TEST REPORT

For

RENO LED LIGHTING INC.

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

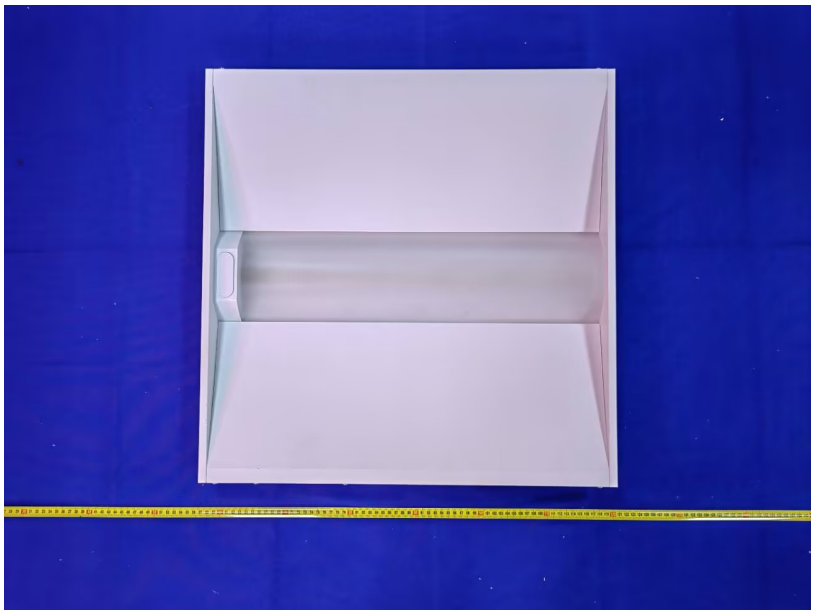
Model Number:	RENO-22CTF-UNV/347-MWMCCT-HL	
Report Type:	Electrical, Photometric and ISTMT tests according to the following standards and show the compliance to DLC Program SSL Technical Requirements V5.1	
Standards:	ANSI/IES LM-79-19: Approved Method: Optical and Electrical Measurements of Solid-State 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	
Sample Size:	One test sample was in good condition and received on 2024-06-24, and used for testing.	
Test Date:	2024-06-24 to 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.	

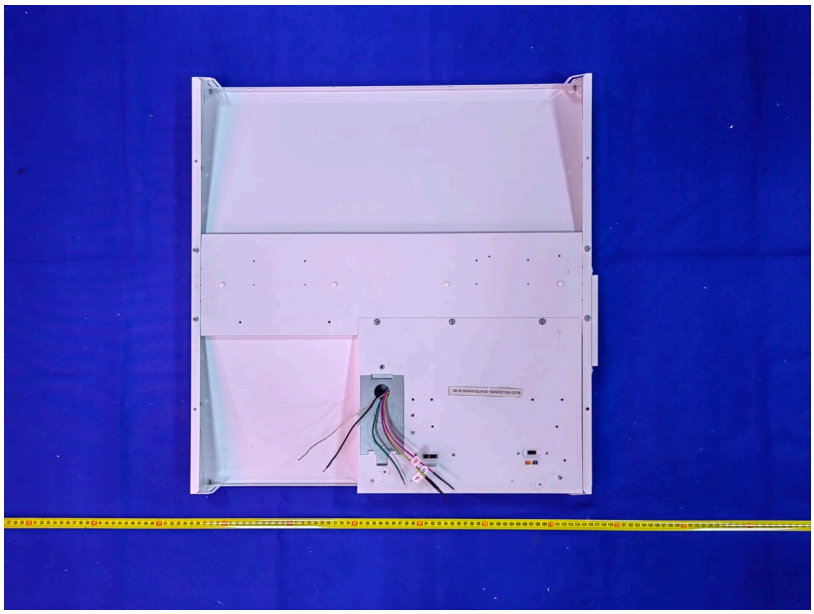
1. Product Description and Rating#

Test Model	Primary Use	Rated Voltage	Power(W)	CCT(K)	LED Model	LED manufacturer	Driver Model	Test Item
RENO-22CTF-UNV/347-MWMCCT-HL	Low-Bay Luminaires for Commercial and Industrial Buildings	120-347VAC 50/60Hz	20/25/30/40	3500K/ 4000K/ 5000K	L128-xx80RA3500xxx	Lumileds Holding B.V.	RENO-SDC40CS085V42DN3A	All

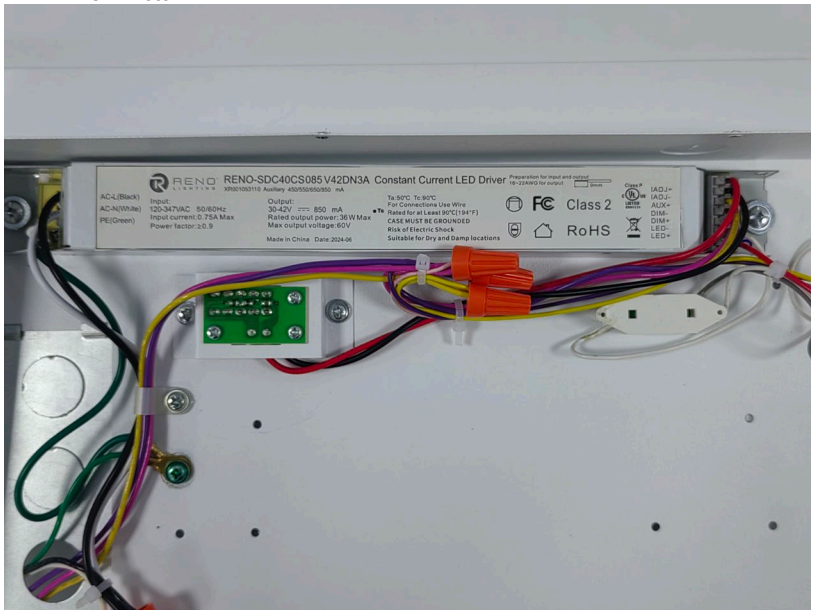
Test Model	Power(W)	CCT(K)	Light Output (lm)	Luminous Efficacy (lm/W)
RENO-22CTF-UNV/347-MWMCCT-HL	20	3500	2640	132
		4000	2860	143
		5000	2720	136
	25	3500	3275	131
		4000	3550	142
		5000	3375	135
	30	3500	3900	130
		4000	4230	141
		5000	4020	134
	40	3500	5168	129.2
		4000	5600	140
		5000	5320	133

2. Product Photo





LED Driver Photo



3. Test Result

Test Model: RENO-22CTF-UNV/347-MWMCCT-HL
Test CCT: 3500K (Input Control Signal Applied: 0%)
Test Wattage: 40W

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	5065.9	5000~10000	4500≤Light output≤11000	Pass
Power(W) ΔΔ	38.98	None.	None.	N/A
Total Efficacy(lm/W) ΔΔ	129.97	≥130	≥126.1	Pass[i]
CCT(K) ΔΔ	3437	3341~3589	No tolerances	Pass
Duv ΔΔ	0.000519	-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	82.7	≥80	≥79	
R9 ΔΔ	7	≥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	5073.56	≥5000	4500≤Light output≤11000	Pass
Power(W) Δ	38.99	None.	None.	N/A
Total Efficacy(lm/W) Δ	130.12	≥130	≥126.1	Pass[i]
Zonal Lumen Distribution(20-50) Δ	52.29%	20-50°≥30%	20-50°≥20%	Pass
UGR crosswise view Δ	22.7	<25	No tolerances	Pass
UGR endwise view Δ	19.7	<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	52.6	≤115	With tolerance of ≤ 1.1°C or 0.4%, whichever is greater due to thermocouple tolerance	Pass
TMP_c(°C) ΔΔ	43.3	≤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	85.8	≤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

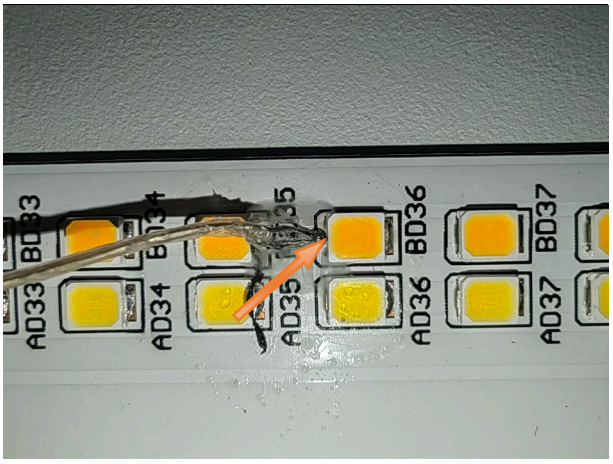
Test Condition: Method: Integrating THDi、PF Test ; Orientation: Downward;

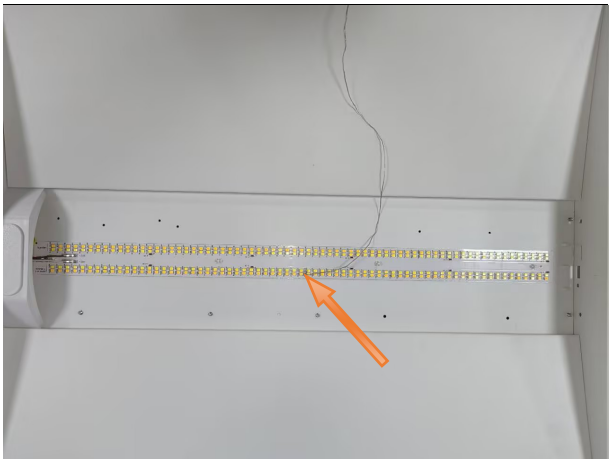
Test Voltage	Test Item	Test Result	DLC Requirements	DLC Requirements(With tolerances and/or allowances)	Conclusion
120	Power Factor ΔΔ	0.9962	≥0.9	⩾0.87	Pass
120	THDi ΔΔ	3.51%	≤20%	⩽25%	Pass
277	Power Factor ΔΔ	0.9535	≥0.9	⩾0.87	Pass
277	THDi ΔΔ	6.81%	≤20%	⩽25%	Pass
347	Power Factor ΔΔ	0.9153	≥0.9	⩾0.87	Pass
347	THDi ΔΔ	10.32%	≤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.

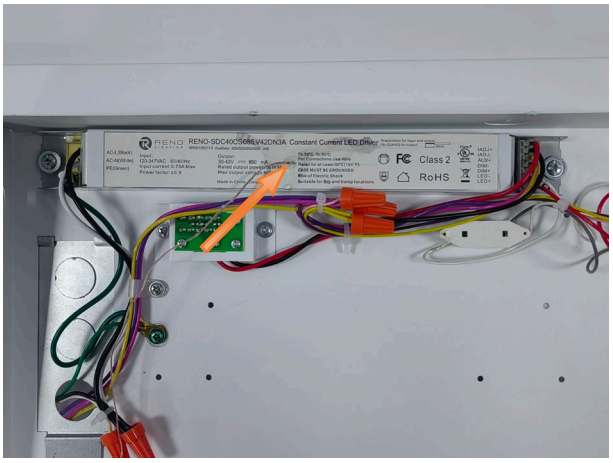
Test CCT: 3500K (Input Control Signal Applied: 0%)

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	0.3259	38.98	0.9963	5065.9	129.97

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
15.220	3437	0.000519	0.4095	0.3940	0.2371	0.5132

Color Rendering Index

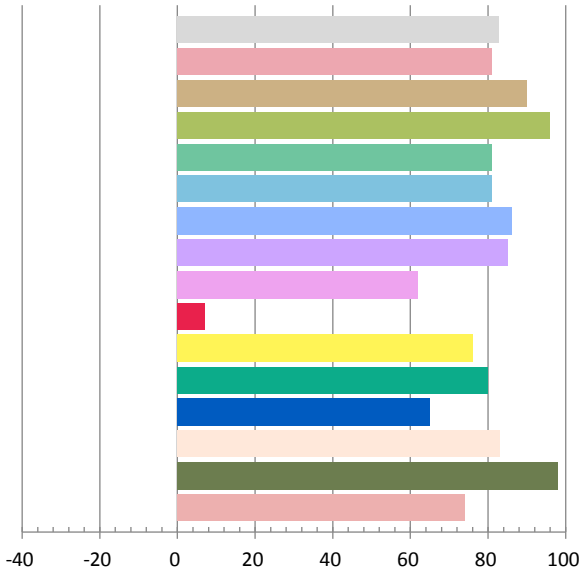
Ra
82.7

R1	R2	R3	R4
81	90	96	81

R5	R6	R7	R8
81	86	85	62

R9	R10	R11	R12
7	76	80	65

R13	R14	R15
83	98	74



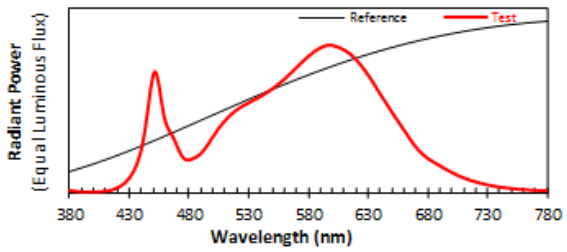
ANSI/IES TM-30-18 Color Rendition Report

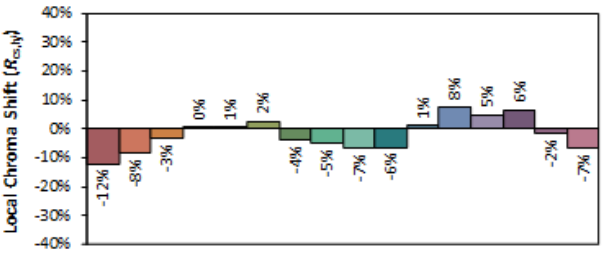
Source: User SPD

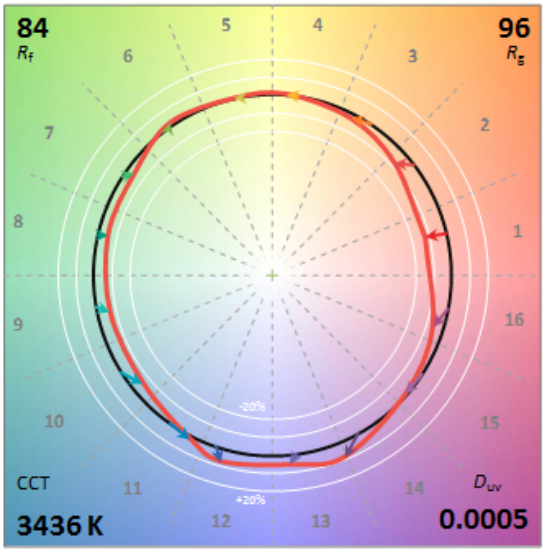
Manufacturer: RENO LED LIGHTING INC.

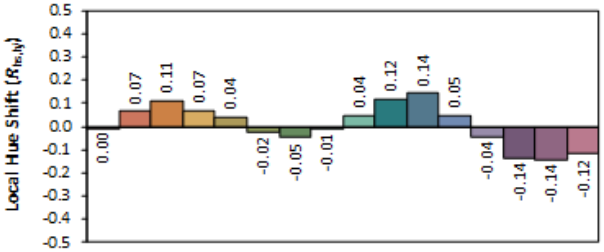
Date: 2024/6/24

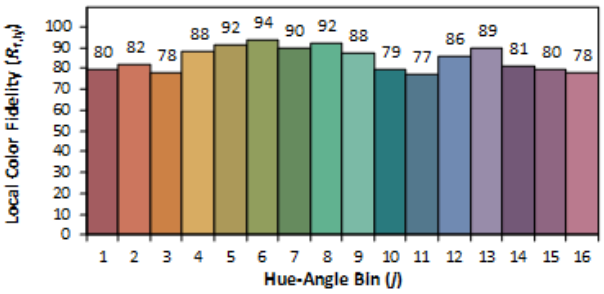
Model: RENO-22CTF-UNV/347-MWMCCT-HL

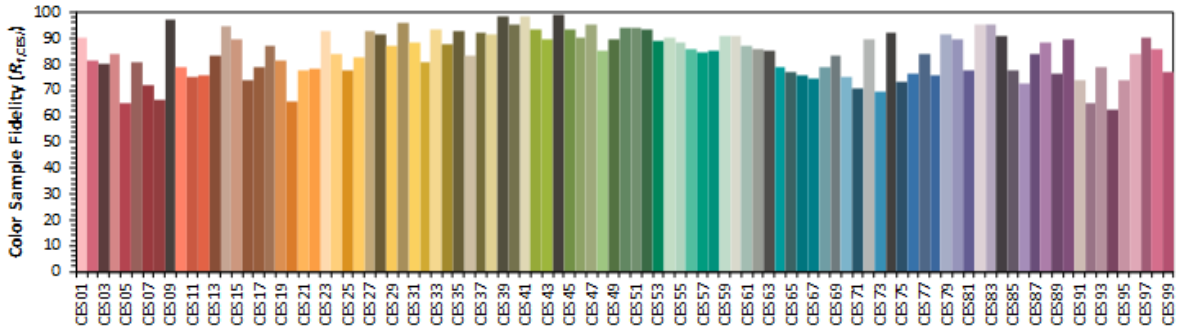












Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

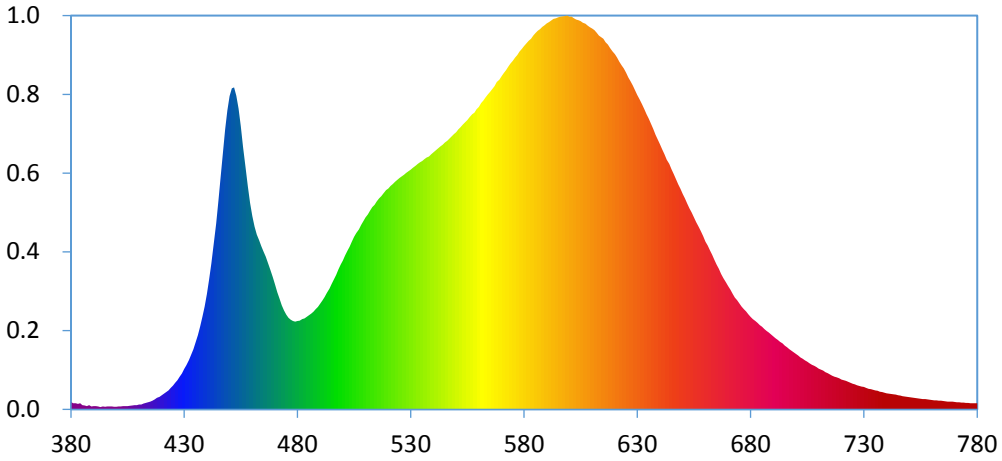
x	0.4095
y	0.3938
u'	0.2371
v'	0.5132

CIE 13.3-1995 (CRI)

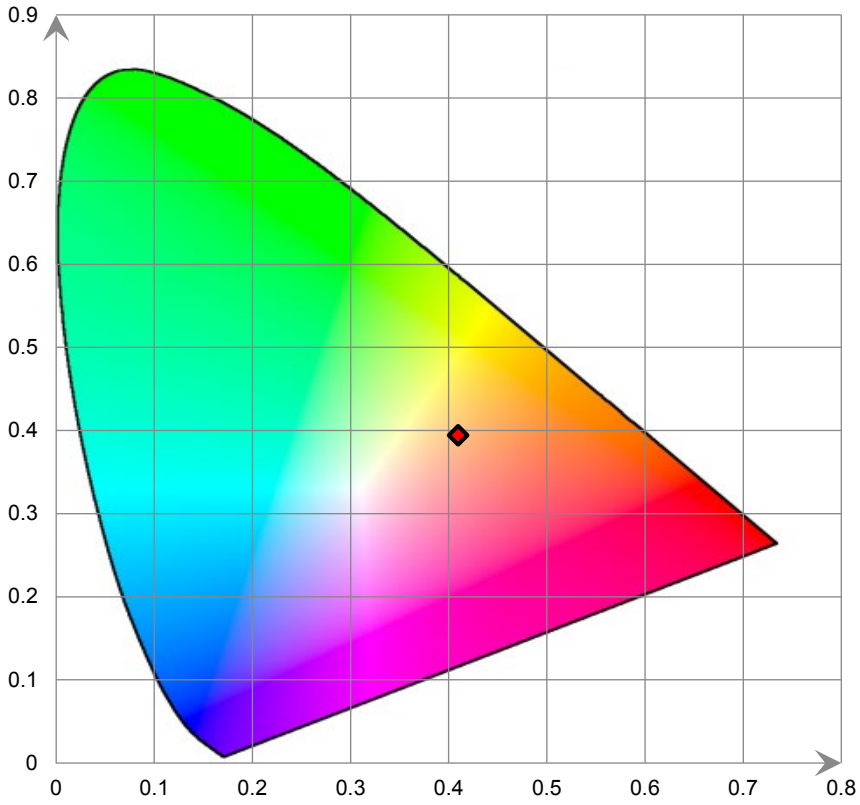
R_a	83
R_9	7

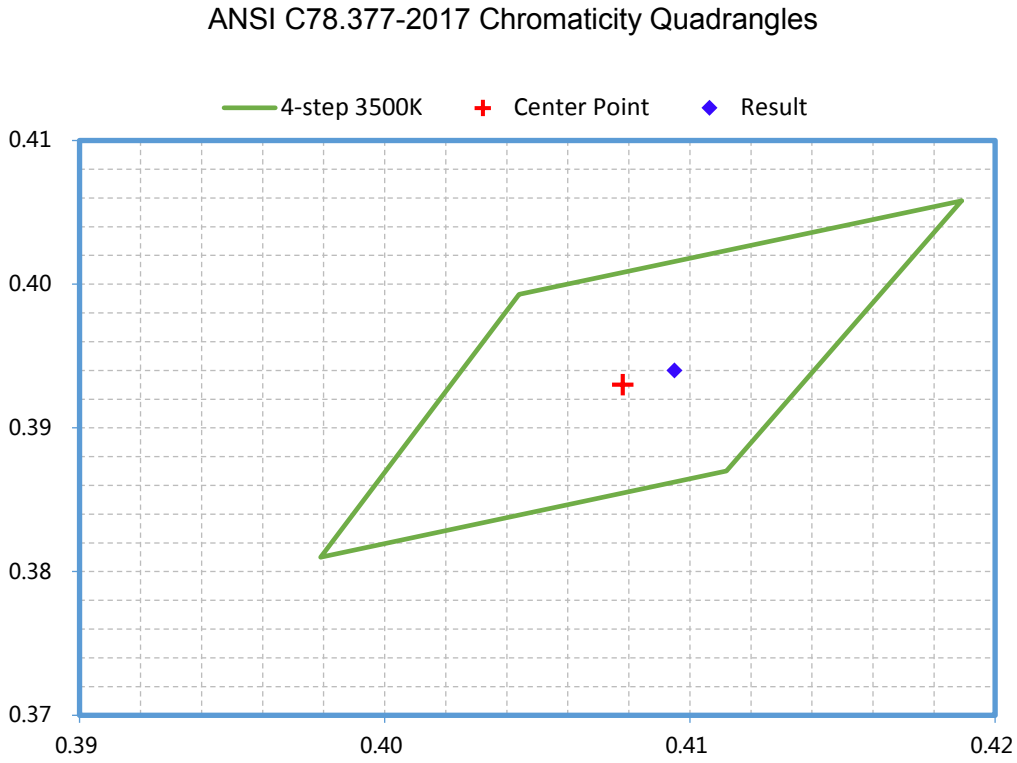
Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.

Relative Spectral Power Distribution



CIE 1931 x y Chromaticity Diagram




ANSI C78.377-2017 Chromaticity Quadrangles
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]

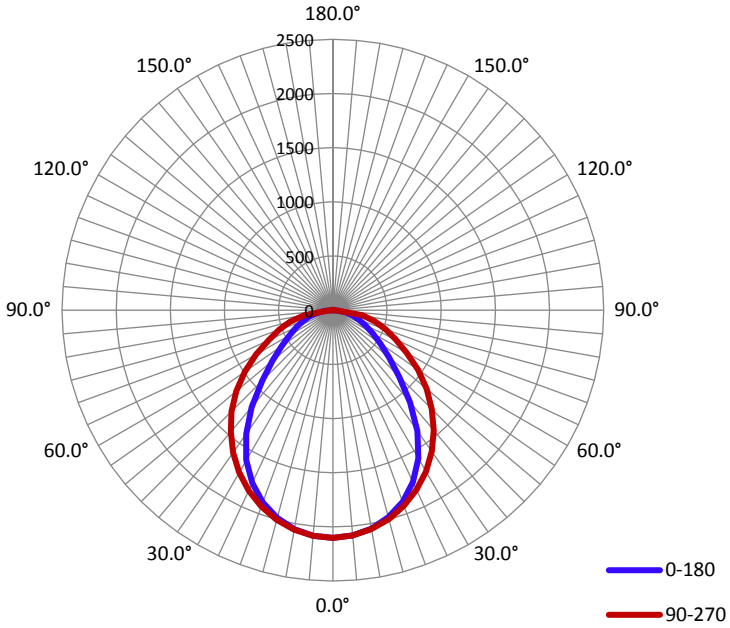
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.1	60	0.3258	38.99	0.9967

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I_{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
5073.56	130.12	2102.0	1.15	1.23

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I_{max}):	83.4	97.4	105.6	97.9	96.1
Field Angle (10% I_{max}):	149.8	161.5	162.8	161.3	158.9

Luminous Intensity (cd) Distribution Data

C / γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0°	2102	2102	2102	2102	2102	2102	2102	2102
1°	2100	2100	2101	2101	2101	2101	2101	2101
2°	2098	2098	2099	2099	2099	2099	2099	2100
3°	2095	2095	2096	2096	2096	2097	2097	2097
4°	2092	2092	2093	2092	2092	2094	2094	2094
5°	2087	2088	2089	2088	2088	2091	2090	2089
6°	2081	2083	2084	2082	2083	2086	2084	2083
7°	2075	2077	2078	2076	2077	2080	2078	2076
8°	2067	2070	2071	2069	2070	2072	2070	2067
9°	2058	2060	2063	2060	2062	2064	2062	2059
10°	2047	2050	2053	2052	2053	2055	2051	2048
11°	2036	2039	2043	2043	2043	2045	2040	2037
12°	2023	2026	2031	2033	2032	2034	2027	2024
13°	2009	2013	2019	2022	2020	2023	2015	2011
14°	1994	1999	2006	2010	2008	2011	2001	1998
15°	1978	1984	1992	1998	1996	1997	1987	1983
16°	1962	1969	1976	1983	1983	1983	1973	1967
17°	1944	1951	1960	1969	1969	1968	1957	1950
18°	1925	1934	1944	1953	1954	1952	1940	1931
19°	1904	1915	1926	1937	1938	1935	1922	1912
20°	1883	1895	1908	1920	1922	1918	1903	1891
21°	1860	1873	1889	1902	1904	1899	1885	1868
22°	1834	1851	1870	1884	1886	1881	1865	1844
23°	1808	1826	1849	1865	1867	1861	1843	1820
24°	1780	1801	1827	1844	1847	1841	1822	1795
25°	1751	1774	1804	1823	1828	1820	1799	1769
26°	1720	1744	1781	1801	1806	1798	1775	1741
27°	1686	1715	1757	1779	1786	1776	1751	1713
28°	1653	1683	1731	1755	1763	1753	1724	1681
29°	1616	1651	1704	1732	1741	1729	1698	1650
30°	1579	1617	1676	1707	1717	1705	1670	1618
31°	1539	1582	1648	1683	1693	1680	1643	1583
32°	1498	1545	1620	1659	1670	1656	1614	1548
33°	1455	1506	1588	1632	1644	1630	1584	1510
34°	1410	1469	1558	1607	1619	1603	1554	1473
35°	1362	1427	1526	1579	1592	1576	1523	1434
36°	1315	1386	1494	1552	1564	1548	1493	1394
37°	1264	1345	1462	1524	1537	1520	1460	1356
38°	1213	1305	1429	1494	1507	1491	1429	1318
39°	1162	1264	1394	1466	1478	1462	1395	1279
40°	1110	1217	1360	1436	1449	1432	1361	1235
41°	1058	1170	1326	1406	1420	1402	1327	1190
42°	1007	1122	1289	1375	1388	1371	1292	1144
43°	958	1075	1252	1347	1357	1343	1257	1099
44°	911	1028	1215	1319	1326	1315	1221	1054
45°	867	980	1179	1292	1294	1287	1186	1009
46°	824	935	1140	1259	1262	1254	1149	965
47°	784	891	1102	1225	1229	1220	1113	922
48°	746	850	1064	1192	1196	1187	1076	882
49°	709	811	1025	1158	1163	1154	1039	842

Luminous Intensity (cd) Distribution Data

C / γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
50°	675	773	988	1124	1130	1120	1003	805
51°	648	738	949	1089	1097	1086	966	770
52°	617	704	912	1055	1062	1052	930	736
53°	587	673	875	1021	1028	1018	894	705
54°	559	642	839	986	994	983	859	674
55°	533	613	803	952	959	949	825	645
56°	508	585	769	917	926	915	791	618
57°	485	558	735	883	890	881	759	591
58°	463	532	702	849	858	847	727	566
59°	442	507	671	815	823	814	696	541
60°	423	483	643	783	790	781	666	518
61°	404	460	615	750	756	748	640	496
62°	386	438	586	719	723	717	613	474
63°	368	417	559	689	693	687	587	453
64°	350	396	532	659	663	658	560	433
65°	331	377	507	631	638	630	534	413
66°	312	358	482	604	614	604	509	395
67°	295	341	458	578	590	579	486	377
68°	279	325	435	552	566	555	463	360
69°	266	309	412	527	541	530	440	343
70°	253	295	392	503	518	507	420	326
71°	242	280	371	479	494	484	399	311
72°	231	267	352	455	471	461	380	296
73°	219	253	333	432	448	438	361	281
74°	207	240	315	408	425	415	342	266
75°	193	226	297	386	402	394	323	253
76°	179	213	279	364	379	372	304	238
77°	166	199	262	342	357	350	286	224
78°	152	185	245	320	334	329	268	210
79°	138	171	229	299	311	308	250	195
80°	124	156	212	276	281	285	232	180
81°	110	141	196	248	238	257	214	164
82°	95	126	179	209	191	218	196	147
83°	80	111	160	166	145	174	175	129
84°	60	95	136	123	101	130	150	110
85°	43	71	106	81	58	85	119	90
86°	27	50	72	54	43	58	82	68
87°	13	34	54	28	29	30	44	43
88°	10	18	36	2	15	3	6	29
89°	7	3	18	1	1	1	3	15
90°	5	1	1	1	0	0	0	1
91°	1	1	1	0	0	0	0	0
92°	2	1	1	0	0	0	0	0
93°	2	1	1	1	0	0	0	0
94°	2	1	1	1	0	0	0	0
95°	2	1	1	1	0	0	0	0
96°	2	1	1	1	0	0	0	0
97°	3	1	1	1	1	0	0	0
98°	2	1	1	1	1	0	0	0
99°	2	1	1	1	1	0	0	0

Luminous Intensity (cd) Distribution Data

C / γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
100°	2	1	1	1	1	0	0	0
101°	2	1	1	1	1	1	0	0
102°	2	1	1	1	1	1	0	0
103°	2	1	1	1	1	1	0	0
104°	2	1	1	1	1	1	1	0
105°	2	1	1	1	1	1	1	0
106°	2	2	1	1	1	1	1	0
107°	2	2	1	1	1	1	1	0
108°	2	2	1	1	1	1	1	1
109°	2	2	1	1	1	1	1	1
110°	2	2	1	1	1	1	1	1
111°	2	2	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°	2	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°	2	2	1	1	1	1	1	1
118°	3	2	1	1	1	1	1	1
119°	3	2	1	1	1	1	1	1
120°	3	2	1	1	1	1	1	1
121°	3	2	2	1	1	1	1	1
122°	3	2	2	1	1	1	1	1
123°	3	2	2	1	1	1	1	1
124°	3	2	2	1	1	1	1	1
125°	3	2	2	1	1	1	1	1
126°	3	2	2	1	1	1	1	1
127°	1	1	2	1	1	1	1	1
128°	1	1	2	1	1	1	1	1
129°	2	1	2	2	1	1	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	2
133°	2	2	2	2	2	2	2	2
134°	2	2	2	2	2	2	2	2
135°	2	3	2	2	2	2	2	2
136°	2	5	2	2	2	2	2	2
137°	2	6	2	2	2	2	2	2
138°	2	5	3	2	2	2	2	2
139°	2	3	3	2	2	2	2	2
140°	2	3	3	3	3	2	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	3
144°	3	3	3	3	3	3	3	3
145°	3	3	3	3	3	3	3	3
146°	3	3	3	3	3	3	3	3
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	3	3	3	3	3
152°	3	3	4	3	3	3	3	3
153°	3	4	4	4	4	4	3	3
154°	4	4	4	4	4	4	3	3
155°	4	4	4	4	4	4	3	4
156°	4	4	4	4	4	4	3	4
157°	4	4	4	4	4	4	4	4
158°	4	4	4	4	4	4	4	4
159°	4	4	4	4	4	4	4	4
160°	4	4	4	4	4	4	4	4
161°	4	4	4	4	4	4	4	3
162°	4	4	4	4	4	4	4	3
163°	3	4	4	4	4	4	4	3
164°	3	3	3	4	4	4	4	3
165°	3	3	4	3	3	4	4	3
166°	3	3	4	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	3	3	3	3
174°	3	3	3	3	3	3	3	3
175°	3	3	3	3	3	3	4	3
176°	3	3	3	3	3	3	3	3
177°	3	3	3	3	3	3	3	3
178°	3	3	3	3	3	2	3	3
179°	3	3	3	2	2	2	3	3
180°	3	3	3	2	2	2	3	3

Luminous Intensity (cd) Distribution Data (cont.)

C / γ	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0°	2102	2102	2102	2102	2102	2102	2102	2102
1°	2102	2101	2102	2101	2101	2101	2101	2101
2°	2100	2100	2101	2100	2100	2100	2099	2099
3°	2098	2097	2099	2098	2098	2097	2096	2097
4°	2094	2094	2095	2095	2094	2094	2093	2093
5°	2090	2089	2090	2090	2090	2090	2089	2089
6°	2084	2083	2085	2085	2085	2084	2083	2084
7°	2077	2076	2078	2080	2080	2078	2077	2078
8°	2069	2068	2071	2072	2074	2071	2071	2071
9°	2060	2059	2062	2064	2066	2064	2064	2062
10°	2050	2049	2052	2055	2058	2055	2055	2053
11°	2039	2038	2042	2045	2048	2046	2045	2042
12°	2028	2026	2031	2035	2038	2036	2034	2030
13°	2014	2013	2019	2023	2026	2024	2023	2018
14°	2000	2000	2006	2011	2015	2012	2010	2004
15°	1985	1986	1992	1997	2002	2000	1997	1990
16°	1968	1971	1977	1984	1989	1987	1982	1974
17°	1950	1954	1961	1969	1975	1972	1966	1957
18°	1931	1935	1945	1954	1960	1957	1950	1939
19°	1910	1915	1927	1937	1945	1941	1932	1922
20°	1888	1894	1909	1919	1928	1924	1915	1901
21°	1865	1872	1891	1902	1911	1907	1896	1880
22°	1841	1848	1870	1884	1894	1890	1877	1858
23°	1815	1824	1848	1865	1876	1871	1857	1834
24°	1789	1799	1826	1845	1858	1851	1836	1810
25°	1760	1772	1803	1824	1838	1831	1814	1783
26°	1731	1745	1779	1803	1818	1810	1791	1756
27°	1699	1715	1755	1782	1797	1789	1767	1726
28°	1667	1686	1730	1760	1776	1767	1743	1695
29°	1632	1654	1703	1738	1754	1745	1717	1664
30°	1597	1621	1676	1714	1731	1721	1690	1630
31°	1559	1586	1650	1690	1708	1697	1663	1595
32°	1519	1550	1621	1666	1683	1672	1635	1559
33°	1479	1512	1593	1640	1659	1647	1607	1522
34°	1437	1474	1563	1612	1633	1621	1577	1483
35°	1394	1435	1533	1585	1606	1594	1547	1444
36°	1352	1395	1502	1557	1578	1566	1516	1402
37°	1309	1354	1469	1528	1551	1537	1484	1360
38°	1266	1312	1437	1499	1522	1508	1452	1316
39°	1216	1268	1403	1470	1494	1479	1419	1272
40°	1167	1224	1370	1441	1464	1450	1385	1226
41°	1115	1179	1339	1411	1437	1420	1353	1181
42°	1066	1133	1308	1380	1407	1389	1321	1134
43°	1017	1087	1276	1350	1378	1359	1289	1087
44°	969	1042	1239	1319	1351	1328	1252	1041
45°	923	998	1203	1288	1324	1297	1215	996
46°	880	954	1166	1255	1297	1264	1177	950
47°	838	912	1129	1222	1264	1232	1139	907
48°	799	872	1092	1189	1231	1199	1100	866
49°	762	833	1054	1155	1197	1165	1062	826

Luminous Intensity (cd) Distribution Data (cont.)

C / γ	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
50°	727	796	1017	1122	1163	1131	1024	788
51°	693	761	981	1088	1129	1096	986	752
52°	662	728	944	1054	1095	1062	948	718
53°	631	696	908	1019	1060	1027	910	685
54°	602	666	872	986	1026	993	873	654
55°	575	640	837	952	991	958	836	627
56°	549	614	802	918	957	923	800	600
57°	525	588	769	884	922	889	765	573
58°	501	563	736	851	888	855	731	546
59°	480	538	705	817	853	821	698	521
60°	460	515	674	784	818	787	666	497
61°	441	493	644	753	783	755	635	473
62°	423	472	616	720	748	723	605	450
63°	406	452	589	690	714	691	576	428
64°	389	433	562	660	683	661	549	407
65°	372	414	538	634	654	635	522	387
66°	356	396	514	609	628	609	497	368
67°	339	379	491	584	601	583	472	349
68°	321	362	468	559	576	557	448	332
69°	304	346	447	534	552	531	425	316
70°	289	329	425	511	528	507	402	300
71°	275	313	405	487	504	482	381	285
72°	261	298	386	464	481	457	360	271
73°	249	283	366	441	457	433	340	257
74°	237	269	348	419	434	409	320	243
75°	224	255	328	396	410	386	301	229
76°	211	240	310	374	387	363	283	215
77°	197	225	292	352	363	340	264	201
78°	183	210	273	330	339	317	247	187
79°	169	194	255	307	312	294	229	173
80°	153	178	237	282	269	267	211	158
81°	137	161	218	242	221	226	194	143
82°	121	144	199	199	176	183	176	128
83°	104	126	177	155	132	140	150	110
84°	87	107	147	112	88	99	124	92
85°	69	88	117	70	59	57	98	71
86°	51	66	80	52	31	43	66	50
87°	33	46	54	35	2	29	34	28
88°	23	26	28	18	1	15	3	7
89°	12	7	2	1	1	1	1	3
90°	2	3	0	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	1
94°	0	0	0	0	0	0	0	1
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	1	1
101°	0	0	0	0	0	0	1	1
102°	0	0	0	0	0	0	1	1
103°	0	0	0	0	0	0	1	1
104°	0	0	0	0	0	0	1	1
105°	0	0	0	0	0	0	1	1
106°	0	0	0	0	0	0	1	1
107°	0	0	0	0	0	0	1	1
108°	0	0	0	0	0	0	1	1
109°	0	0	0	0	0	0	1	1
110°	0	0	0	0	0	0	1	1
111°	0	0	0	0	0	1	1	1
112°	0	0	0	0	0	1	1	1
113°	0	0	0	0	0	1	1	1
114°	0	0	0	0	0	1	1	1
115°	0	0	0	0	0	1	1	1
116°	1	0	0	0	0	1	1	1
117°	0	0	0	1	0	1	1	1
118°	1	0	0	1	1	1	1	1
119°	1	1	1	1	1	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	3
137°	1	1	1	1	1	1	1	2
138°	1	1	1	1	1	1	1	2
139°	1	1	1	1	1	1	1	3
140°	1	1	1	1	1	1	1	6
141°	1	1	1	1	1	1	1	4
142°	1	1	1	1	1	1	1	2
143°	1	1	1	1	1	1	1	2
144°	1	1	1	1	1	1	1	2
145°	1	1	1	1	1	1	1	2
146°	1	1	1	1	1	1	1	2
147°	1	2	1	1	1	1	1	2
148°	1	1	1	1	1	1	1	2
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	1	1	1	1	1	2	2
157°	2	2	2	1	1	1	2	2
158°	2	2	2	1	1	1	2	2
159°	2	2	2	1	1	1	2	2
160°	2	2	2	1	1	1	2	2
161°	2	2	2	2	1	2	2	2
162°	2	2	2	2	1	2	2	2
163°	2	2	2	2	2	2	2	2
164°	2	2	2	2	2	2	2	2
165°	2	2	2	2	2	2	2	2
166°	2	2	2	2	2	2	2	2
167°	2	2	2	2	2	2	2	2
168°	2	2	2	2	2	2	2	2
169°	2	2	2	2	2	2	2	2
170°	2	2	2	2	2	2	2	2
171°	2	2	2	2	2	2	2	2
172°	2	2	2	2	2	2	2	2
173°	2	2	2	2	2	2	2	2
174°	2	2	2	2	2	2	2	2
175°	2	2	2	2	2	2	2	2
176°	3	2	2	2	2	2	2	2
177°	3	2	2	2	2	2	2	2
178°	3	3	2	2	2	2	2	2
179°	3	3	3	2	2	2	3	3
180°	3	3	3	2	2	2	3	3

Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	50.1	0.99
5-10	148.2	2.92
10-15	239.8	4.73
15-20	321.3	6.33
20-25	388.8	7.66
25-30	438.7	8.65
30-35	467.9	9.22
35-40	474.3	9.35
40-45	458.4	9.03
45-50	424.9	8.38
50-55	380.6	7.50
55-60	331.0	6.53
60-65	280.0	5.51
65-70	232.2	4.58
70-75	187.6	3.70
75-80	142.7	2.81
80-85	82.7	1.63
85-90	16.4	0.32
90-95	0.3	0.01
95-100	0.3	0.00
100-105	0.3	0.01
105-110	0.4	0.01
110-115	0.4	0.01
115-120	0.5	0.01
120-125	0.5	0.01
125-130	0.5	0.01
130-135	0.5	0.01
135-140	0.7	0.01
140-145	0.7	0.01
145-150	0.7	0.02
150-155	0.6	0.01
155-160	0.5	0.01
160-165	0.4	0.01
165-170	0.3	0.01
170-175	0.2	0.00
175-180	0.1	0.00

Deg	Flux (lm)	%
0-5	50.1	0.99
0-10	198.3	3.91
0-15	438.1	8.64
0-20	759.4	14.97
0-25	1148.3	22.63
0-30	1587.0	31.28
0-35	2054.9	40.50
0-40	2529.1	49.85
0-45	2987.6	58.88
0-50	3412.5	67.26
0-55	3793.1	74.76
0-60	4124.1	81.29
0-65	4404.1	86.80
0-70	4636.2	91.38
0-75	4823.8	95.08
0-80	4966.5	97.89
0-85	5049.2	99.52
0-90	5065.6	99.84
0-95	5065.9	99.85
0-100	5066.2	99.85
0-105	5066.5	99.86
0-110	5066.9	99.87
0-115	5067.3	99.88
0-120	5067.8	99.89
0-125	5068.3	99.90
0-130	5068.8	99.91
0-135	5069.4	99.92
0-140	5070.1	99.93
0-145	5070.8	99.94
0-150	5071.4	99.96
0-155	5072.0	99.97
0-160	5072.6	99.98
0-165	5073.0	99.99
0-170	5073.3	100.00
0-175	5073.5	100.00
0-180	5073.6	100.00

Test Model: RENO-22CTF-UNV/347-MWMCCT-HL
Test CCT: 4000K (Input Control Signal Applied: 50%)
Test Wattage: 40W

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	5287.5	5000~10000	4500≤Light output≤11000	Pass
Power(W) ΔΔ	37.57	None.	None.	N/A
Total Efficacy(lm/W) ΔΔ	140.74	≥130	≥126.1	Pass
CCT(K) ΔΔ	4109	3831~4139	No tolerances	Pass
Duv ΔΔ	0.000663	-0.0023~0.0043	No tolerances	Pass
IES Rf ΔΔ	84	70	69	Pass
IES Rg ΔΔ	96	89	88	
IES Rcs,h1 ΔΔ	-11%	-12%~23%	-13%~24%	
Ra ΔΔ	83.4	≥80	≥79	
R9 ΔΔ	12	≥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	0.9962	≥0.9	≥0.87	Pass
120	THDi ΔΔ	3.62%	≤20%	≤25%	Pass
277	Power Factor ΔΔ	0.9506	≥0.9	≥0.87	Pass
277	THDi ΔΔ	6.55%	≤20%	≤25%	Pass
347	Power Factor ΔΔ	0.9094	≥0.9	≥0.87	Pass
347	THDi ΔΔ	10.87%	≤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]

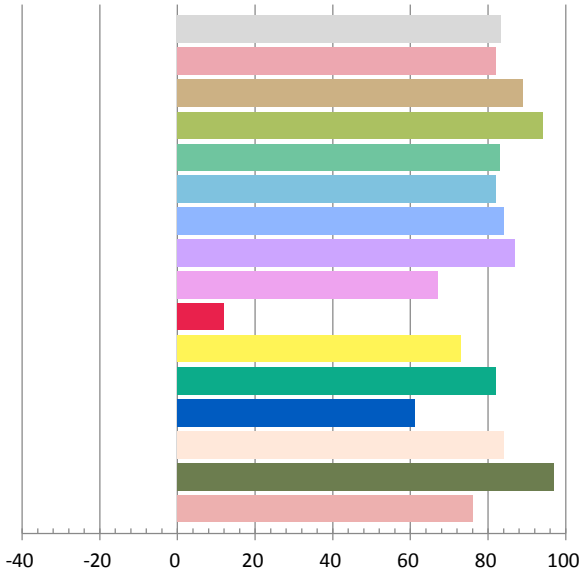
Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.0	60	0.3142	37.57	0.9962	5287.5	140.74

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
16.120	4109	0.000663	0.3762	0.3755	0.2228	0.5004

Color Rendering Index

Ra			
83.4			
R1	R2	R3	R4
82	89	94	83
R5	R6	R7	R8
82	84	87	67
R9	R10	R11	R12
12	73	82	61
R13	R14	R15	
84	97	76	



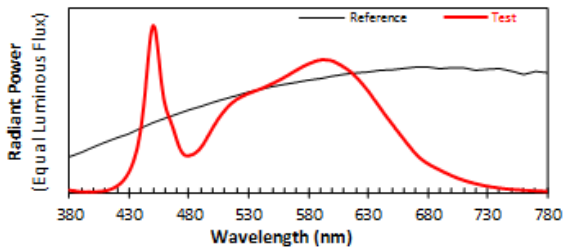
ANSI/IES TM-30-18 Color Rendition Report

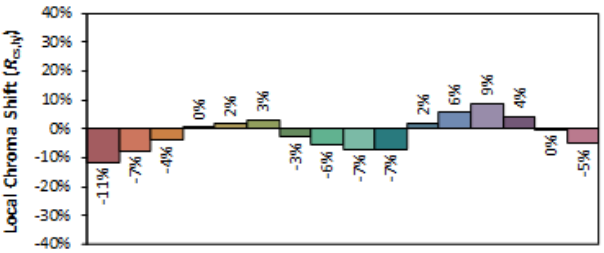
Source: User SPD

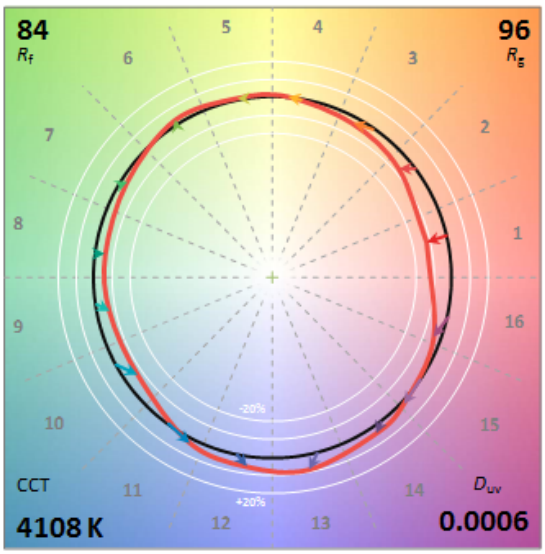
Manufacturer: RENO LED LIGHTING INC.

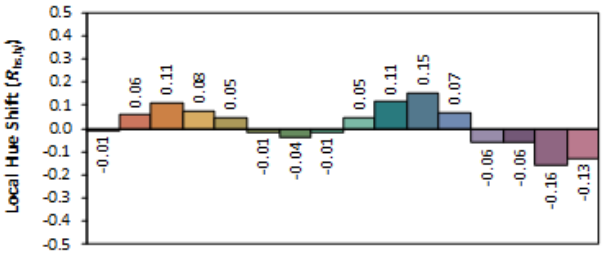
Date: 2024/6/24

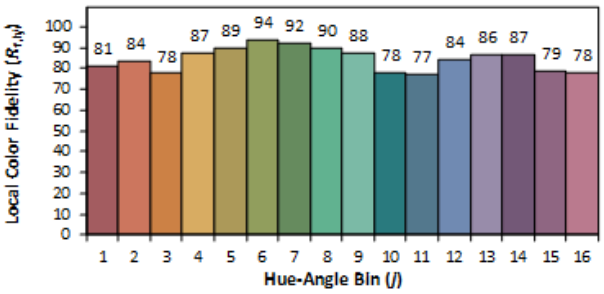
Model: RENO-22CTF-UNV/347-MWMCCT-HL

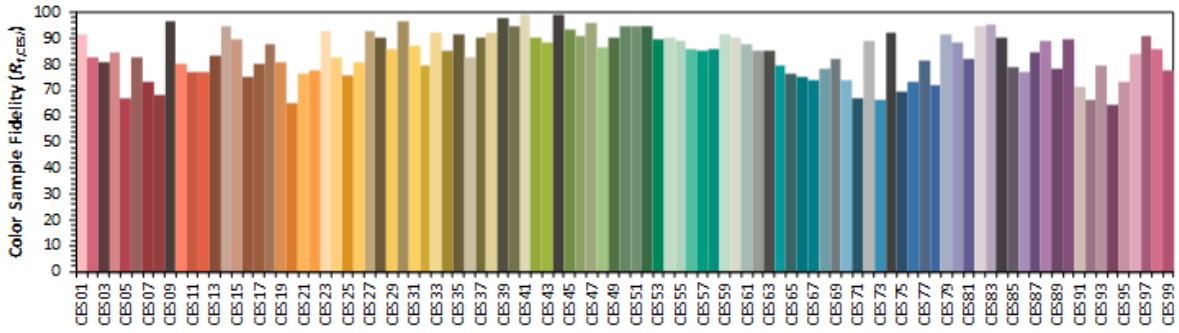












Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

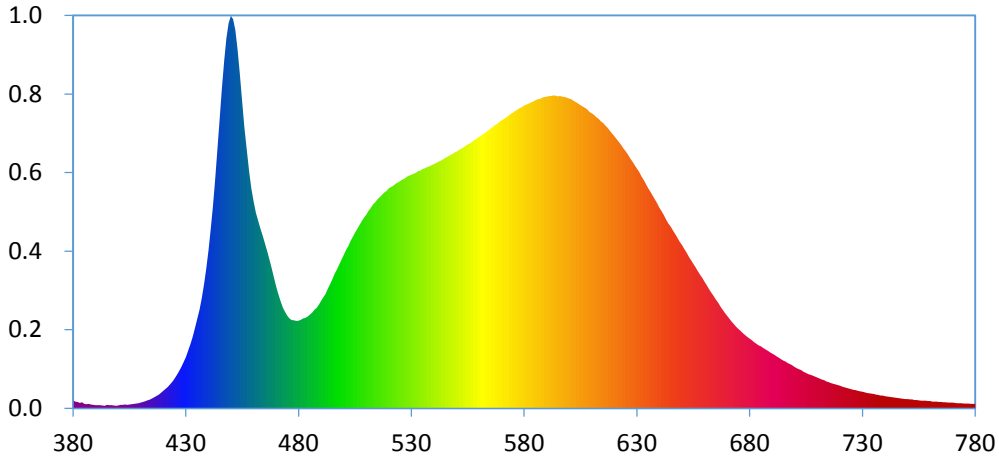
x	0.3762
y	0.3753
u'	0.2229
v'	0.5003

CIE 13.3-1995 (CRI)

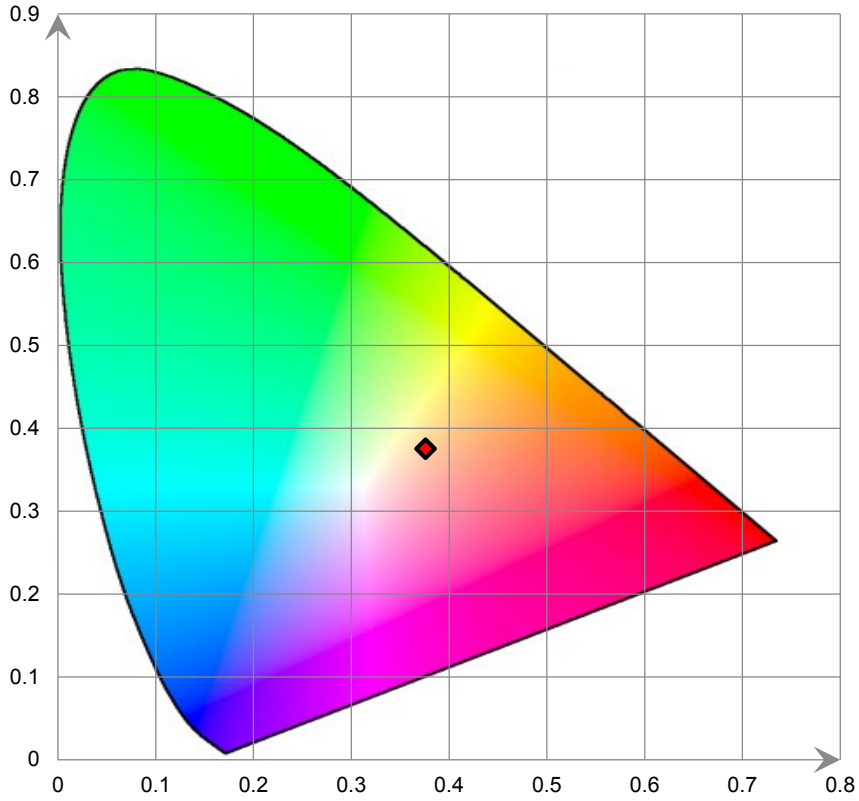
R_a	83
R_9	11

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

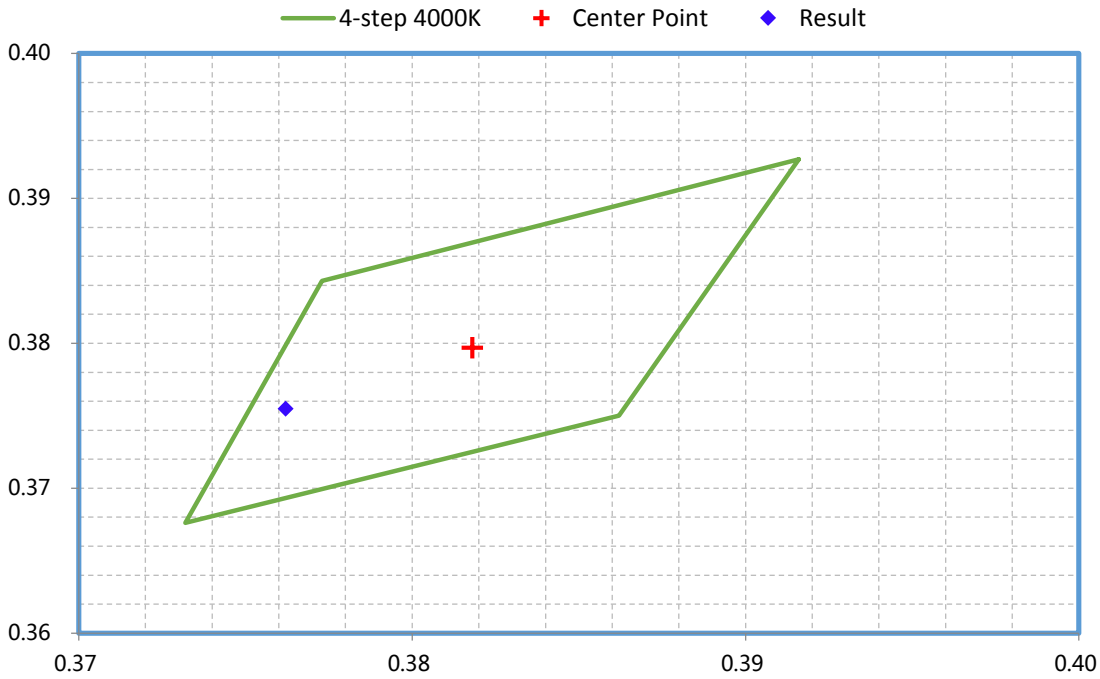
Relative Spectral Power Distribution



CIE 1931 x y Chromaticity Diagram



ANSI C78.377-2017 Chromaticity Quadrangles



Test Model: RENO-22CTF-UNV/347-MWMCCT-HL
Test CCT: 5000K (Input Control Signal Applied: 100%)
Test Wattage: 40W

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	5162	5000~10000	4500≤Light output≤11000	Pass
Power(W) ΔΔ	38.76	None.	None.	N/A
Total Efficacy(lm/W) ΔΔ	133.18	≥130	≥126.1	Pass
CCT(K) ΔΔ	4976	4809~5249	No tolerances	Pass
Duv ΔΔ	0.00333	-0.0013~0.0053	No tolerances	Pass
IES Rf ΔΔ	83	70	69	Pass
IES Rg ΔΔ	97	89	88	
IES Rcs,h1 ΔΔ	-12%	-12%~23%	-13%~24%	
Ra ΔΔ	81.8	≥80	≥79	
R9 ΔΔ	6	≥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	0.9962	≥0.9	≥0.87	Pass
120	THDi ΔΔ	3.53%	≤20%	≤25%	Pass
277	Power Factor ΔΔ	0.9531	≥0.9	≥0.87	Pass
277	THDi ΔΔ	6.72%	≤20%	≤25%	Pass
347	Power Factor ΔΔ	0.9141	≥0.9	≥0.87	Pass
347	THDi ΔΔ	10.41%	≤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]

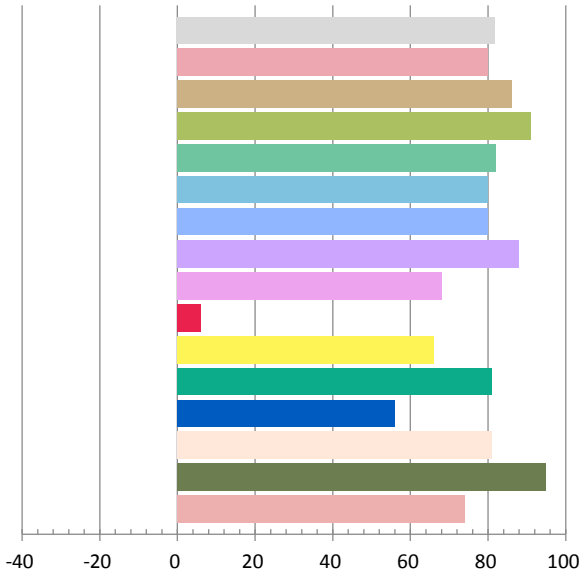
Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.0	60	0.3241	38.76	0.9963	5162	133.18

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
15.931	4976	0.00333	0.3465	0.3594	0.2093	0.4886

Color Rendering Index

Ra			
81.8			
R1	R2	R3	R4
80	86	91	82
R5	R6	R7	R8
80	80	88	68
R9	R10	R11	R12
6	66	81	56
R13	R14	R15	
81	95	74	



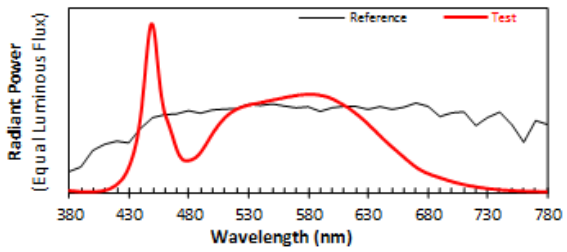
ANSI/IES TM-30-18 Color Rendition Report

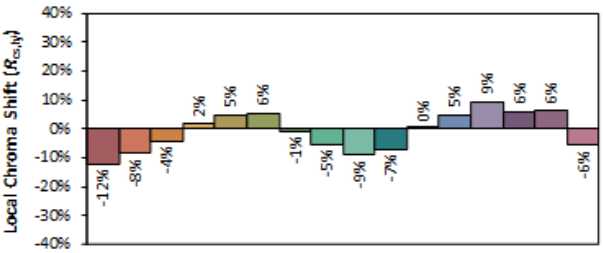
Source: User SPD

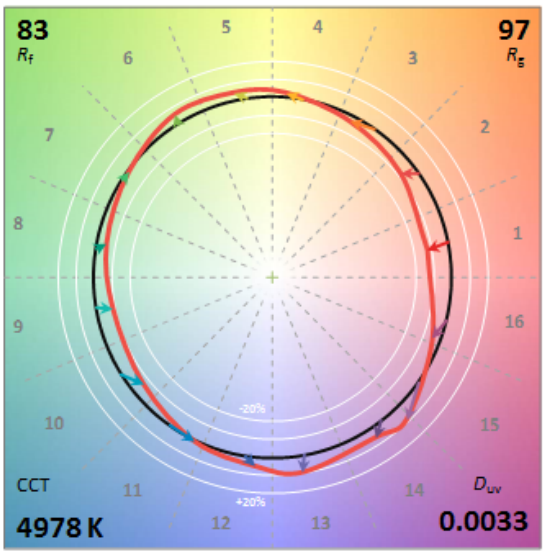
Manufacturer: RENO LED LIGHTING INC.

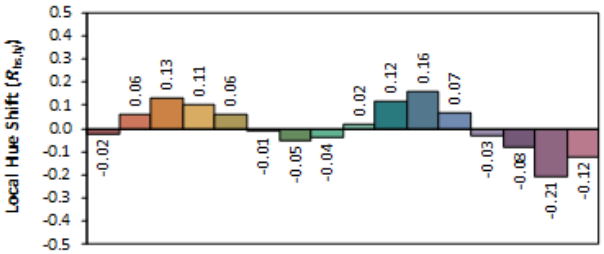
Date: 2024/6/24

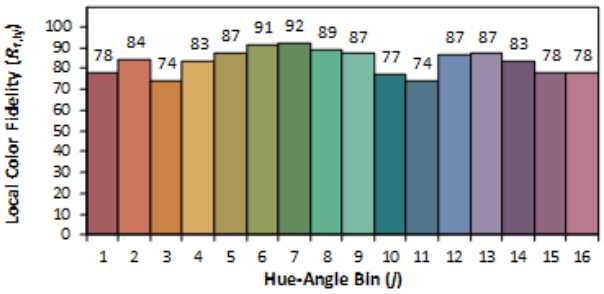
Model: RENO-22CTF-UNV/347-MWMCCT-HL

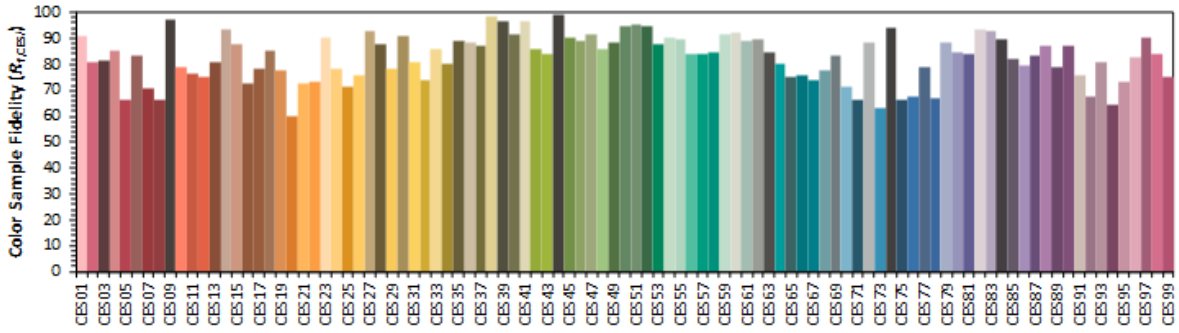












Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

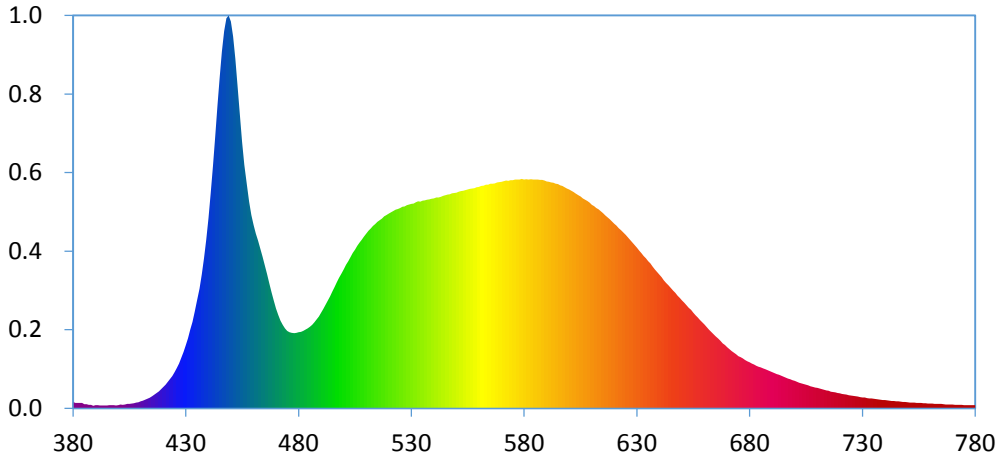
x	0.3464
y	0.3592
u'	0.2094
v'	0.4885

CIE 13.3-1995 (CRI)

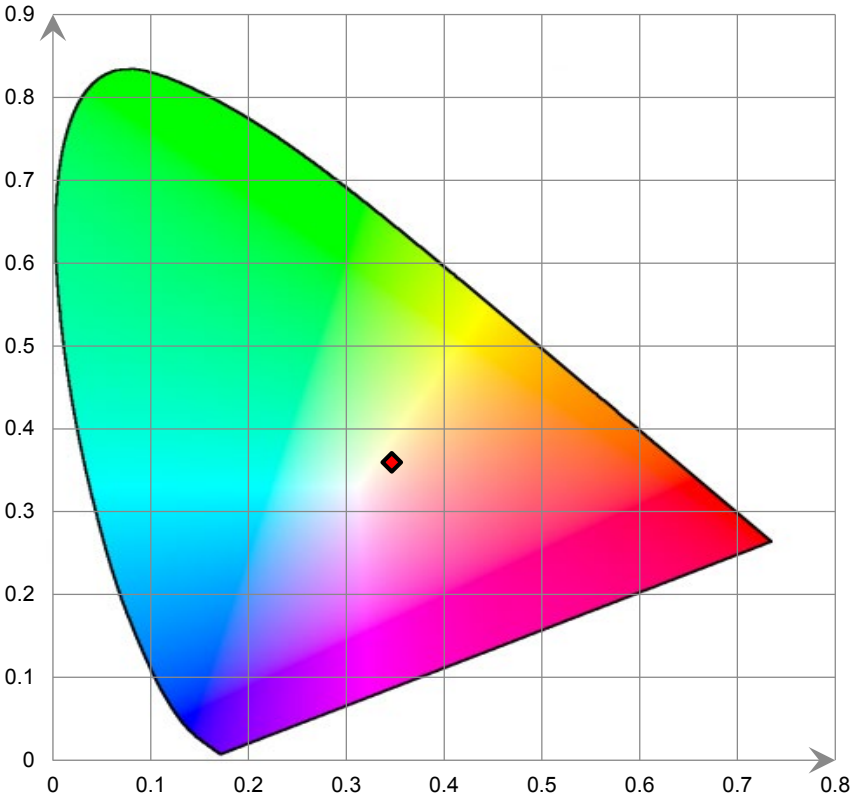
R_a	82
R_9	4

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

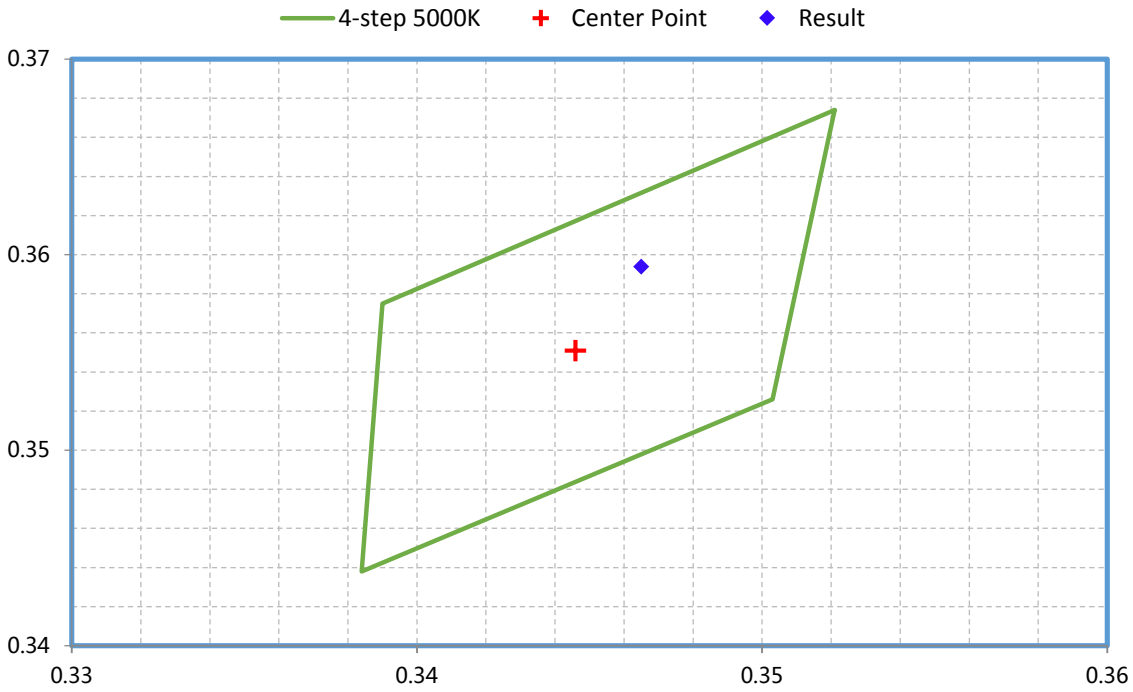
Relative Spectral Power Distribution



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**********