TEST REPORT

For

RENO LED LIGHTING INC.

9133 Leslie St, Unit 120,Richmond Hill, ON L4B 4N1, Canada

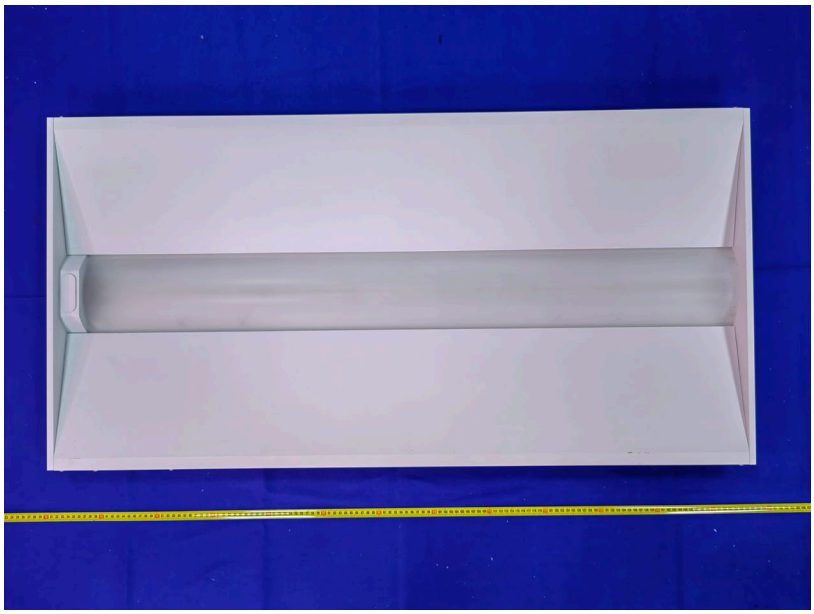
Model Number:	RENO-24CTF-UNV/347-MWMCCT	
Report Type:	Electrical, Photometric and ISTMT tests according to the following standards and show the compliance to DLC Program SSL Technical Requirements V5.1	
Standards:	ANSI/IES LM-79-19: Approved Method: Optical and Electrical Measurements of Solid-State 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 (This method is not in NVLAP accreditation scope) *IES TM-30-18: IES Method for Evaluating Light Source Color Rendition (This method is not in NVLAP accreditation scope)	
Reviewed By:	Hill Liu	Hill Liu
Report Number:	2402U65810E-EE-2	
Sample Size:	One test sample was in good condition and received on 2024-06-24, and used for testing.	
Test Date:	2024-06-27to 2024-07-04	
Report Date:	2024-07-22	
Approved by:	Blake Zhang / EE Engineer	Blake zhang
Prepared By:	Bay Area Compliance Laboratories Corp. (Shenzhen) 5F (B-West), 6F, 7F, the 3rd Phase of Wan Li Industrial Building D, Shihua Road, Futian Free Trade Zone Shenzhen, 518038, China. Tel: +86-755-33320018 Fax: +86-755-33320008	
Test Location 1:	Test facility was located at No.12, Pulong East 1st Road, Tangxia Town, Dongguan, Guangdong, China.	
Test Location 2:	Test facility was located at Room 301, No.113, Pingkang Road, Dalang, Dongguan, Guangdong, China.	

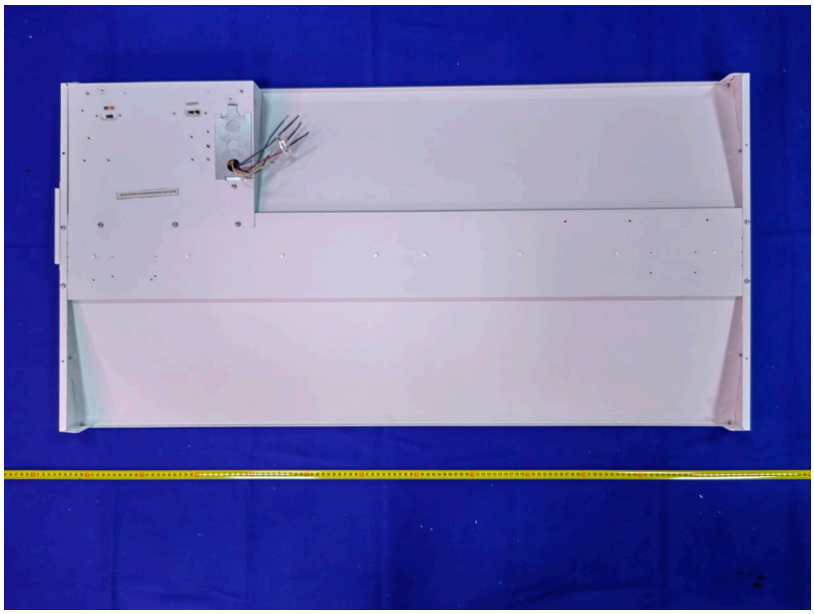
1. Product Description and Rating#

Test Model	Primary Use	Rated Voltage	Power(W)	CCT(K)	LED Model	LED manufacturer	Driver Model	Test Item
RENO-24CTF-UNV/347-MWMCCT	Low-Bay Luminaires for Commercial and Industrial Buildings	120-347VAC 50/60Hz	29/34/39/49	3500K/ 4000K/ 5000K	L128-xx80RA3500xxx	Lumileds Holding B.V.	RENO-SDC48CS105V42DN3A	All

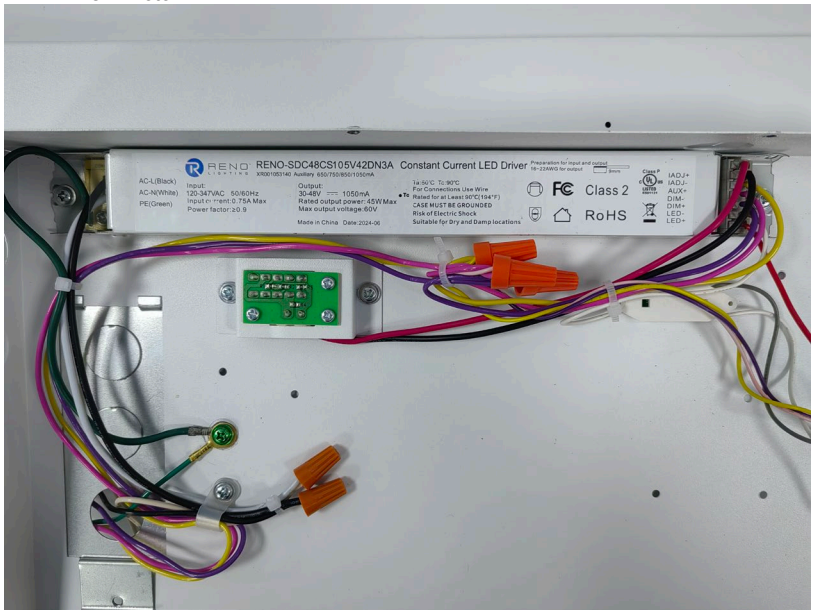
Test Model	Power(W)	CCT(K)	Light Output (lm)	Luminous Efficacy (lm/W)
RENO-24CTF-UNV/347-MWMCCT	29	3500	3886	134
		4000	4147	143
		5000	4002	138
	34	3500	4522	133
		4000	4828	142
		5000	4658	137
	39	3500	5148	132
		4000	5499	141
		5000	5304	136
	49	3500	6434	131.3
		4000	6860	140
		5000	6615	135

2. Product Photo





LED Driver Photo



3. Test Result

Test Model: RENO-24CTF-UNV/347-MWMCCT
Test CCT: 3500K (Input Control Signal Applied: 0%)
Test Wattage: 49W

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

Test Item	Test Result	DLC Requirements	DLC Requirements(With tolerances and/or allowances)	Conclusion
Light Output(lm) ΔΔ	6256.5	5000~10000	4500≤Light output≤11000	Pass
Power(W) ΔΔ	47.04	None.	None.	N/A
Total Efficacy(lm/W) ΔΔ	133.01	≥130	≥126.1	Pass[i]
CCT(K) ΔΔ	3462	3341~3589	No tolerances	Pass
Duv ΔΔ	0.0000272	-0.0028~0.0038	No tolerances	Pass
IES Rf ΔΔ	84	70	69	Pass
IES Rg ΔΔ	96	89	88	
IES Rcs,h1 ΔΔ	-12%	-12%~23%	-13%~24%	
Ra ΔΔ	82.5	≥80	≥79	
R9 ΔΔ	8	≥0	≥-1	

Test Condition: Method: Goniophotometer; Orientation: Downward; Test Voltage: 120.0V 60Hz;

Test Item	Test Result	DLC Requirements	DLC Requirements(With tolerances and/or allowances)	Conclusion
Light Output(lm) Δ	6269.09	≥5000	4500≤Light output≤11000	Pass
Power(W) Δ	47.04	None.	None.	N/A
Total Efficacy(lm/W) Δ	133.27	≥130	≥126.1	Pass[i]
Zonal Lumen Distribution(20-50) Δ	52.61%	20-50°≥30%	20-50°≥20%	Pass
UGR crosswise view Δ	20.3	<25	No tolerances	Pass
UGR endwise view Δ	18.6	<25	No tolerances	Pass

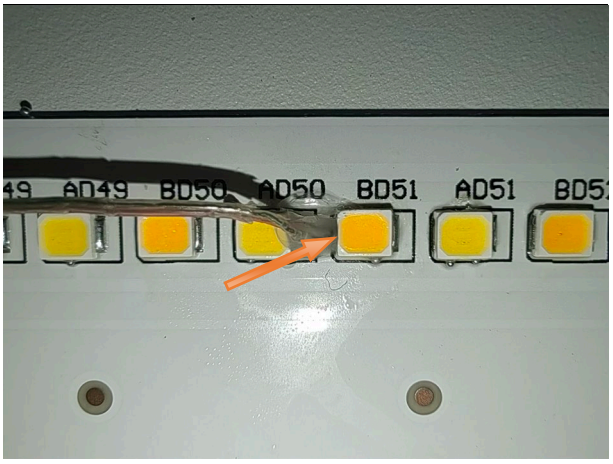
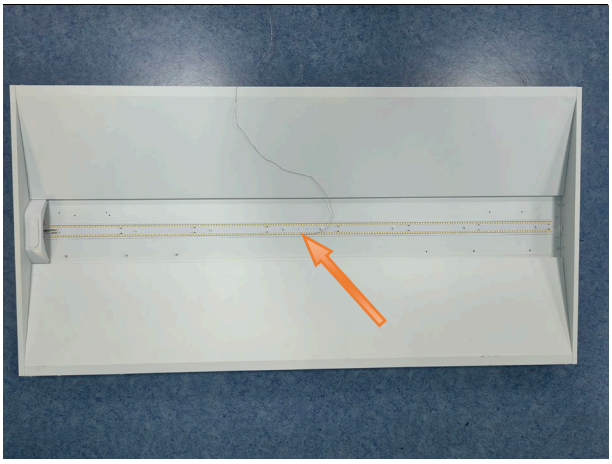
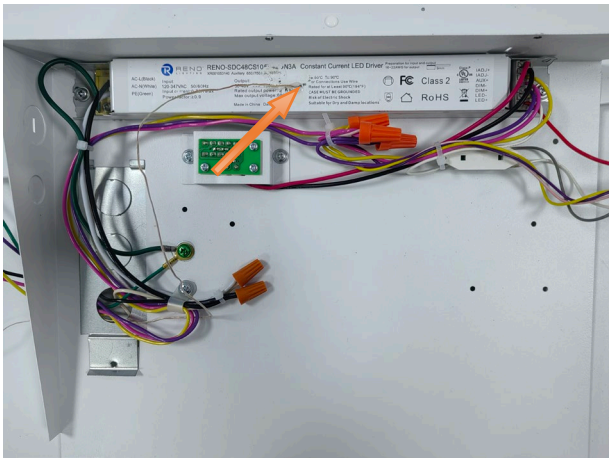
Test Condition: Test Voltage: 120V 60Hz;

Test Item	Test Result	DLC Requirements	DLC Requirements(With tolerances and/or allowances)	Conclusion
TMP_{LED}(°C) ΔΔ	38.1	≤115	With tolerance of ⩽ 1.1°C or 0.4%, whichever is greater due to thermocouple tolerance	Pass
TMP_c(°C) ΔΔ	45.8	≤90	With tolerance of ⩽ 1.1°C or 0.4%, whichever is greater due to thermocouple tolerance	Pass
Drive Current/Individual LED source(mA) ΔΔ	74.9	≤150	With +5% Tolerence	Pass
L_{90} Lumen Maintenance Life (Hours) ΔΔ	51000	≥36000	None.	Pass
Color Maintenance ΔΔ	0.002	≤0.004	≤0.0044	Pass

Test Condition: Method: Integrating THDi、PF Test ; Orientation: Downward;

Test Voltage	Test Item	Test Result	DLC Requirements	DLC Requirements(With tolerances and/or allowances)	Conclusion
120	Power Factor ΔΔ	0.9942	≥0.9	⩾0.87	Pass
120	THDi ΔΔ	8.22%	≤20%	⩽25%	Pass
277	Power Factor ΔΔ	0.9668	≥0.9	⩾0.87	Pass
277	THDi ΔΔ	12.79%	≤20%	⩽25%	Pass
347	Power Factor ΔΔ	0.9379	≥0.9	⩾0.87	Pass
347	THDi ΔΔ	20.27%	≤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 only for information. When determining the compliance of the result, tolerances and/or allowances may be applied to the measured value.
4. ΔTest facility was located at No.12, Pulong East 1st Road, Tangxia Town, Dongguan, Guangdong, China.
5. ΔΔTest facility was located at Room 301, No.113, Pingkang Road, Dalang, Dongguan, Guangdong, China.

Test CCT: 3500K (Input Control Signal Applied: 0%)	
Temperature measurement point on TMP_{LED}	
	
Driver Case Measurement Point T_c	
	

[Integrating Sphere System]

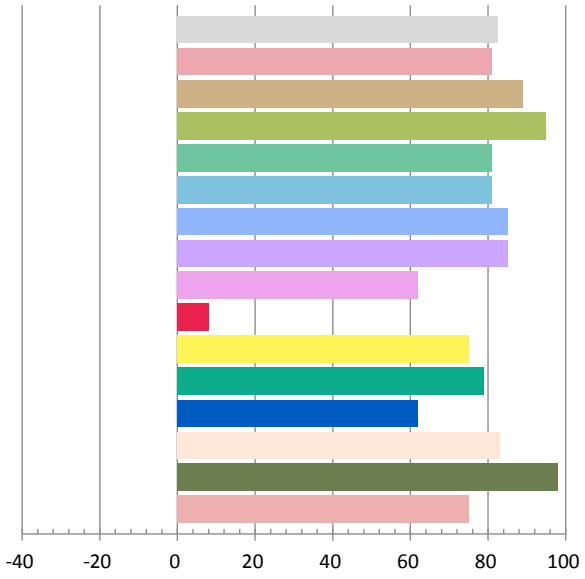
Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.0	60	0.3935	47.04	0.9961	6256.5	133.01

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
18.809	3462	0.0000272	0.4075	0.3919	0.2367	0.5121

Color Rendering Index

Ra			
82.5			
R1	R2	R3	R4
81	89	95	81
R5	R6	R7	R8
81	85	85	62
R9	R10	R11	R12
8	75	79	62
R13	R14	R15	
83	98	75	



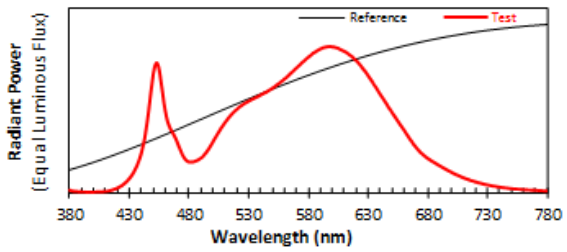
ANSI/IES TM-30-18 Color Rendition Report

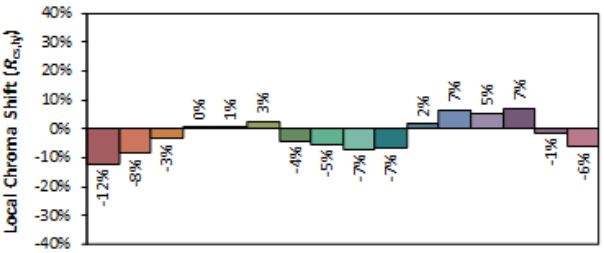
Source: User SPD

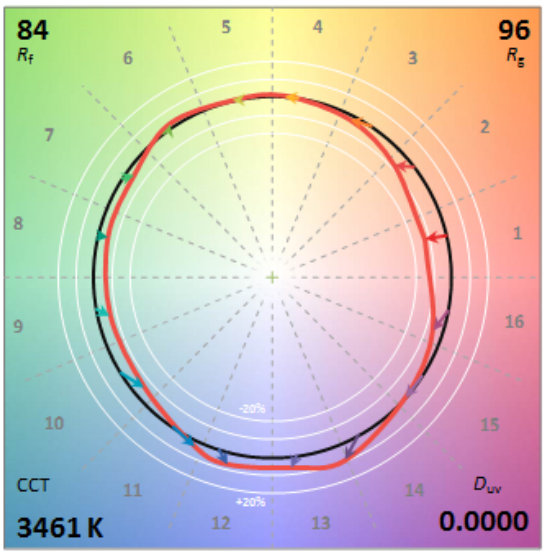
Manufacturer: RENO LED LIGHTING INC.

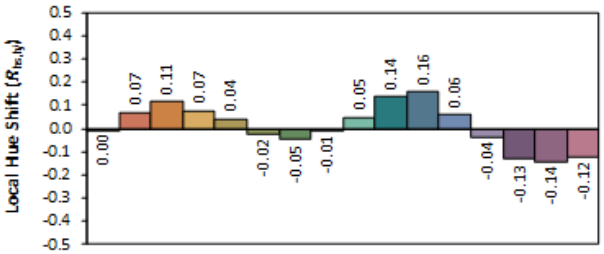
Date: 2024/6/28

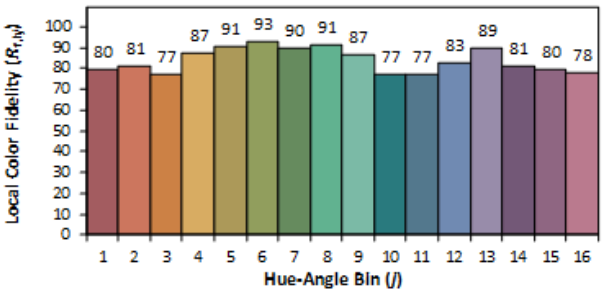
Model: RENO-24CTF-UNV/347-MWMCCT

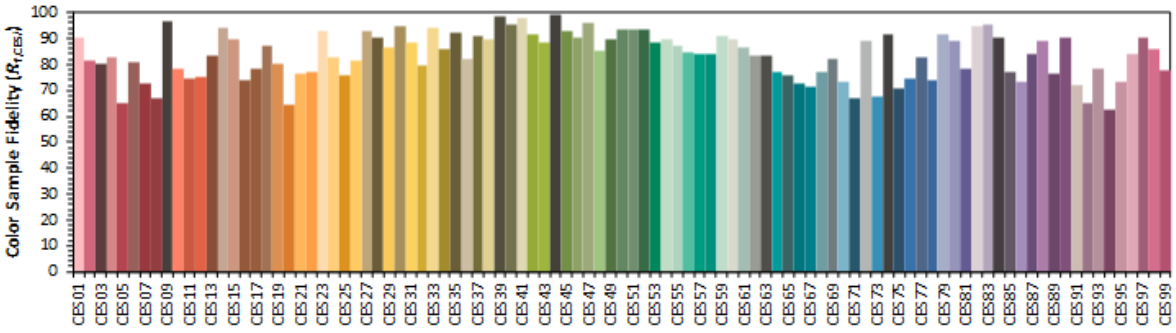












Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

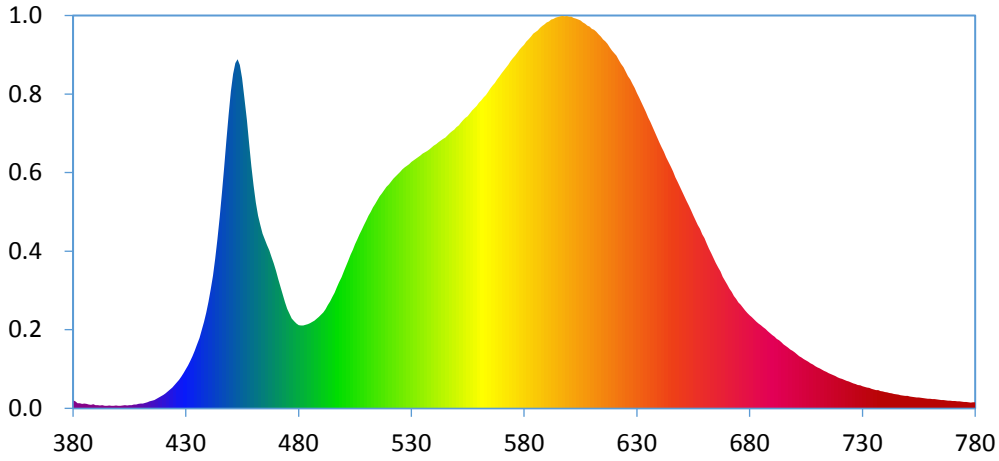
x	0.4075
y	0.3917
u'	0.2367
v'	0.5120

CIE 13.3-1995 (CRI)

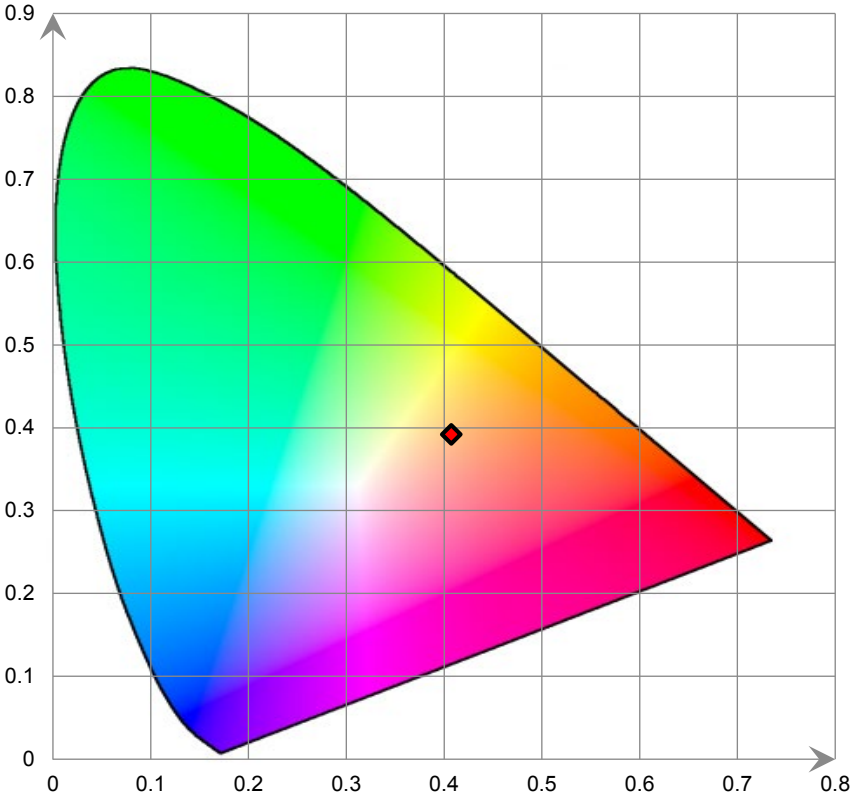
R_a	82
R_9	8

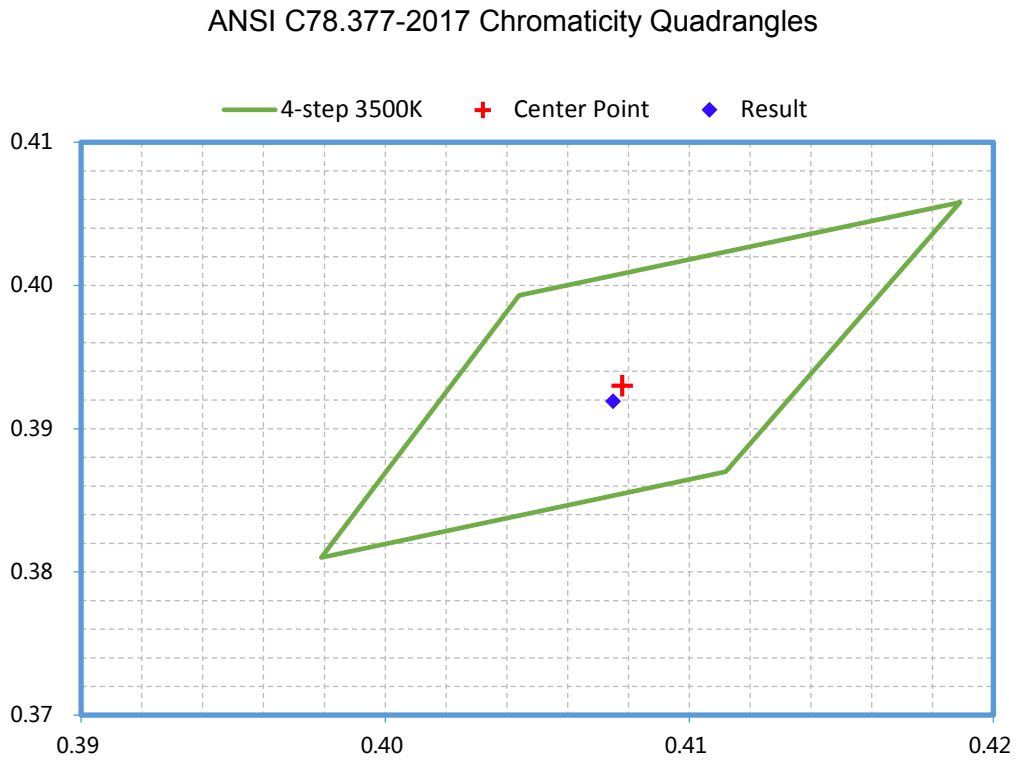
Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.

Relative Spectral Power Distribution



CIE 1931 x y Chromaticity Diagram




ANSI C78.377-2017 Chromaticity Quadrangles
4-step 3500K
Center Point
Result
0.41
0.40
0.39
0.38
0.37
0.39
0.40
0.41
0.42

[Goniophotometer System]

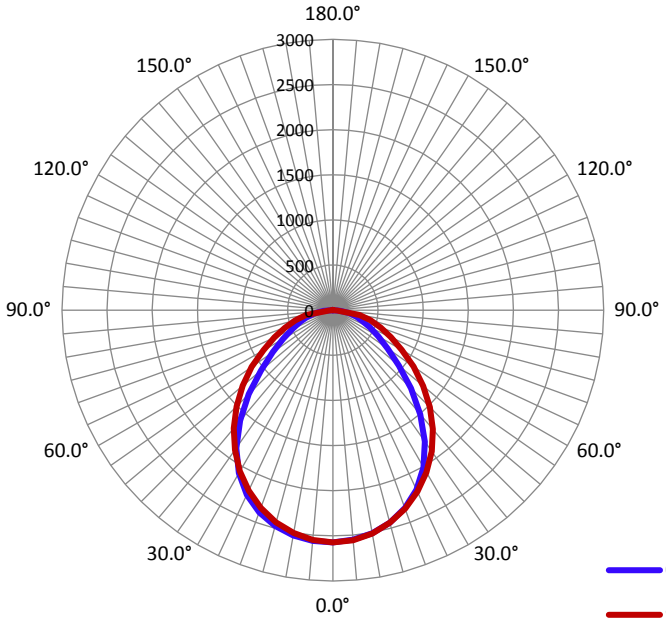
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.1	60	0.3941	47.04	0.9939

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I_{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
6269.09	133.27	2573.0	1.21	1.20

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I_{max}):	89.4	98.2	100.9	98.5	96.8
Field Angle (10% I_{max}):	153.2	163.8	161.8	163.8	160.7

Luminous Intensity (cd) Distribution Data

C / γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0°	2572	2572	2572	2572	2572	2572	2572	2572
1°	2570	2571	2571	2571	2572	2572	2572	2573
2°	2567	2568	2569	2569	2570	2571	2572	2572
3°	2563	2564	2565	2566	2567	2568	2570	2571
4°	2559	2560	2561	2562	2563	2565	2567	2568
5°	2552	2554	2555	2556	2558	2560	2563	2564
6°	2546	2547	2548	2549	2552	2554	2558	2559
7°	2538	2539	2540	2541	2544	2547	2551	2553
8°	2529	2530	2531	2532	2535	2538	2543	2546
9°	2519	2520	2520	2522	2524	2529	2534	2538
10°	2508	2509	2509	2510	2513	2518	2523	2529
11°	2496	2497	2496	2497	2500	2506	2513	2519
12°	2483	2484	2484	2485	2486	2493	2501	2507
13°	2468	2470	2469	2469	2471	2480	2489	2494
14°	2452	2454	2454	2454	2455	2465	2475	2481
15°	2436	2437	2437	2436	2438	2449	2459	2466
16°	2418	2419	2419	2419	2421	2432	2443	2450
17°	2399	2401	2400	2400	2402	2414	2424	2433
18°	2379	2380	2380	2380	2382	2394	2406	2415
19°	2356	2359	2359	2359	2362	2373	2386	2394
20°	2333	2336	2336	2337	2340	2352	2365	2373
21°	2309	2312	2313	2314	2317	2330	2343	2351
22°	2282	2287	2289	2290	2294	2307	2321	2327
23°	2255	2260	2264	2265	2270	2283	2296	2303
24°	2224	2232	2238	2241	2245	2259	2271	2277
25°	2193	2202	2211	2213	2219	2233	2245	2249
26°	2159	2171	2182	2186	2191	2206	2216	2219
27°	2125	2140	2152	2157	2163	2179	2188	2189
28°	2088	2105	2122	2128	2134	2151	2158	2156
29°	2049	2070	2090	2098	2104	2120	2129	2122
30°	2008	2033	2056	2067	2074	2090	2096	2085
31°	1966	1994	2023	2035	2043	2059	2065	2048
32°	1922	1953	1988	2002	2010	2026	2031	2010
33°	1875	1911	1951	1968	1977	1993	1997	1968
34°	1828	1868	1913	1933	1943	1959	1959	1926
35°	1777	1822	1876	1899	1908	1925	1923	1881
36°	1725	1774	1836	1863	1872	1889	1883	1836
37°	1673	1726	1797	1826	1837	1853	1845	1788
38°	1619	1676	1755	1789	1799	1816	1804	1739
39°	1564	1625	1714	1750	1761	1778	1763	1689
40°	1508	1575	1672	1713	1723	1740	1722	1638
41°	1453	1522	1629	1673	1683	1699	1678	1586
42°	1395	1469	1586	1633	1644	1660	1635	1534
43°	1337	1417	1539	1593	1603	1619	1590	1481
44°	1280	1365	1495	1551	1562	1579	1545	1429
45°	1223	1315	1450	1509	1521	1536	1500	1375
46°	1166	1266	1404	1466	1478	1494	1454	1326
47°	1110	1217	1359	1424	1436	1452	1408	1277
48°	1055	1164	1312	1382	1393	1409	1361	1228
49°	1002	1112	1266	1340	1350	1366	1315	1175

Luminous Intensity (cd) Distribution Data

C / γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
50°	952	1061	1219	1300	1308	1327	1269	1123
51°	906	1011	1174	1261	1264	1287	1223	1072
52°	861	963	1128	1221	1221	1248	1178	1022
53°	819	917	1084	1177	1177	1203	1132	976
54°	778	873	1040	1134	1134	1160	1088	930
55°	741	831	996	1091	1091	1116	1044	887
56°	704	792	955	1048	1048	1073	1001	846
57°	669	754	914	1007	1005	1031	960	807
58°	637	718	874	965	963	989	919	771
59°	609	684	836	925	922	948	880	735
60°	581	652	800	885	881	908	843	702
61°	553	621	764	846	842	869	807	670
62°	526	592	729	809	805	831	770	639
63°	501	565	696	773	771	795	737	610
64°	476	538	663	739	738	760	704	581
65°	453	512	633	706	707	727	672	554
66°	430	488	605	674	677	695	641	528
67°	408	465	578	645	647	664	613	503
68°	388	443	551	614	619	633	586	479
69°	367	422	524	587	591	604	559	456
70°	348	402	499	557	563	575	532	434
71°	330	383	474	530	535	547	506	414
72°	314	365	450	503	507	518	480	394
73°	299	347	427	476	480	492	456	374
74°	284	330	405	450	454	465	432	355
75°	270	314	383	426	429	439	408	337
76°	254	297	361	401	404	414	386	319
77°	237	281	341	377	380	390	364	301
78°	220	263	321	354	356	366	343	283
79°	202	246	302	332	331	343	322	265
80°	184	228	283	308	298	318	301	246
81°	165	208	264	276	252	285	281	227
82°	146	188	244	234	202	241	260	208
83°	125	167	220	187	147	182	236	187
84°	104	144	188	141	86	123	203	163
85°	84	121	143	94	46	64	156	139
86°	65	99	71	48	5	34	85	115
87°	45	70	53	3	3	5	45	86
88°	26	47	35	2	2	3	4	57
89°	7	24	18	1	1	1	2	29
90°	4	1	1	1	1	1	1	1
91°	2	1	1	1	0	0	0	0
92°	2	1	1	1	1	0	0	0
93°	5	1	1	1	1	0	0	0
94°	3	1	1	1	1	1	0	0
95°	2	1	1	1	1	1	1	0
96°	2	1	1	1	1	1	1	0
97°	3	1	1	1	1	1	1	0
98°	3	1	1	1	1	1	1	0
99°	3	1	1	1	1	1	1	0

Luminous Intensity (cd) Distribution Data

C / γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
100°	3	1	1	1	1	1	1	0
101°	4	1	1	1	1	1	1	0
102°	3	1	1	1	1	1	1	0
103°	3	1	1	1	1	1	1	0
104°	3	1	1	1	1	1	1	1
105°	3	1	1	1	1	1	1	1
106°	3	1	1	1	1	1	1	1
107°	3	1	1	1	1	1	1	1
108°	2	1	1	1	1	1	1	1
109°	3	1	1	1	1	1	1	1
110°	2	1	1	1	1	1	1	1
111°	3	1	1	1	1	1	1	1
112°	2	2	1	1	1	1	1	1
113°	2	2	1	1	1	1	1	1
114°	3	2	1	1	1	1	1	1
115°	2	2	1	1	1	1	1	1
116°	2	2	1	1	1	1	1	1
117°	3	2	1	1	1	1	1	1
118°	2	2	1	1	1	1	1	1
119°	2	2	1	1	1	1	1	1
120°	2	2	1	1	1	1	1	1
121°	3	2	1	1	1	1	1	1
122°	2	2	1	1	1	1	1	1
123°	2	2	1	1	1	1	1	1
124°	2	2	1	1	1	1	1	1
125°	2	2	1	1	1	1	1	1
126°	2	2	2	1	1	1	1	1
127°	2	2	2	1	1	1	1	1
128°	2	2	2	2	2	1	1	1
129°	2	2	2	2	2	2	1	1
130°	2	2	2	2	2	2	1	1
131°	2	2	2	2	2	2	2	1
132°	2	2	2	2	2	2	2	1
133°	2	2	2	2	2	2	2	1
134°	2	2	2	2	2	2	2	2
135°	2	2	2	2	2	2	2	2
136°	2	2	2	2	2	2	2	2
137°	2	2	2	2	2	2	2	2
138°	3	3	2	2	2	2	2	2
139°	3	4	3	3	3	2	2	2
140°	3	3	3	3	3	3	2	2
141°	3	3	3	3	3	3	2	2
142°	3	3	3	3	3	3	2	2
143°	3	3	3	3	3	3	3	2
144°	3	3	3	3	3	3	3	2
145°	3	3	3	3	3	3	3	2
146°	3	3	3	3	3	3	3	2
147°	3	3	3	3	3	3	3	3
148°	3	3	3	3	3	3	3	3
149°	3	3	3	3	3	3	3	3

Luminous Intensity (cd) Distribution Data

C / γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
150°	3	3	3	3	3	3	3	3
151°	3	3	3	4	4	3	3	3
152°	3	3	3	4	4	3	3	3
153°	3	3	3	4	4	3	3	3
154°	3	3	3	4	4	4	3	3
155°	3	3	3	4	4	4	3	3
156°	3	3	3	4	4	4	3	3
157°	3	3	3	4	4	4	3	3
158°	3	3	3	4	4	3	3	3
159°	3	3	3	4	4	3	3	3
160°	3	3	3	4	3	3	3	3
161°	3	3	3	4	3	3	3	3
162°	3	3	3	3	3	3	3	3
163°	3	3	3	3	3	3	3	3
164°	3	3	3	3	3	3	3	3
165°	3	3	3	3	3	3	3	3
166°	3	3	3	3	3	3	3	3
167°	3	3	3	3	3	3	3	3
168°	3	3	3	3	3	3	3	3
169°	3	3	3	3	3	3	3	3
170°	3	3	3	3	3	3	3	3
171°	3	3	3	3	3	3	3	3
172°	3	3	3	3	3	3	3	3
173°	3	3	3	3	2	2	3	3
174°	3	3	3	2	2	2	3	3
175°	3	3	3	2	2	2	3	3
176°	3	3	3	2	2	2	2	3
177°	3	3	2	2	2	2	2	3
178°	3	3	2	2	2	2	3	3
179°	3	3	2	2	2	2	2	3
180°	3	2	2	2	2	2	2	3

Luminous Intensity (cd) Distribution Data (cont.)

C / γ	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0°	2572	2572	2572	2572	2572	2572	2572	2572
1°	2573	2573	2573	2572	2572	2570	2571	2571
2°	2573	2572	2572	2571	2569	2568	2569	2568
3°	2572	2570	2570	2568	2566	2564	2564	2564
4°	2569	2568	2566	2564	2561	2559	2560	2559
5°	2566	2564	2562	2559	2555	2553	2554	2554
6°	2562	2559	2556	2552	2548	2545	2546	2547
7°	2556	2553	2549	2543	2539	2536	2538	2539
8°	2550	2546	2541	2534	2530	2527	2528	2531
9°	2543	2538	2532	2524	2519	2516	2518	2521
10°	2534	2529	2523	2513	2507	2504	2507	2511
11°	2525	2519	2511	2501	2494	2491	2494	2498
12°	2514	2508	2499	2487	2480	2477	2480	2486
13°	2502	2495	2485	2474	2465	2462	2466	2471
14°	2488	2481	2471	2457	2448	2445	2449	2456
15°	2474	2466	2455	2442	2431	2429	2433	2440
16°	2458	2450	2438	2423	2414	2410	2415	2421
17°	2442	2432	2421	2406	2394	2391	2396	2403
18°	2423	2415	2401	2386	2376	2370	2376	2382
19°	2404	2394	2381	2366	2354	2350	2355	2361
20°	2384	2373	2360	2344	2332	2327	2332	2338
21°	2361	2351	2339	2322	2309	2304	2309	2314
22°	2338	2328	2315	2298	2285	2279	2284	2289
23°	2312	2304	2291	2273	2260	2255	2260	2262
24°	2286	2277	2266	2248	2235	2230	2234	2235
25°	2257	2250	2239	2222	2207	2203	2206	2205
26°	2226	2220	2212	2194	2180	2175	2179	2174
27°	2194	2189	2183	2166	2151	2146	2149	2142
28°	2160	2157	2155	2137	2122	2117	2119	2108
29°	2123	2123	2122	2107	2091	2086	2087	2073
30°	2084	2086	2091	2075	2059	2055	2054	2037
31°	2045	2050	2057	2044	2028	2023	2020	1998
32°	2002	2010	2023	2011	1995	1989	1985	1959
33°	1958	1969	1988	1977	1961	1955	1948	1917
34°	1912	1927	1952	1943	1928	1920	1912	1874
35°	1863	1883	1914	1908	1892	1885	1874	1830
36°	1814	1836	1876	1872	1857	1849	1835	1783
37°	1762	1789	1836	1836	1819	1812	1796	1736
38°	1708	1740	1797	1797	1783	1775	1755	1687
39°	1654	1690	1754	1760	1745	1736	1714	1637
40°	1599	1639	1714	1721	1707	1698	1672	1587
41°	1542	1588	1670	1683	1668	1659	1630	1536
42°	1485	1536	1627	1643	1629	1620	1586	1484
43°	1427	1483	1583	1603	1588	1579	1544	1432
44°	1369	1430	1538	1562	1548	1540	1499	1380
45°	1315	1376	1493	1521	1507	1497	1454	1327
46°	1260	1323	1447	1479	1466	1456	1409	1274
47°	1206	1270	1402	1437	1424	1413	1365	1221
48°	1148	1217	1357	1395	1383	1372	1324	1170
49°	1093	1165	1316	1352	1341	1330	1282	1119

Luminous Intensity (cd) Distribution Data (cont.)

C / γ	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
50°	1040	1113	1274	1309	1303	1287	1241	1068
51°	989	1063	1233	1267	1264	1245	1196	1019
52°	941	1015	1188	1225	1225	1201	1150	972
53°	896	967	1143	1183	1181	1160	1106	926
54°	853	923	1100	1140	1139	1117	1062	883
55°	812	879	1056	1098	1096	1075	1019	841
56°	774	838	1014	1055	1053	1033	977	800
57°	738	800	973	1016	1011	992	936	762
58°	703	764	933	975	969	952	896	726
59°	671	729	894	935	928	912	857	692
60°	639	695	856	896	888	873	820	659
61°	609	664	819	859	848	836	784	624
62°	580	633	783	823	812	800	748	599
63°	553	607	748	787	777	764	714	574
64°	527	581	715	754	745	731	682	547
65°	502	555	682	721	713	699	650	521
66°	478	529	651	690	683	668	620	496
67°	454	504	621	659	653	638	590	472
68°	431	481	592	630	624	611	562	450
69°	409	458	565	603	594	584	535	428
70°	388	437	539	575	566	556	509	408
71°	367	417	513	548	537	528	484	388
72°	348	397	488	520	510	501	459	370
73°	332	378	464	493	484	475	436	352
74°	316	359	440	467	458	449	413	335
75°	300	340	417	442	432	424	390	318
76°	284	322	395	418	408	400	368	302
77°	266	304	373	393	384	376	348	285
78°	247	286	352	370	360	353	328	269
79°	228	267	331	346	335	329	309	252
80°	208	249	311	321	301	304	290	235
81°	189	230	290	286	252	267	270	216
82°	168	209	269	237	195	220	251	196
83°	146	188	245	185	137	169	227	175
84°	124	165	212	122	80	107	174	153
85°	103	141	160	44	42	55	122	129
86°	79	115	108	32	4	3	70	103
87°	56	86	56	22	3	2	35	73
88°	38	46	4	11	1	1	2	38
89°	21	6	2	1	1	1	1	3
90°	3	3	1	0	0	0	0	1
91°	0	0	0	0	0	0	0	0
92°	0	0	0	0	0	0	0	0
93°	0	0	0	0	0	0	0	0
94°	0	0	0	0	0	0	0	0
95°	0	0	0	0	0	0	0	1
96°	0	0	0	0	0	0	0	1
97°	0	0	0	0	0	0	0	1
98°	0	0	0	0	0	0	0	1
99°	0	0	0	0	0	0	0	1

Luminous Intensity (cd) Distribution Data (cont.)

C / γ	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
100°	0	0	0	0	0	0	0	1
101°	0	0	0	0	0	0	0	1
102°	0	0	0	0	0	0	0	1
103°	0	0	0	0	0	0	0	1
104°	0	0	0	0	0	0	0	1
105°	0	0	0	0	0	0	0	1
106°	0	0	0	0	0	0	0	1
107°	0	0	0	0	0	0	0	1
108°	0	0	0	0	0	0	0	1
109°	0	0	0	0	0	0	0	1
110°	0	0	0	0	0	0	0	1
111°	0	0	0	0	0	0	0	1
112°	0	0	0	0	0	0	0	1
113°	0	0	0	0	0	0	0	1
114°	0	0	0	0	0	0	0	1
115°	0	0	0	0	0	0	0	1
116°	0	0	0	0	0	0	0	1
117°	0	0	1	0	0	0	0	1
118°	0	0	1	1	0	0	0	1
119°	0	0	1	1	0	1	1	1
120°	1	1	1	1	1	1	1	1
121°	1	1	1	1	1	1	1	1
122°	1	1	1	1	1	1	1	1
123°	1	1	1	1	1	1	1	1
124°	1	1	1	1	1	1	1	1
125°	1	1	1	1	1	1	1	1
126°	1	1	1	1	1	1	1	1
127°	1	1	1	1	1	1	1	1
128°	1	1	1	1	1	1	1	1
129°	1	1	1	1	1	1	1	1
130°	1	1	1	1	1	1	1	1
131°	1	1	1	1	1	1	1	1
132°	1	1	1	1	1	1	1	1
133°	1	1	1	1	1	1	1	1
134°	1	1	1	1	1	1	1	1
135°	1	1	1	1	1	1	1	1
136°	1	1	1	1	1	1	1	1
137°	1	1	1	1	1	1	1	1
138°	1	1	1	1	1	1	1	1
139°	1	1	1	1	1	1	1	1
140°	1	1	1	1	1	1	1	1
141°	1	1	1	1	1	1	1	1
142°	1	1	1	1	1	1	1	1
143°	1	1	1	1	1	1	1	1
144°	1	1	1	1	1	1	1	1
145°	1	1	1	1	1	1	1	1
146°	1	1	1	1	1	1	1	1
147°	1	1	1	1	1	1	1	1
148°	1	1	1	1	1	1	1	1
149°	1	1	1	1	1	1	1	1

Luminous Intensity (cd) Distribution Data (cont.)

C / γ	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
150°	1	1	1	1	1	1	1	1
151°	1	1	1	1	1	1	1	1
152°	1	1	1	1	1	1	1	1
153°	1	1	1	1	1	1	1	1
154°	1	1	1	1	1	1	1	2
155°	1	1	1	1	1	1	1	2
156°	1	2	1	1	1	1	1	2
157°	1	1	1	1	1	1	1	2
158°	1	1	1	1	1	1	1	2
159°	2	1	1	1	1	1	1	2
160°	2	1	1	1	1	1	2	2
161°	2	1	1	1	1	1	2	2
162°	2	2	1	1	1	1	2	2
163°	2	2	1	1	1	1	2	2
164°	2	2	1	1	1	1	2	2
165°	2	2	1	1	1	1	2	2
166°	2	2	1	1	1	2	2	2
167°	2	2	1	1	1	2	2	2
168°	2	2	1	1	1	2	2	2
169°	2	2	2	1	1	2	2	2
170°	2	2	2	1	2	2	2	2
171°	2	2	2	1	2	2	3	2
172°	2	2	2	2	2	2	3	2
173°	2	2	2	2	1	2	2	2
174°	2	2	2	2	2	2	2	2
175°	2	2	2	2	2	2	2	3
176°	3	2	2	2	2	2	2	3
177°	3	2	2	2	2	2	2	3
178°	3	2	2	2	2	2	2	3
179°	3	2	2	2	2	2	2	3
180°	3	2	2	2	2	2	2	3

Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	61.3	0.98
5-10	181.5	2.89
10-15	294.3	4.70
15-20	395.0	6.30
20-25	479.3	7.64
25-30	542.7	8.66
30-35	581.0	9.27
35-40	591.0	9.43
40-45	573.0	9.14
45-50	531.0	8.47
50-55	472.7	7.54
55-60	406.6	6.48
60-65	341.5	5.45
65-70	282.1	4.50
70-75	227.2	3.62
75-80	175.0	2.79
80-85	106.2	1.70
85-90	20.1	0.32
90-95	0.3	0.01
95-100	0.3	0.00
100-105	0.4	0.01
105-110	0.4	0.00
110-115	0.4	0.01
115-120	0.4	0.01
120-125	0.5	0.00
125-130	0.5	0.01
130-135	0.5	0.01
135-140	0.6	0.01
140-145	0.6	0.01
145-150	0.6	0.01
150-155	0.6	0.01
155-160	0.5	0.01
160-165	0.4	0.00
165-170	0.3	0.01
170-175	0.2	0.00
175-180	0.1	0.00

Deg	Flux (lm)	%
0-5	61.3	0.98
0-10	242.8	3.87
0-15	537.1	8.57
0-20	932.1	14.87
0-25	1411.5	22.51
0-30	1954.2	31.17
0-35	2535.2	40.44
0-40	3126.2	49.87
0-45	3699.2	59.01
0-50	4230.2	67.48
0-55	4702.9	75.02
0-60	5109.5	81.50
0-65	5451.0	86.95
0-70	5733.1	91.45
0-75	5960.2	95.07
0-80	6135.2	97.86
0-85	6241.5	99.56
0-90	6261.6	99.88
0-95	6261.9	99.89
0-100	6262.3	99.89
0-105	6262.6	99.90
0-110	6263.0	99.90
0-115	6263.4	99.91
0-120	6263.8	99.92
0-125	6264.3	99.92
0-130	6264.8	99.93
0-135	6265.3	99.94
0-140	6265.9	99.95
0-145	6266.6	99.96
0-150	6267.2	99.97
0-155	6267.7	99.98
0-160	6268.2	99.99
0-165	6268.6	99.99
0-170	6268.9	100.00
0-175	6269.0	100.00
0-180	6269.1	100.00

Test Model: RENO-24CTF-UNV/347-MWMCCT
Test CCT: 4000K (Input Control Signal Applied: 50%)
Test Wattage: 49W

Test Condition: Method: Integrating Sphere System; Orientation: Downward; Test Voltage: 120.1V 60Hz;

Test Item	Test Result	DLC Requirements	DLC Requirements(With tolerances and/or allowances)	Conclusion
Light Output(lm) ΔΔ	6513.1	5000~10000	4500≤Light output≤11000	Pass
Power(W) ΔΔ	45.68	None.	None.	N/A
Total Efficacy(lm/W) ΔΔ	142.58	≥130	≥126.1	Pass
CCT(K) ΔΔ	4109	3831~4139	No tolerances	Pass
Duv ΔΔ	0.00018	-0.0023~0.0043	No tolerances	Pass
IES Rf ΔΔ	84	70	69	Pass
IES Rg ΔΔ	95	89	88	
IES Rcs,h1 ΔΔ	-11%	-12%~23%	-13%~24%	
Ra ΔΔ	83.8	≥80	≥79	
R9 ΔΔ	14	≥0	≥-1	

Test Condition: Method: Integrating THDi、PF Test ; Orientation: Downward;

Test Voltage	Test Item	Test Result	DLC Requirements	DLC Requirements(With tolerances and/or allowances)	Conclusion
120	Power Factor ΔΔ	0.9943	≥0.9	≥0.87	Pass
120	THDi ΔΔ	8.32%	≤20%	≤25%	Pass
277	Power Factor ΔΔ	0.9669	≥0.9	≥0.87	Pass
277	THDi ΔΔ	12.81%	≤20%	≤25%	Pass
347	Power Factor ΔΔ	0.9378	≥0.9	≥0.87	Pass
347	THDi ΔΔ	20.40%	≤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 only for information. When determining the compliance of the result, tolerances and/or allowances may be applied to the measured value.
4. ΔΔ Test facility was located at Room 301, No.113, Pingkang Road, Dalang, Dongguan, Guangdong, China.

[Integrating Sphere System]

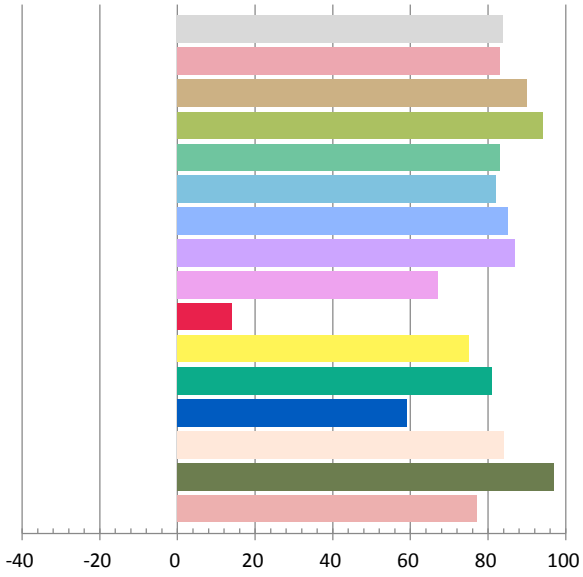
Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.0	60	0.3818	45.68	0.997	6513.1	142.58

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
19.910	4109	0.00018	0.3758	0.3742	0.2231	0.4997

Color Rendering Index

Ra			
83.8			
R1	R2	R3	R4
83	90	94	83
R5	R6	R7	R8
82	85	87	67
R9	R10	R11	R12
14	75	81	59
R13	R14	R15	
84	97	77	



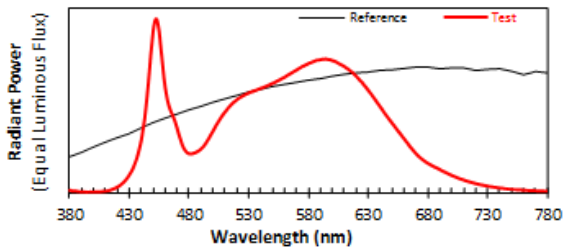
ANSI/IES TM-30-18 Color Rendition Report

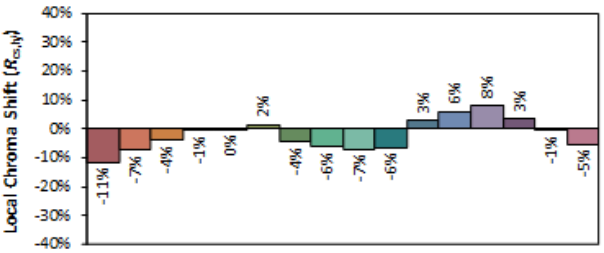
Source: User SPD

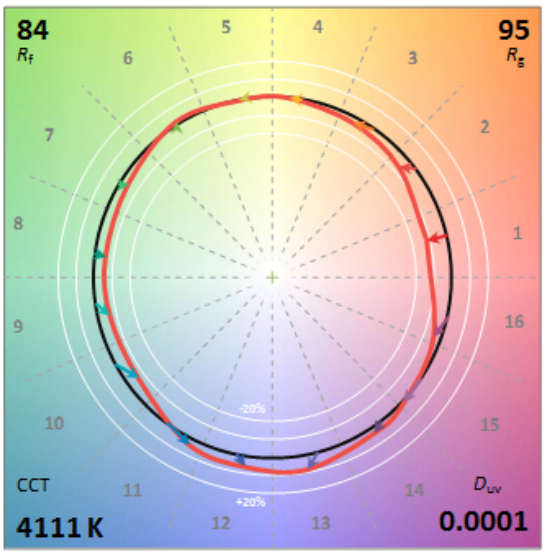
Manufacturer: RENO LED LIGHTING INC.

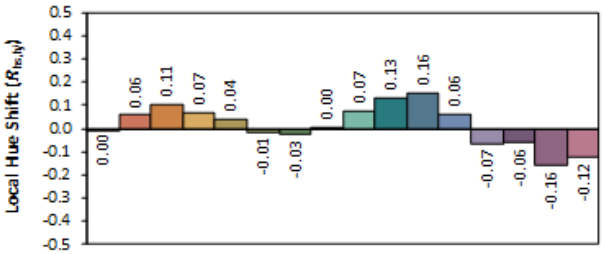
Date: 2024/6/28

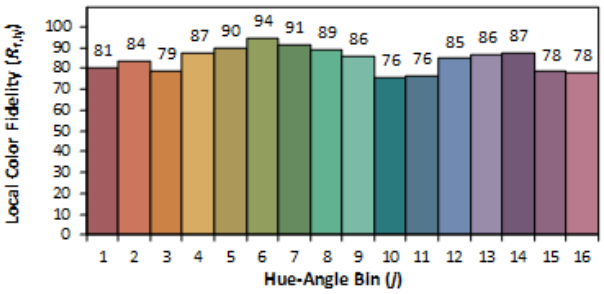
Model: RENO-24CTF-UNV/347-MWMCCT

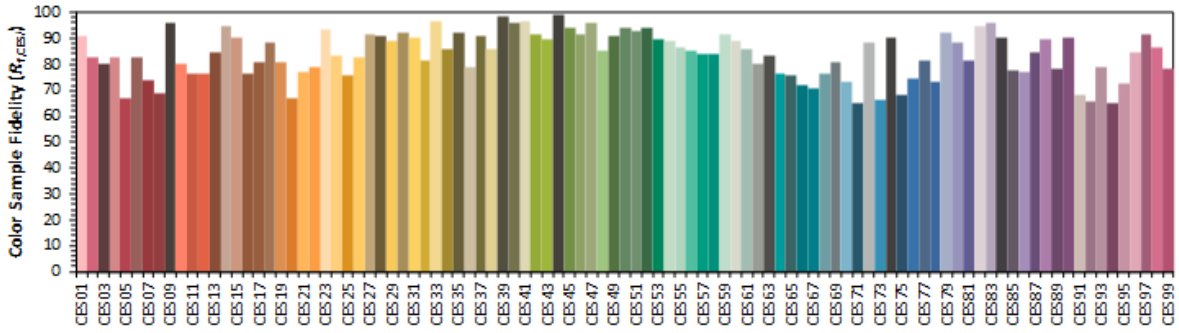












Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

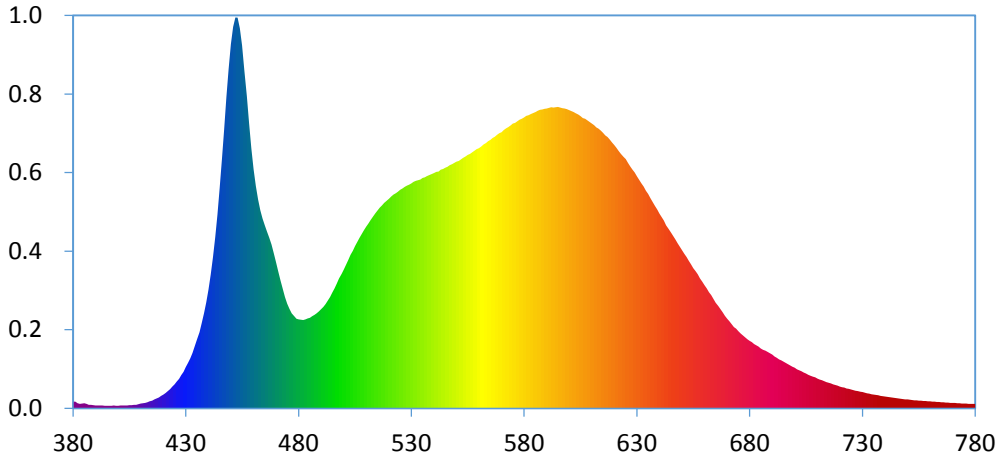
x	**0.3757**
y	**0.3740**
u'	**0.2231**
v'	**0.4997**

CIE 13.3-1995 (CRI)

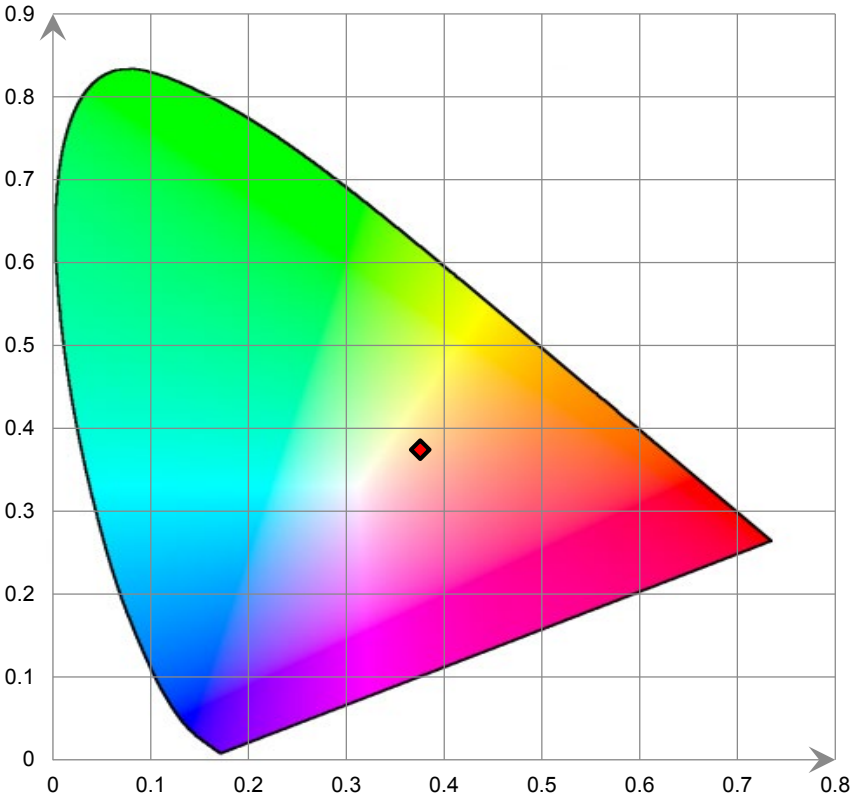
R_a	84
R_9	13

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

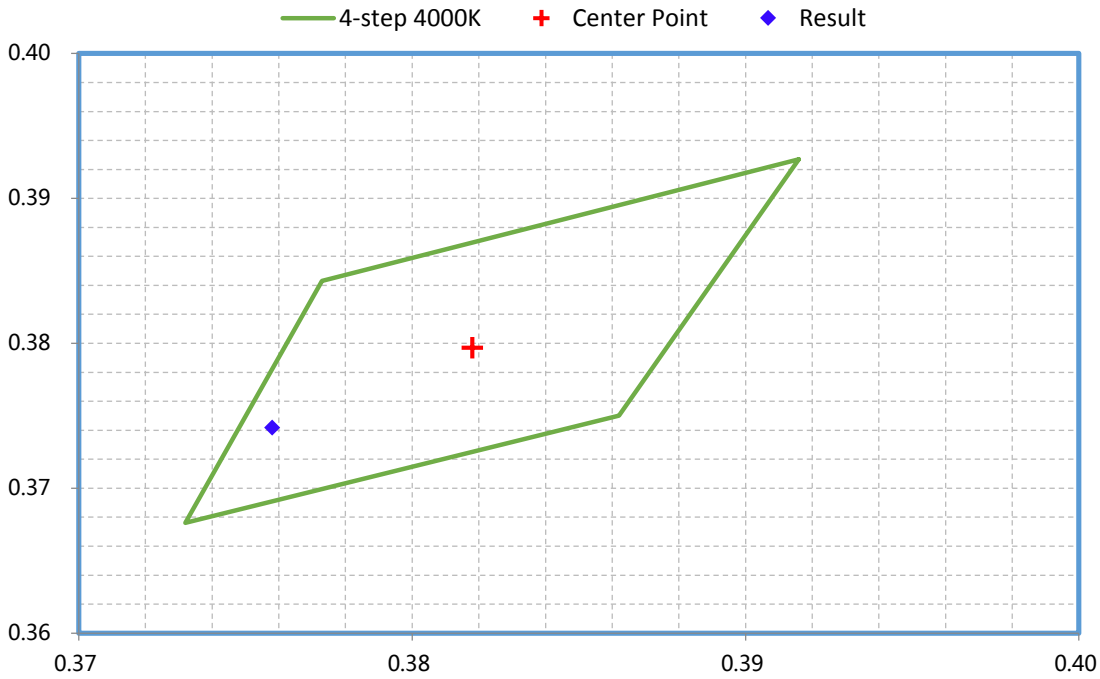
Relative Spectral Power Distribution



CIE 1931 x y Chromaticity Diagram



ANSI C78.377-2017 Chromaticity Quadrangles



Test Model: RENO-24CTF-UNV/347-MWMCCT
Test CCT: 5000K (Input Control Signal Applied: 100%)
Test Wattage: 49W

Test Condition: Method: Integrating Sphere System; Orientation: Downward; Test Voltage: 120.1V 60Hz;

Test Item	Test Result	DLC Requirements	DLC Requirements(With tolerances and/or allowances)	Conclusion
Light Output(lm) ΔΔ	6444.7	5000~10000	4500≤Light output≤11000	Pass
Power(W) ΔΔ	47	None.	None.	N/A
Total Efficacy(lm/W) ΔΔ	137.13	≥130	≥126.1	Pass
CCT(K) ΔΔ	4962	4809~5249	No tolerances	Pass
Duv ΔΔ	0.00263	-0.0013~0.0053	No tolerances	Pass
IES Rf ΔΔ	83	70	69	Pass
IES Rg ΔΔ	96	89	88	
IES Rcs,h1 ΔΔ	-12%	-12%~23%	-13%~24%	
Ra ΔΔ	82.8	≥80	≥79	
R9 ΔΔ	10	≥0	≥-1	

Test Condition: Method: Integrating THDi、PF Test ; Orientation: Downward;

Test Voltage	Test Item	Test Result	DLC Requirements	DLC Requirements(With tolerances and/or allowances)	Conclusion
120	Power Factor ΔΔ	0.9942	≥0.9	≥0.87	Pass
120	THDi ΔΔ	8.12%	≤20%	≤25%	Pass
277	Power Factor ΔΔ	0.9658	≥0.9	≥0.87	Pass
277	THDi ΔΔ	12.72%	≤20%	≤25%	Pass
347	Power Factor ΔΔ	0.9376	≥0.9	≥0.87	Pass
347	THDi ΔΔ	20.21%	≤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 only for information. When determining the compliance of the result, tolerances and/or allowances may be applied to the measured value.
4. ΔΔ Test facility was located at Room 301, No.113, Pingkang Road, Dalang, Dongguan, Guangdong, China.

[Integrating Sphere System]

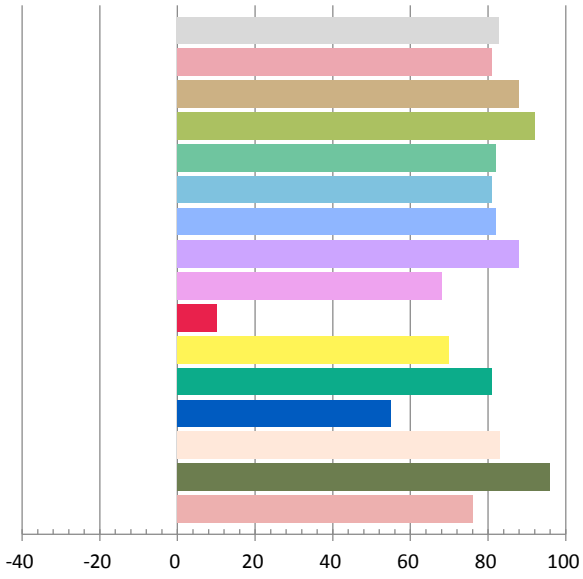
Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.0	60	0.3936	47	0.995	6444.7	137.13

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
19.970	4962	0.00263	0.3467	0.3582	0.2100	0.4881

Color Rendering Index

Ra			
82.8			
R1	R2	R3	R4
81	88	92	82
R5	R6	R7	R8
81	82	88	68
R9	R10	R11	R12
10	70	81	55
R13	R14	R15	
83	96	76	



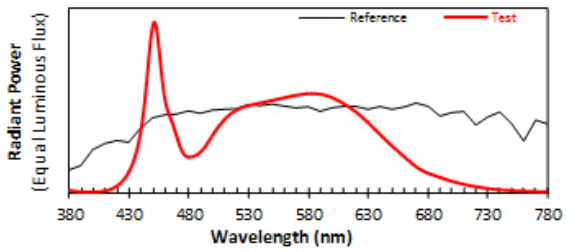
ANSI/IES TM-30-18 Color Rendition Report

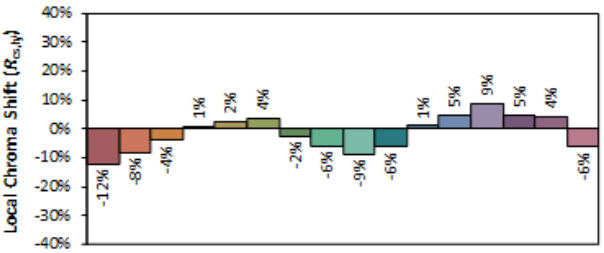
Source: User SPD

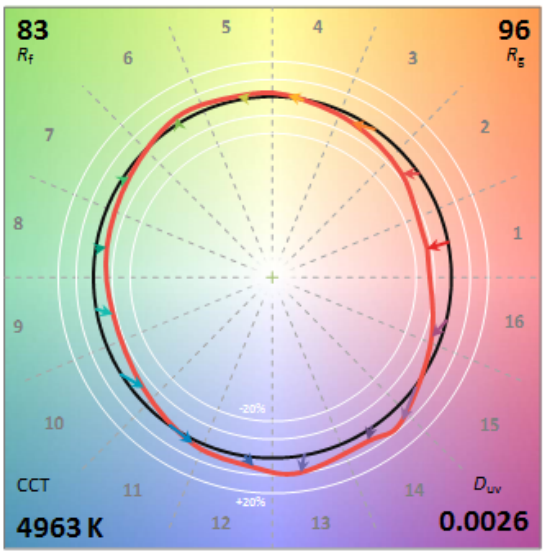
Manufacturer: RENO LED LIGHTING INC.

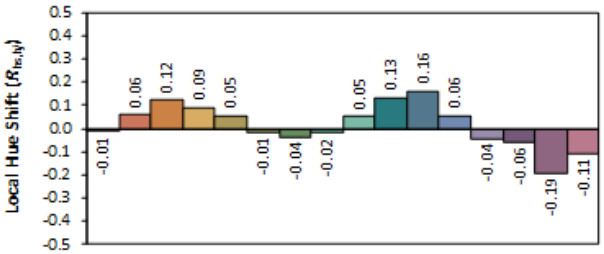
Date: 2024/6/28

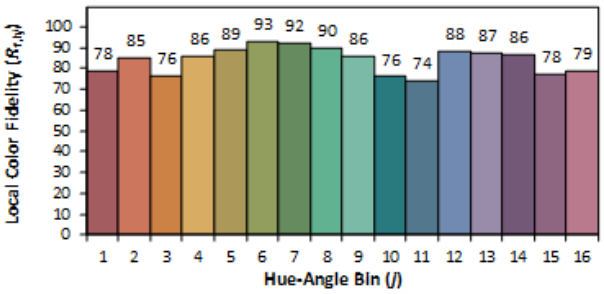
Model: RENO-24CTF-UNV/347-MWMCCT

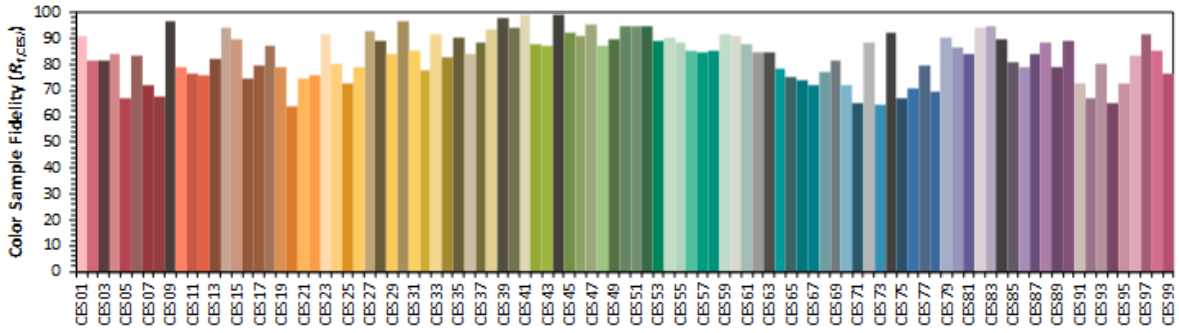












Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

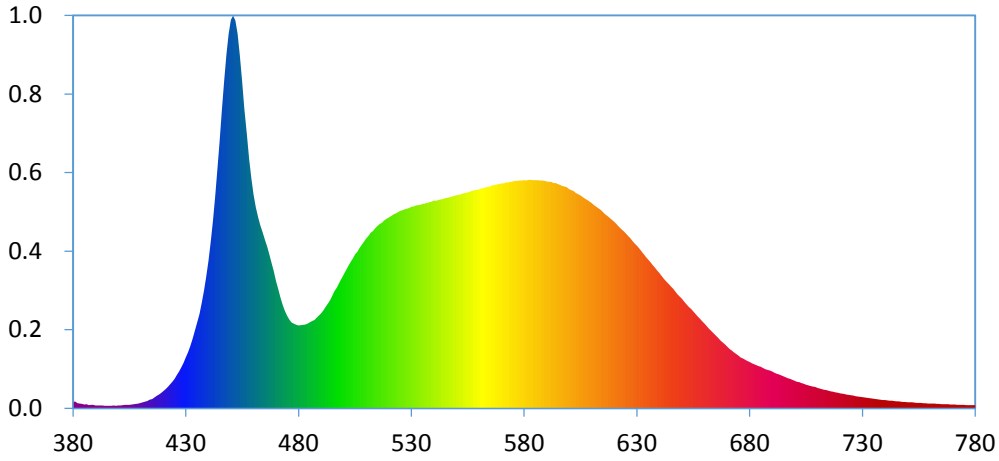
x	0.3467
y	0.3580
u'	0.2100
v'	0.4880

CIE 13.3-1995 (CRI)

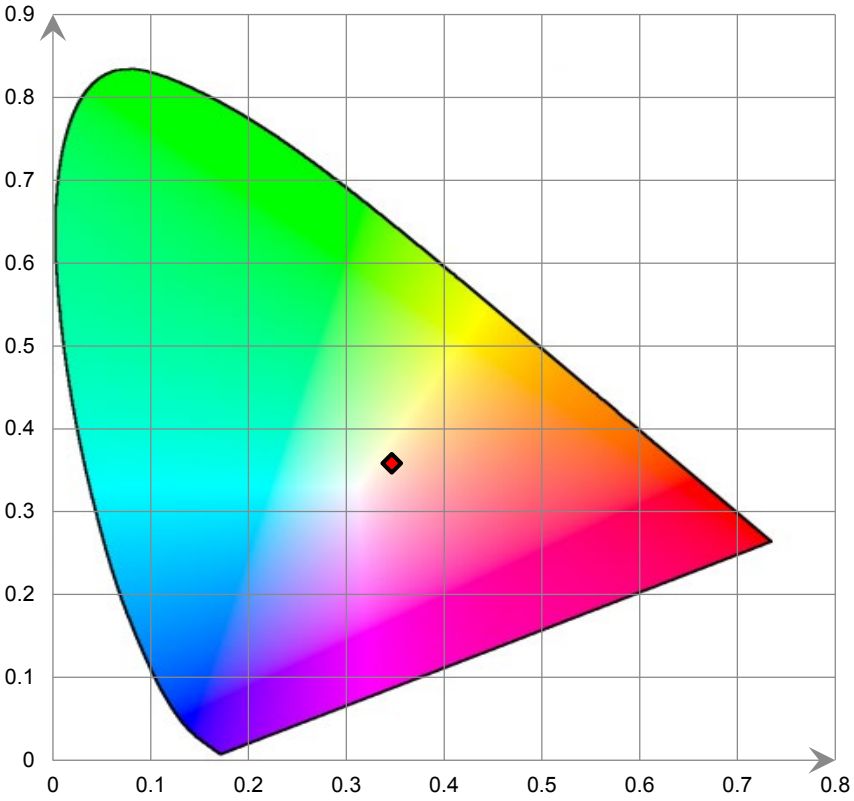
R_a	83
R_9	8

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

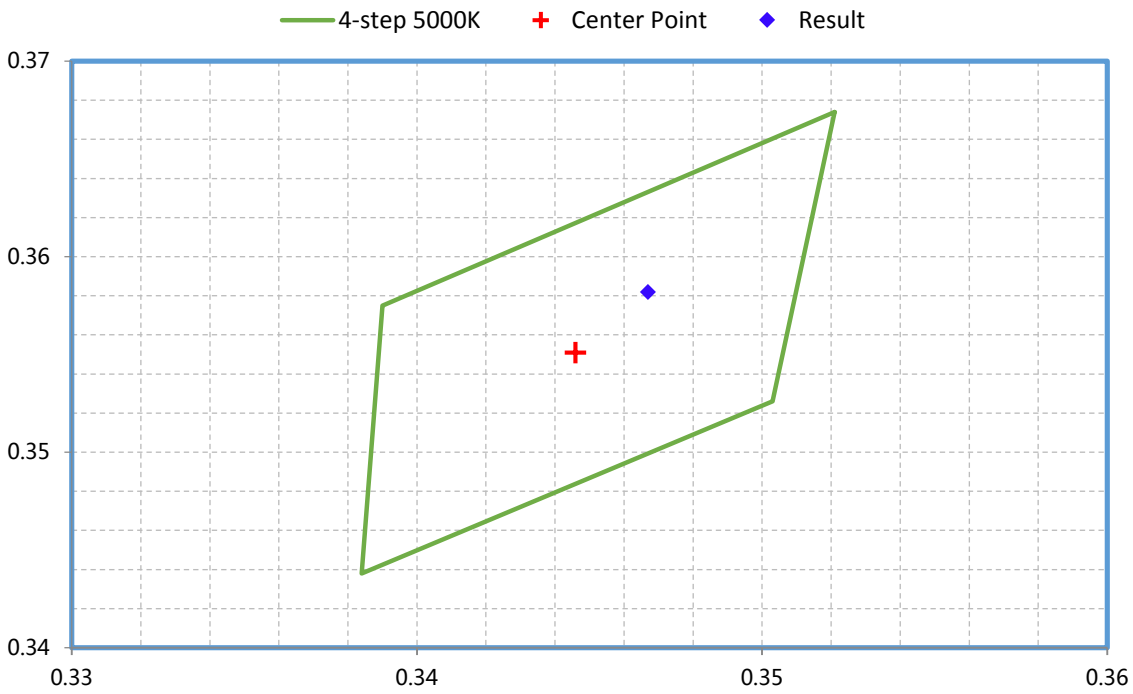
Relative Spectral Power Distribution



CIE 1931 x y Chromaticity Diagram



ANSI C78.377-2017 Chromaticity Quadrangles



4. Description of Test Equipment

Device	Manufacture	Model No	Serial No	Calibration date	Calibration due date
2.0m integrating sphere	EVERFINE	R98	11010018	2023-09-02	2024-09-01
spectroradiometer	EVERFINE	HAAS-2000	G112048TS81331121	2023-09-02	2024-09-01
Digital Power Meter	EVERFINE	PF2010A	1011004	2023-09-02	2024-09-01
Digital CC&CV DC Power Supply	EVERFINE	WY305-V1	1101047	2023-09-02	2024-09-01
Standard Light Source	EVERFINE	D204	N/A	2023-05-12	2025-05-11
Special zero-voltage synchronous switching AC	EVERFINE	DPS1010-YF	1011001T	2023-09-02	2024-09-01
AC POWER SUPPLY	EVERFINE	VPS1030 PWM	1012017	2023-09-02	2024-09-01
Digital CC&CV DC Power Supply	EVERFINE	WY12010	1009009	2023-09-02	2024-09-01
Digital power meter	YOKOGAWA	WT-210	91j926132	2023-09-02	2024-09-01
full-field speed goniophotometer	EVERFINE	GO-R5000	YG108492N10120001	2023-09-02	2024-09-01
wireless remote thermohygrometer	N/A	AOK-5017B	N/A	2023-09-02	2024-09-01
Standard Light Source	EVERFINE	D908	N/A	2023-05-12	2025-05-11
Multimeter	FLUKE	115C	N/A	2023-09-02	2024-09-01
Hybrid Recorder	YOKOGAWA	DR240	10#	2023-11-09	2024-11-08
AC POWER SUPPLY	HengPu	HPA 1103	0003394	2023-09-02	2024-09-01
Variable-Voltage Transformer	CHKO	TDGC2G-3	201102	N/A	N/A

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

5. 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 includes some test methods are not in NVLAP accreditation scope marked *.

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=2 with the 95% confidence interval.

6. This report cannot be reproduced except in full, without prior written approval of the Company.

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