (0%,3500K) 93784 (50%,4000K) 93784 (100%,5000K)	
Model Difference	N/A	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Retrofit Kits for Direct Linear Ambient Luminaires	
LED Manufacturer	ShenZhen JuFei Optoelectronics Co., Ltd.	
LED Model	01.JT.CC2835W80P03	
Dimming	Continuous	
Integral Controls	NO	
Sample Number	STD221156NB-B1	
Date of Receipt	Dec.02,2022	
Luminaire Aperture (for downlights)	--	in.
Luminaire Length	--	mm
Luminaires Width	--	mm
Number of Units (modular products)	N/A	s

<b>1.2 Rated Values:</b>	
Rated Voltage / Frequency	120-277Vac, 50/60Hz
Nominal Power	46W/38W/30W (Power Adjustable)
Rated Initial Lamp Lumen	--
Declared CCT	3500K,4000K,5000K (Color Tunable)



### 1.3 Test Specifications:

Test item	<ol style="list-style-type: none"> <li>1. Total Luminous Flux</li> <li>2. Luminous Distribution Intensity</li> <li>3. Luminous Efficacy</li> <li>4. Correlated Color Temperature</li> <li>5. Color Rendering Index</li> <li>6. Chromaticity Coordinate</li> <li>7. Electrical Parameters</li> </ol>
Reference Standard	<ol style="list-style-type: none"> <li>1. IES LM-79-2008 Electrical and Photometric Measurements of Solid-State Lighting Products</li> <li>2. ANSI C78.377-2015 Specifications for the Chromaticity of Solid State Lighting Products</li> <li>3. CIE 13.3-1995 Method of Measuring and Specifying Colour Rendering Properties of Light Sources</li> <li>4. CIE 15-2004 Technical Report Colorimetry</li> <li>5. IESNA LM-16-93 Practical Guide to Colorimetry of Light Source</li> </ol>

### 1.4 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  $1^{\circ}$  vertical intervals and  $22.5^{\circ}$  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 Summary of Test Result**

Criteria Item	Measured Value		Compliance	Requirement (DLC V5.1)	
				Standard: >=	Premium: >=
Minimum Total Luminous	6988.7		Pass	>=375 lm/ft (-10%)	
Minimum Luminous Efficacy	151.68		Pass	Standard: >= 115(-3%)	Premium: >= 130(-3%)
Minimum Power Factor	0.9685		Pass	>= 0.9(-3%)	
Maximum THD %	13.08		Pass	<= 20(+5)	
Minimum CRI	82.9		Pass	>= 80(-1)	
Minimum R9	5		Pass	>= 0(-1)	
Minimum Rg	96		Pass	>= 89(-1)	
Minimum Rf	84		Pass	>= 70(-1)	
Res, h1	-12		Pass	-12%-23%(-1%)	
CCT (K)	3500K	3503	Pass	<=6500K	
	4000K	4248			
	5000K	5184			
Zonal Lumen Requirement	0-60°:	80.8	Pass	>= 40(-3)	
Corrected UGR(Crosswise)	21.6		Pass	Premium: <22.0	
Corrected UGR(Endwise)	20.3		Pass	Premium: <22.0	



**2.2 Electrical, Photometric and Chromaticity Measurements**

<b>Test date</b>	2022-12-05	<b>Test Ambient:</b>	25 ± 1 ° C
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	60
<b>Model Number</b>	93784 (0%,3500K)	<b>Total Operating Time(min)</b>	75

**Electrical Measurement in LITHONIA SERIES L2 32 MOVLT GEB10IS:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD221156	120.1	60.01	0.3944	47.11	0.9947	7.33
NB-B1	277.0	60.01	0.1707	45.86	0.9697	12.85

**Photometric Measurement in LITHONIA SERIES L2 32 MOVLT GEB10IS –  
 Goniophotometer Method(Test Distance: 26.00m):**

Parameter	Result	
Test Voltage (V)	120	277
Frequency (Hz)	60	60
Total Luminous (lm)	7145.0	6988.7
Luminous Efficacy (lm/W)	151.68	152.39
Zonal lumens in the 0-60° zone (%)	80.8	--
Corrected UGR(Crosswise)	21.6	--
Corrected UGR(Endwise)	20.3	--
Beam Angle (°)	117.5	--
Center Beam Candle Power (cd)	2448	--

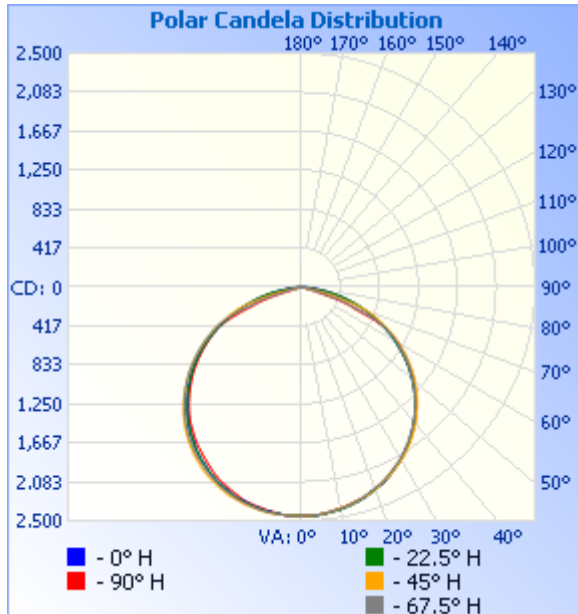


**Zonal Lumen Tabulation**

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1,930.8	27%
0-40	3,195.7	44.7%
0-60	5,776.2	80.8%
60-90	1,357.9	19%
70-100	421.6	5.9%
90-120	4.8	0.1%
0-90	7,134.0	99.9%
90-180	10.5	0.1%
0-180	7,144.6	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	232.0	3.2%	90-100	1.7	0%
10-20	669.5	9.4%	100-110	1.5	0%
20-30	1,029.3	14.4%	110-120	1.7	0%
30-40	1,264.9	17.7%	120-130	1.4	0%
40-50	1,341.2	18.8%	130-140	1.3	0%
50-60	1,239.3	17.3%	140-150	1.1	0%
60-70	937.9	13.1%	150-160	1.0	0%
70-80	374.0	5.2%	160-170	0.7	0%
80-90	45.9	0.6%	170-180	0.3	0%

**Photometric Data**



**Illuminance at a Distance**

	Center Beam fc	Beam Width	
4.0ft	153.0 fc	13.1 ft	13.3 ft
8.0ft	38.2 fc	26.3 ft	26.5 ft
12.0ft	17.0 fc	39.4 ft	39.8 ft
16.0ft	9.6 fc	52.5 ft	53.0 ft
20.0ft	6.1 fc	65.7 ft	66.3 ft

■ Vert. Spread: 117.3°  
■ Horiz. Spread: 117.8°

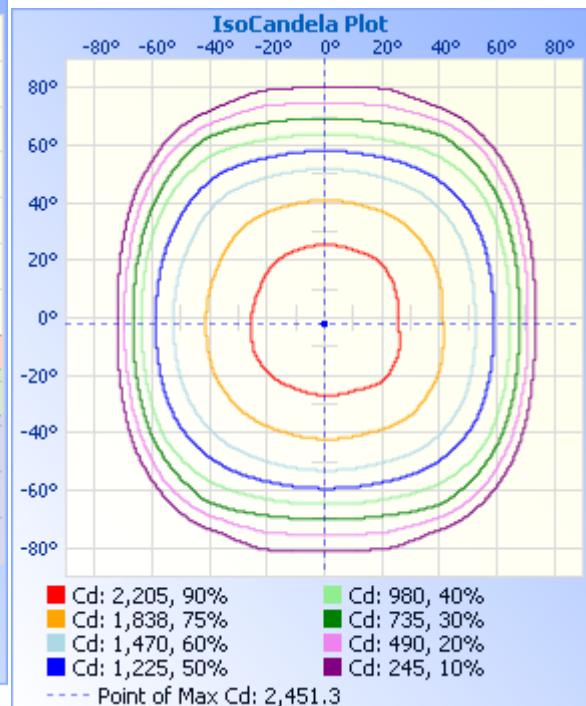
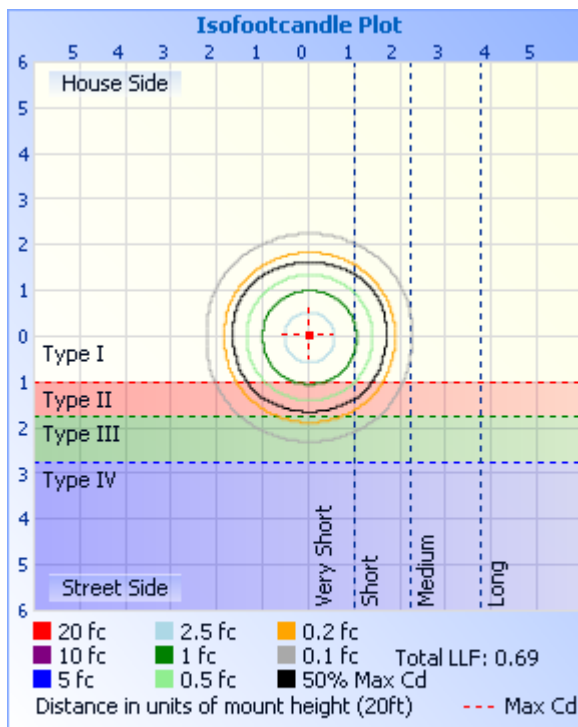




Table--1

UNIT: cd

C (DEG) Y (DEG)	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5		
0	2448	2448	2448	2448	2448	2448	2448	2448	2448	2448	2448	2448	2448	2448	2448	2448		
5	2439	2441	2440	2439	2440	2442	2436	2435	2435	2442	2440	2436	2441	2439	2443	2443		
10	2403	2416	2416	2409	2410	2414	2399	2404	2400	2417	2415	2410	2416	2418	2432	2425		
15	2362	2368	2377	2365	2366	2368	2357	2354	2357	2376	2375	2370	2369	2377	2399	2383		
20	2286	2306	2316	2303	2292	2306	2296	2289	2300	2317	2318	2313	2308	2317	2350	2330		
25	2205	2230	2244	2222	2222	2223	2225	2207	2221	2246	2241	2230	2239	2240	2276	2252		
30	2096	2133	2147	2125	2123	2124	2131	2113	2129	2150	2146	2130	2140	2141	2184	2162		
35	1986	2020	2028	2009	2012	2008	2026	1999	2016	2039	2034	2010	2015	2021	2075	2051		
40	1859	1889	1895	1871	1874	1874	1898	1869	1887	1907	1898	1880	1887	1889	1944	1924		
45	1707	1741	1744	1719	1722	1720	1750	1722	1736	1763	1749	1727	1737	1736	1789	1775		
50	1538	1576	1574	1548	1551	1552	1586	1557	1572	1599	1584	1560	1564	1566	1613	1611		
55	1356	1394	1387	1358	1364	1362	1404	1378	1394	1416	1401	1379	1383	1383	1428	1427		
60	1164	1193	1184	1159	1162	1161	1202	1180	1196	1216	1199	1175	1179	1180	1218	1227		
65	946	979	969	944	946	949	987	949	920	993	982	954	951	957	998	1010		
70	526	573	747	726	722	729	739	536	503	558	755	726	725	729	767	585		
75	62.3	125	390	502	495	503	366	113	60.4	138	385	502	496	503	394	129		
80	20.2	20.4	36.8	292	281	263	26.7	16.7	18.4	17.0	40.7	291	280	287	30.1	20.9		
85	16.5	16.9	14.9	30.7	105	18.3	12.8	14.4	16.1	14.5	12.7	34.5	103	24.6	15.0	17.9		
90	0.06	1.19	3.57	5.05	6.72	4.44	1.94	0.08	0.41	0.66	3.48	4.83	3.44	4.69	2.84	0.66		
95	0.00	0.65	2.50	2.38	3.81	2.04	1.27	0.00	0.00	0.00	1.81	2.07	1.86	2.41	1.76	0.21		
100	0.00	0.16	0.92	1.63	4.51	1.34	0.48	0.00	0.21	0.34	0.85	1.55	3.10	1.95	1.04	0.37		
105	0.26	0.75	0.72	1.60	4.73	1.33	0.51	0.29	0.66	0.65	0.95	1.75	4.19	2.20	1.20	1.01		
110	0.50	0.75	0.92	1.87	3.89	1.53	0.74	0.34	0.95	0.91	1.25	2.17	4.78	2.74	1.58	1.22		
115	0.79	0.75	1.10	1.87	3.13	1.51	0.74	0.45	1.16	1.04	1.47	2.24	4.46	2.82	1.89	1.38		
120	0.79	0.75	1.12	1.58	2.46	1.51	0.87	0.77	1.13	1.22	1.57	2.19	3.96	2.79	1.99	1.43		
125	0.79	0.85	1.20	1.58	1.41	1.43	1.17	0.77	1.18	1.37	1.57	1.97	2.80	2.37	1.99	1.56		
130	1.00	0.98	1.22	1.87	1.64	1.85	1.20	1.11	1.55	1.71	1.67	2.19	2.03	2.32	1.99	1.72		
135	1.18	1.11	1.22	1.90	1.07	1.88	1.22	1.19	1.55	1.71	1.72	2.46	1.86	2.55	2.09	1.85		
140	1.29	1.19	1.25	2.02	1.14	1.95	1.48	1.24	1.74	1.73	1.87	2.46	1.34	2.84	2.19	1.88		
145	1.32	1.29	1.47	2.02	1.16	2.03	1.60	1.43	1.76	1.81	2.02	2.56	1.39	2.79	2.45	2.01		
150	1.34	1.66	1.54	2.04	1.48	2.20	1.99	1.59	1.82	1.94	2.24	2.54	1.59	2.67	2.57	2.38		
155	1.58	1.68	1.74	2.04	1.63	2.32	2.04	1.78	2.00	2.05	2.37	2.54	1.78	2.32	2.62	2.60		
160	1.71	1.84	1.92	2.32	1.91	2.30	2.09	2.09	2.21	2.23	2.52	2.54	2.03	2.03	3.06	2.78		
165	2.39	2.33	2.26	2.51	2.06	2.64	2.44	2.46	2.40	2.38	2.72	2.56	2.43	2.17	3.21	3.10		
170	2.84	2.79	2.71	2.59	2.25	2.82	3.08	2.86	2.90	2.87	3.06	2.76	2.43	2.25	3.18	3.37		
175	3.05	2.98	2.81	2.61	2.30	2.79	3.23	3.10	3.32	3.29	3.11	2.76	2.43	2.25	2.88	3.15		
180	3.05	3.11	2.81	2.39	2.30	2.84	3.13	3.31	3.29	3.03	3.04	2.78	2.38	2.25	2.85	3.18		





**2.2 Electrical, Photometric and Chromaticity Measurements**

<b>Test date</b>	2022-12-05	<b>Test Ambient:</b>	25 ± 1 ° C
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	60
<b>Model Number</b>	93784 (0%,3500K)	<b>Total Operating Time(min)</b>	61

**Electrical Measurement in LITHONIA SERIES L2 32 MOVLT GEB10IS:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD221156	120.0	60	0.3959	47.23	0.9941	7.45
NB-B1	277.0	60	0.1713	45.98	0.9691	12.97

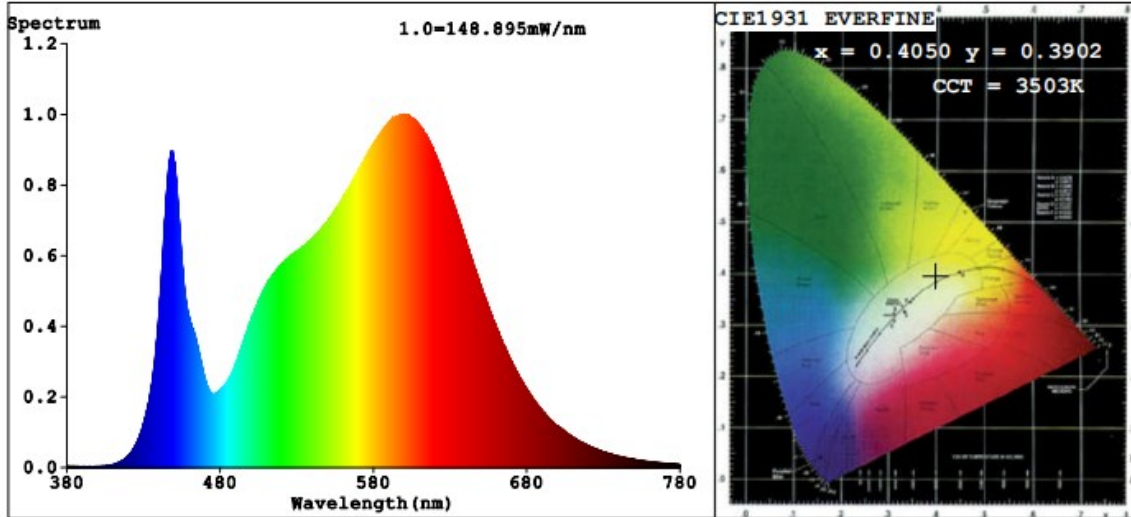
**Chromaticity Measurement in LITHONIA SERIES L2 32 MOVLT GEB10IS -  
 Sphere-Spectroradiometer Method(Self-absorption:1.0878)(4π geometry):**

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3503
Duv	-0.0002
Chromaticity (x, y)	x=0.4050 y=0.3902
Chromaticity (u', v')	u'=0.2357 v'=0.5110
Color Rendering Index (CRI)	82.9
R9	5
Rg	96
Rf	84
Rcs,h1(%)	-12

**Photometric Measurement –Sphere-Spectroradiometer Method:**

Parameter	Result	
	Test Voltage (V)	120
Frequency (Hz)	60	60
Total Luminous (lm)	7238	7080
Luminous Efficacy (lm/W)	153.25	153.98

**Spectral Power Distribution & Chromaticity Diagram**



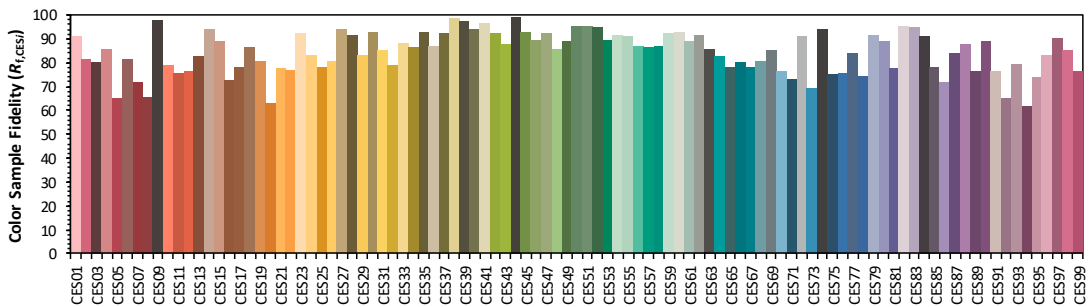
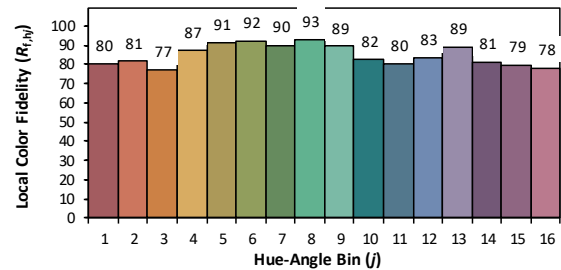
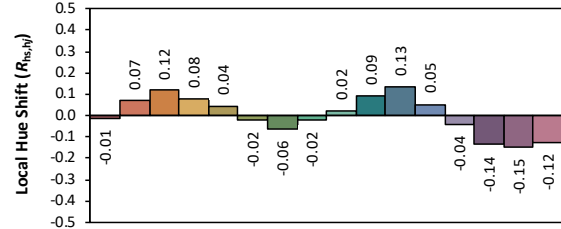
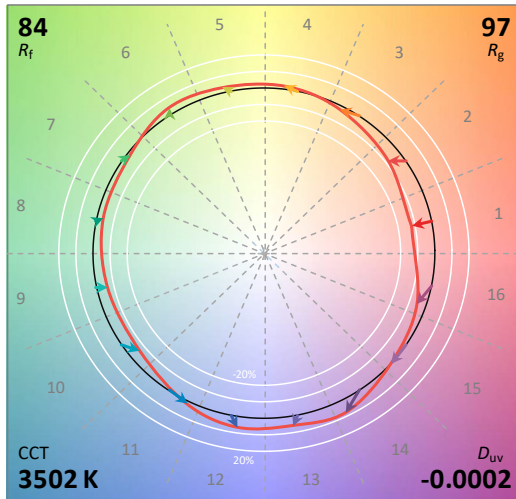
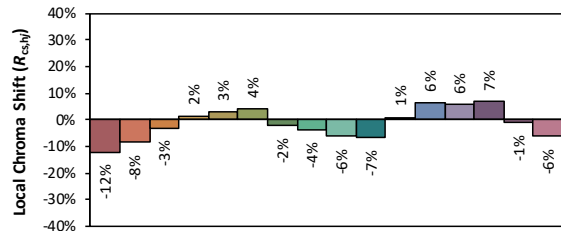
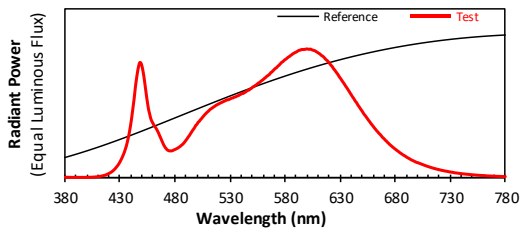
R1 =81	R2 =90	R3 =96	R4 =82	R5 =82	R6 =87	R7 =84		
R8 =61	R9 =5	R10=76	R11=82	R12=68	R13=83	R14=98	R15=74	



**TM30**

**ANSI/IES TM-30-18 Color Rendition Report**

Source: 01.JT.CC2835W80P03      Manufacturer: P.Q.L., Inc.  
 Date: 2022-12-05      Model: 93784 (0%, 3500K)



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

$x$     0.4050  
 $y$     0.3901  
 $u'$    0.2358  
 $v'$    0.5109

CIE 13.3-1995  
 (CRI)  
 $R_a$     83  
 $R_g$     5

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.0



**2.3 Electrical, Photometric and Chromaticity Measurements**

<b>Test date</b>	2022-12-05	<b>Test Ambient:</b>	25 ± 1 ° C
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	60
<b>Model Number</b>	93784 (50%,4000K)	<b>Total Operating Time(min)</b>	61

**Electrical Measurement in LITHONIA SERIES L2 32 MOVLT GEB10IS:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD221156	120.0	60	0.3744	44.64	0.9935	7.51
NB-B1	277.0	60	0.1620	43.46	0.9685	13.08

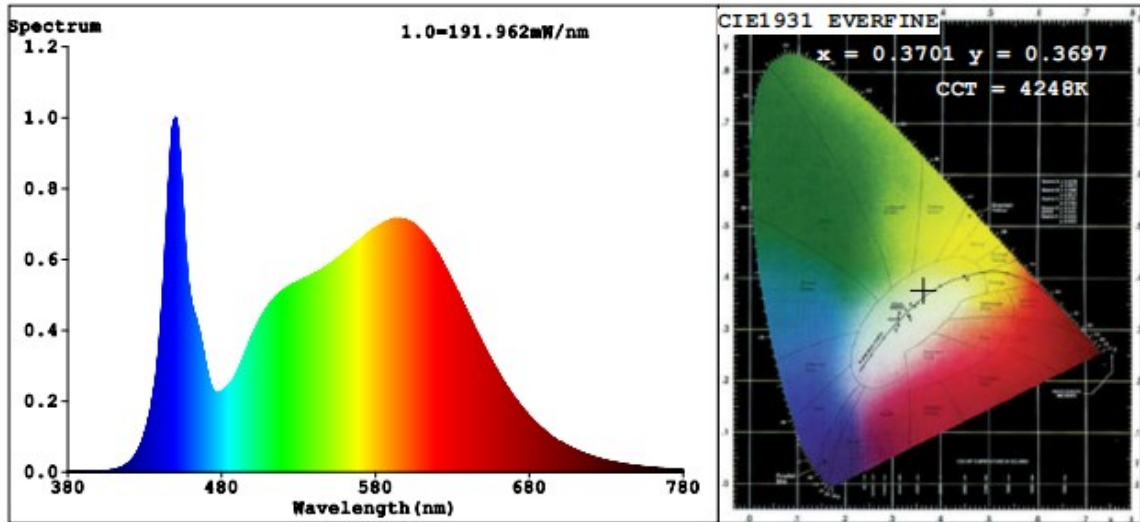
**Chromaticity Measurement in LITHONIA SERIES L2 32 MOVLT GEB10IS -  
 Sphere-Spectroradiometer Method(Self-absorption:1.0881)(4π geometry):**

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	4248
Duv	-0.0001
Chromaticity (x, y)	x=0.3701 y=0.3697
Chromaticity (u', v')	u'=0.2210 v'=0.4969
Color Rendering Index (CRI)	84.6
R9	14
Rg	96
Rf	85
Rcs,h1(%)	-12

**Photometric Measurement –Sphere-Spectroradiometer Method:**

Parameter	Result	
Test Voltage (V)	120	277
Frequency (Hz)	60	60
Total Luminous (lm)	7408	7246
Luminous Efficacy (lm/W)	165.95	166.73

**Spectral Power Distribution & Chromaticity Diagram**



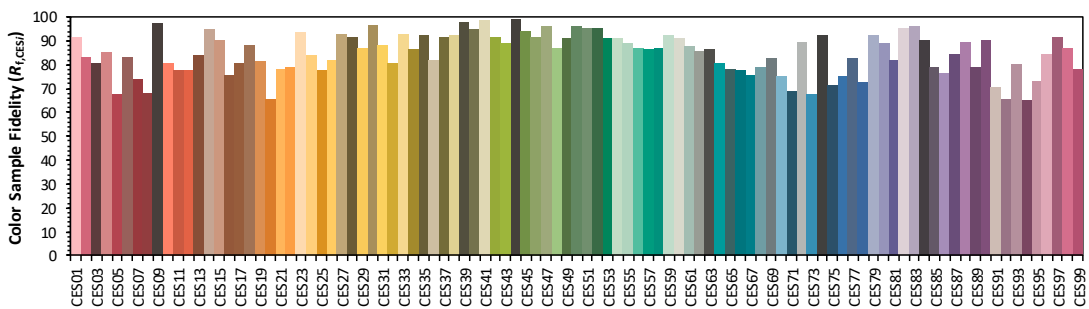
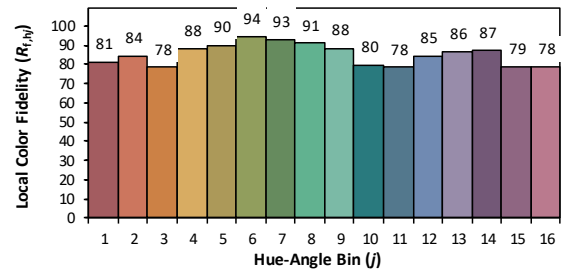
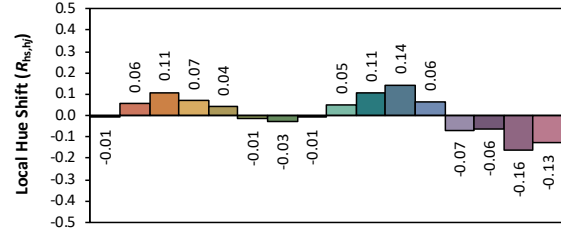
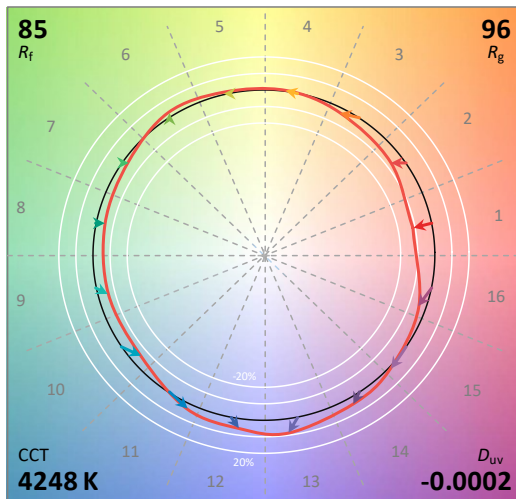
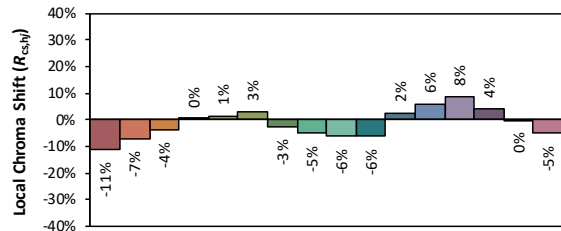
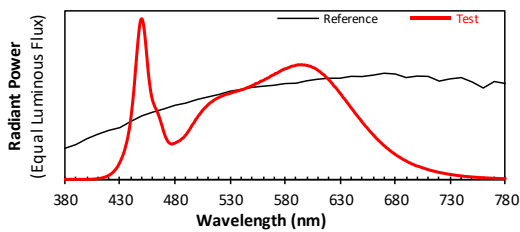
R1 =83	R2 =90	R3 =95	R4 =84	R5 =84	R6 =86	R7 =87	
R8 =67	R9 =14	R10=76	R11=84	R12=63	R13=85	R14=97	R15=77



**TM30**

**ANSI/IES TM-30-18 Color Rendition Report**

Source: 01.JT.CC2835W80P03      Manufacturer: P.Q.L., Inc.  
 Date: 2022-12-05      Model: 93784 (50%, 4000K)



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

$x$     0.3700  
 $y$     0.3696  
 $u'$    0.2211  
 $v'$    0.4968

CIE 13.3-1995  
 (CRI)  
 $R_a$     85  
 $R_g$     14

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.0



**2.4 Electrical, Photometric and Chromaticity Measurements**

<b>Test date</b>	2022-12-05	<b>Test Ambient:</b>	25 ± 1 ° C
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	60
<b>Model Number</b>	93784 (100%,5000K)	<b>Total Operating Time(min)</b>	61

**Electrical Measurement in LITHONIA SERIES L2 32 MOVLT GEB10IS:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD221156	120.0	60	0.3885	46.33	0.9937	7.48
NB-B1	277.0	60	0.1681	45.11	0.9688	13.01

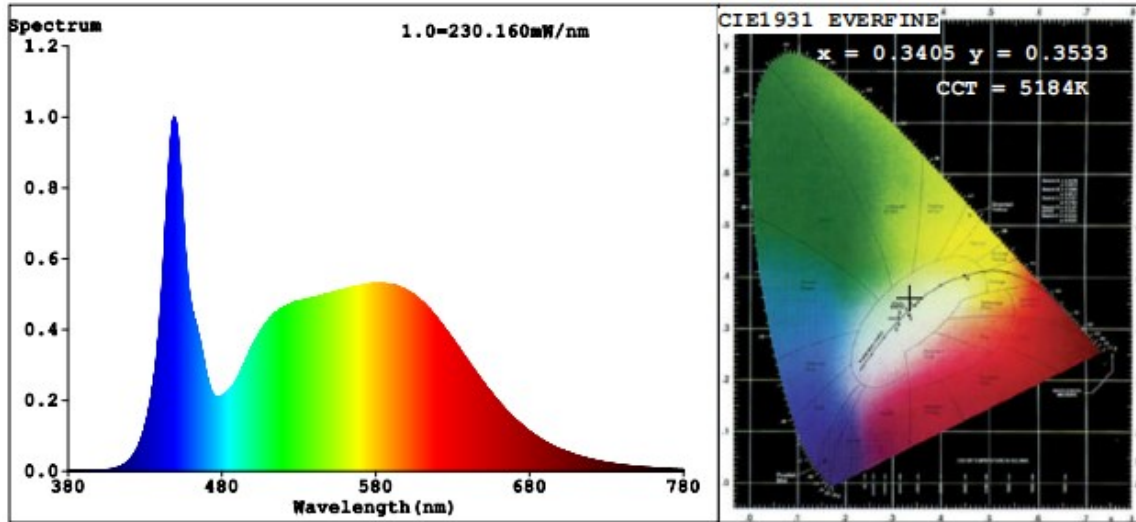
**Chromaticity Measurement in LITHONIA SERIES L2 32 MOVLT GEB10IS -  
 Sphere-Spectroradiometer Method(Self-absorption:1.0886)(4π geometry):**

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	5184
Duv	0.0027
Chromaticity (x, y)	x=0.3405 y=0.3533
Chromaticity (u', v')	u'=0.2077 v'=0.4848
Color Rendering Index (CRI)	83.8
R9	11
Rg	96
Rf	84
Rcs,h1(%)	-12

**Photometric Measurement –Sphere-Spectroradiometer Method:**

Parameter	Result	
Test Voltage (V)	120	277
Frequency (Hz)	60	60
Total Luminous (lm)	7208	7050
Luminous Efficacy (lm/W)	155.58	156.28

**Spectral Power Distribution & Chromaticity Diagram**



R1 =82	R2 =88	R3 =92	R4 =85	R5 =83	R6 =84	R7 =87		
R8 =69	R9 =11	R10=71	R11=85	R12=64	R13=84	R14=96	R15=77	



**TM30**

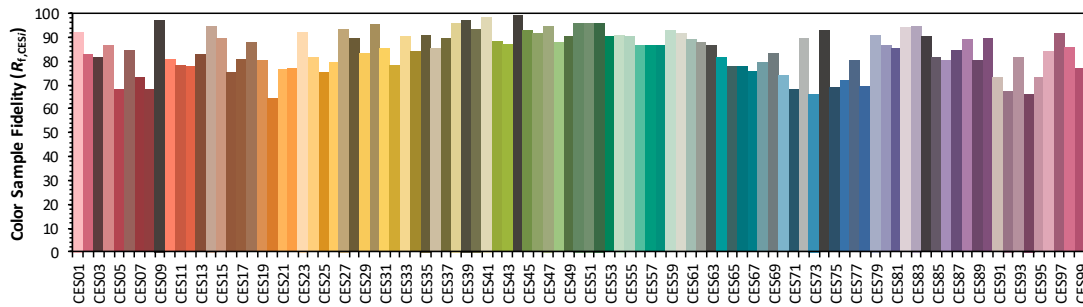
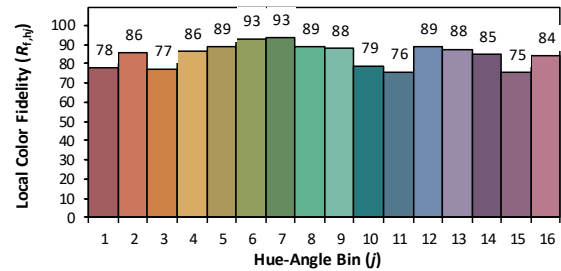
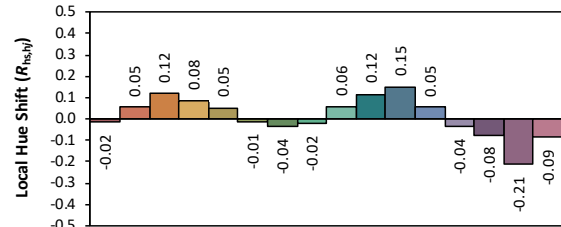
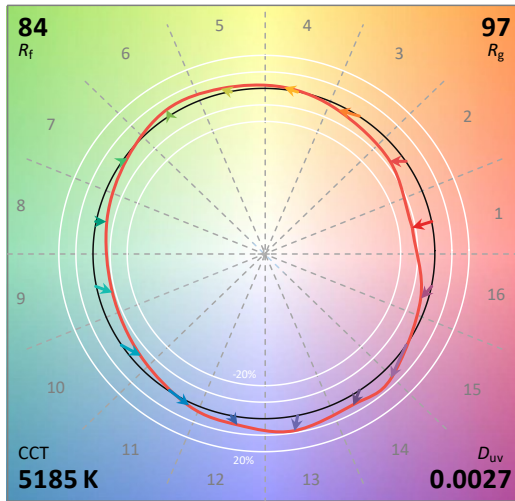
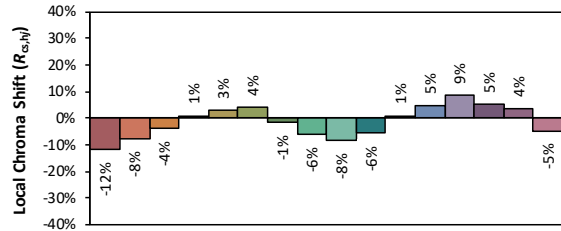
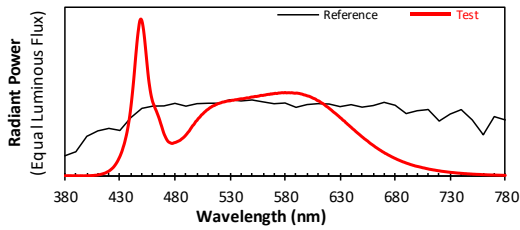
**ANSI/IES TM-30-18 Color Rendition Report**

Source: 01.JT.CC2835W80P03

Manufacturer: P.Q.L., Inc.

Date: 2022-12-05

Model: 93784 (100%, 5000K)



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

$x$  0.3404  
 $y$  0.3531  
 $u'$  0.2077  
 $v'$  0.4847

CIE 13.3-1995  
(CRI)  
 $R_a$  84  
 $R_g$  11

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.0



**2.5 Data comparison for different power**

<b>Test date</b>	2022-12-05	<b>Test Ambient:</b>	25.2 ° C
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	60
<b>Model Number</b>	93784	<b>Total Operating Time(min)</b>	61

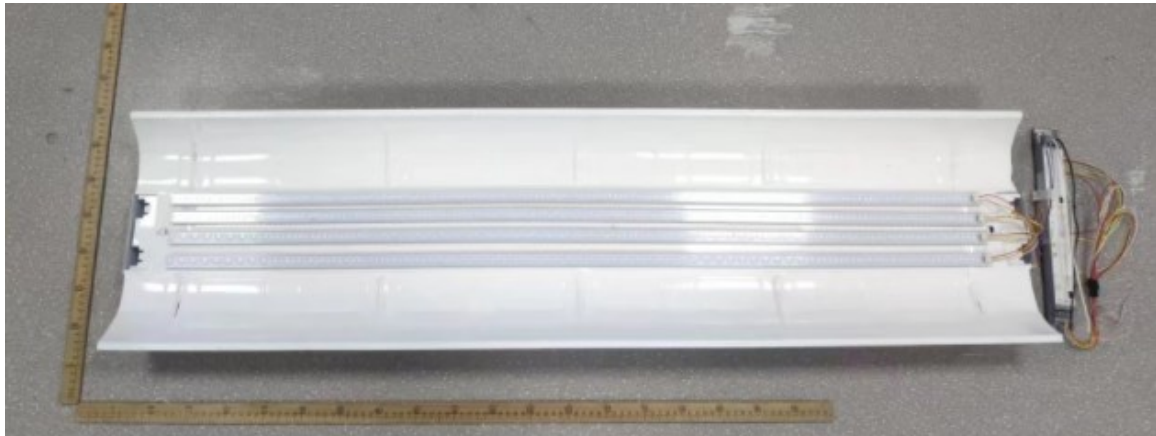
Sample No.	Wattage and CCT setting	Test Voltage (V)	Flux(lm)	P(W)	Luminous Efficacy lm/W
STD221156NB-B1	30W,3500K setting	120.0	4964	30.92	160.54
STD221156NB-B1	38W,3500K setting	120.0	5818	37.08	156.90
STD221156NB-B1	46W,3500K setting	120.0	7145.0	47.11	151.68



### 3. Test Equipment

Equipment ID	Equipment Name	Last Calibration Date	Next Calibration Date
ST-R-702	2 meter Integrating Sphere	Verified by D204 standard lamp	
ST-R-701	Spectral analysis system HAAS-1200	Verified by D204 standard lamp	
ST-R-703	Standard Lamp D204	2022-01-14	2023-01-13
ST-R-704	Power Meter for Integrating Sphere	2022-01-03	2023-01-02
ST-R-707	Temperature Probe for Integrating Sphere	2022-01-03	2023-01-02
ST-R-714	Goniophotometer system	Verified by D908S standard lamp	
ST-R-710	Standard Lamp D908S	2022-01-14	2023-01-13
ST-R-711	Power Meter for Goniophotometer	2022-01-03	2023-01-02
ST-R-709	Hygrothermograph for Goniophotometer	2022-01-03	2023-01-02
Uncertainty(K=2): Photometric Measurement (Sphere):3.40% Chromaticity Measurement(Sphere):44.8K Photometric Measurement(Goniophotometer):3.64%			

#### 4. Product Photo



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