Certificate#4810.01

LM-79-08 Test Report

For

SATCO PRODUCTS INC.

(Brand Name: SATCO/NUVO)

110 Heartland Bivd. Brentwood NY 11717

LED Downlights

Model name(s):
S11873

Representative (Tested) Model:
S11873 (Setting at 2700K)
S11873 (Setting at 3000K)
S11873 (Setting at 3500K)
S11873 (Setting at 4000K)
S11873 (Setting at 5000K)

Test & Report By:

Candy Chen

Engineer: Candy Chen

Date:2022-12-12

Review By:

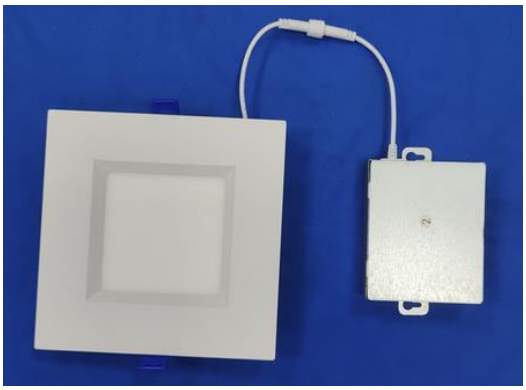
Jason Luo

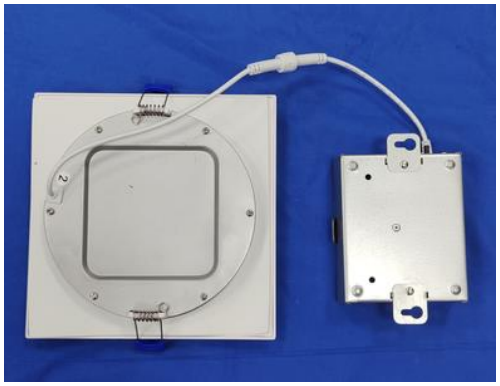
Manager: Jason Luo

1.1 Product Information:

Organization Name	SATCO PRODUCTS INC.	
Brand Name	SATCO/NUVO	
Model Number	S11873	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	LED Downlights	
Rated Voltage / Frequency	120V/60HZ	
Nominal Power	15W	
Rated Initial Lamp Lumen	--	
Declared CCT	2700K, 3000K, 3500K, 4000K, 5000K(color tunable)	
LED Manufacturer	Lumileds Holding B.V.	
LED Model	L128-##90RA35000U1	
Sample Number	BLC2212001E-D1-PL	
Luminaire Aperture (for Downlights Retrofit)	--	in.
Luminaire Length	--	mm
Luminaires Width	--	mm
Number of Units (modular products)	N/A	s

Photo





1.2 Test Specifications:

Date of Receipt	2022-12-06
Date of Test	2022-12-10
Test item	1. Total Luminous Flux 2. Luminous Distribution Intensity 3. Luminous Efficacy 4. Correlated Color Temperature 5. Color Rendering Index 6. Chromaticity Coordinate 7. Electrical Parameters
Reference Standard	1. IES LM-79-2008 Electrical and Photometric Measurements of Solid-State Lighting Products 2. ANSI C78.377-2008 Specifications for the Chromaticity of Solid State Lighting Products 3. CIE 13.3-1995 Method of Measuring and Specifying Colour Rendering Properties of Light Sources 4. CIE 15-2004 Technical Report Colorimetry 5. IESNA LM-16-93 Practical Guide to Colorimetry of Light Source 6. IESNA TM-16-05 Technical Memorandum on Light Emitting Diode (LED) Sources and Systems
Reference Work Instruction	BL-QP-033

1.3 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 °C ±1 °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 °vertical intervals and 22.5 °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 ºC ±1 ºC. 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.
Goniophotometer near field detector f1'=1.13%, Test distance: 1.599m.

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 ºC ±1 ºC. 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.
Self-absorption:
S11873:1.0225

2.1 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction BL-QP-033)

Test date	2022-12-10	Test Ambient:	25.2 ℃
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	S11873 (Setting at 2700K)		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
BLC2212001E-D1-PL	120.0	60	0.125	14.48	0.966

Sphere-Spectroradiometer Method:

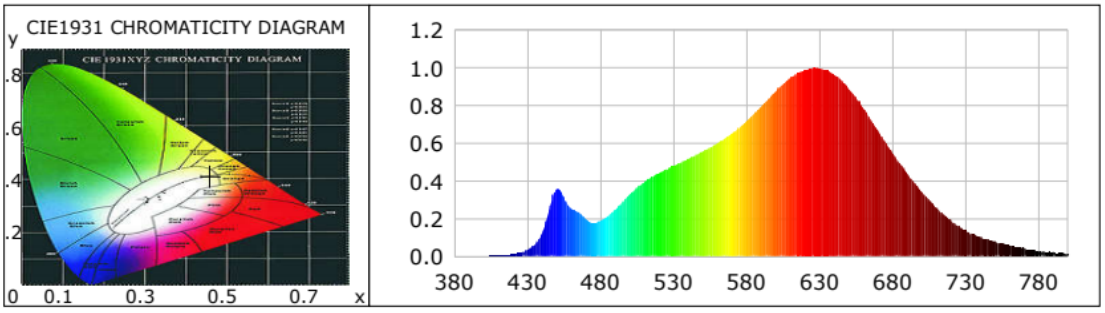
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
CCT (K)	2720
Duv	0.00081
Chromaticity (x, y)	x=0.4596 y=0.4127
Chromaticity (u', v')	u(u')=0.2614 v'=0.5281
Color Rendering Index (CRI)	94.9
R9	67

Special Color Rendering Indices			
R1	95	R9	67
R2	98	R10	94
R3	99	R11	98
R4	96	R12	87
R5	96	R13	96
R6	98	R14	99
R7	93	R15	91
R8	85	--	--

Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	1102
Luminous Efficacy (lm/W)	76.10
Beam Angle °	110.3
Center Beam Candle Power (cd)	397

Spectral Power Distribution and Chromaticity Diagram



WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)
380	0.0003	0.0068	535	0.4598	11.3317	690	0.6679	16.4606
385	0.0007	0.0169	540	0.4778	11.7755	695	0.6067	14.9521
390	0.0010	0.0240	545	0.4972	12.2528	700	0.5477	13.4978
395	0.0010	0.0250	550	0.5156	12.7065	705	0.4930	12.1482
400	0.0009	0.0217	555	0.5359	13.2066	710	0.4399	10.8419
405	0.0016	0.0394	560	0.5551	13.6795	715	0.3879	9.5587
410	0.0018	0.0436	565	0.5780	14.2433	720	0.3407	8.3971
415	0.0052	0.1290	570	0.6011	14.8122	725	0.2977	7.3367
420	0.0110	0.2713	575	0.6242	15.3819	730	0.2560	6.3082
425	0.0190	0.4677	580	0.6505	16.0298	735	0.2190	5.3976
430	0.0337	0.8312	585	0.6822	16.8129	740	0.1869	4.6062
435	0.0598	1.4740	590	0.7155	17.6324	745	0.1602	3.9487
440	0.1190	2.9329	595	0.7535	18.5683	750	0.1364	3.3609
445	0.2438	6.0087	600	0.7924	19.5272	755	0.1155	2.8463
450	0.3565	8.7865	605	0.8340	20.5516	760	0.1028	2.5337
455	0.3146	7.7530	610	0.8751	21.5651	765	0.0923	2.2751
460	0.2530	6.2339	615	0.9122	22.4790	770	0.0780	1.9233
465	0.2348	5.7863	620	0.9471	23.3402	775	0.0682	1.6812
470	0.1979	4.8771	625	0.9711	23.9301	780	0.0590	1.4545
475	0.1764	4.3463	630	0.9909	24.4197	785	0.0489	1.2045
480	0.1866	4.5983	635	0.9977	24.5875	790	0.0445	1.0970
485	0.2117	5.2179	640	0.9980	24.5940	795	0.0349	0.8599
490	0.2446	6.0280	645	0.9854	24.2832	800	0.0289	0.7117
495	0.2856	7.0393	650	0.9641	23.7592			
500	0.3274	8.0674	655	0.9342	23.0215			
505	0.3623	8.9283	660	0.8892	21.9134			
510	0.3925	9.6728	665	0.8399	20.6988			
515	0.4201	10.3535	670	0.7853	19.3526			
520	0.4410	10.8678	675	0.7260	17.8918			
525	0.4598	11.3317	680	0.6679	16.4606			
530	0.4778	11.7755	685	0.6067	14.9521			

Zonal Lumen Tabulation

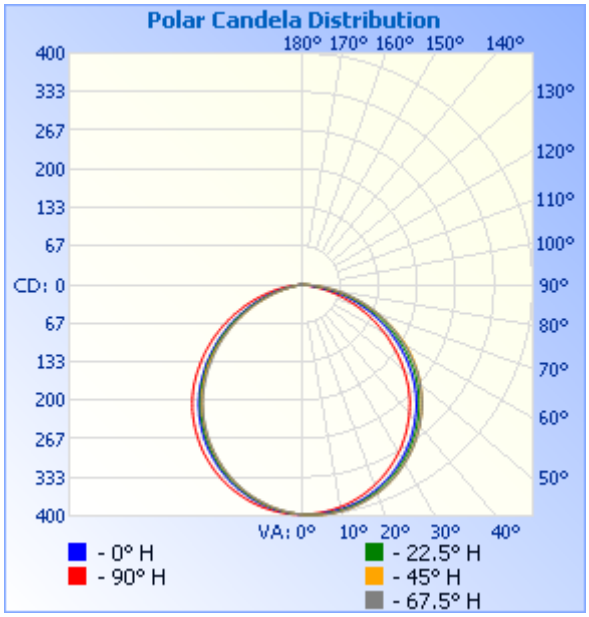
Zonal Lumen Summary

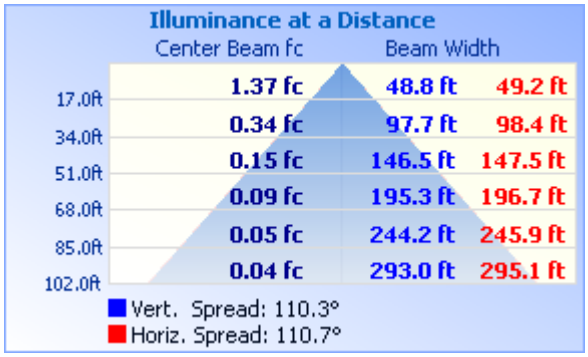
Zone	Lumens	% Lamp	% Luminaire
0-30	308.2	28%	28%
0-40	505.1	45.8%	45.8%
0-60	889.7	80.7%	80.7%
60-90	211.5	19.2%	19.2%
70-100	80.1	7.3%	7.3%
90-120	0.2	0%	0%
0-90	1,101.2	99.9%	99.9%
90-180	0.7	0.1%	0.1%
0-180	1,101.9	100%	100%

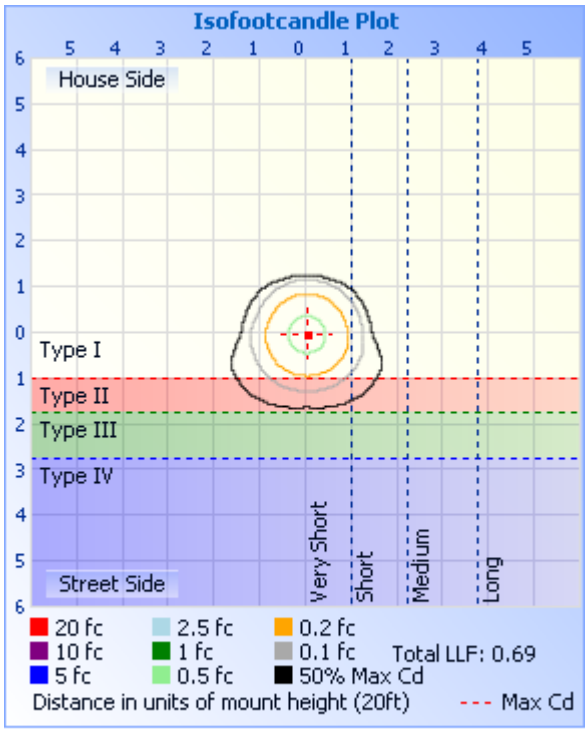
Lumens Per Zone

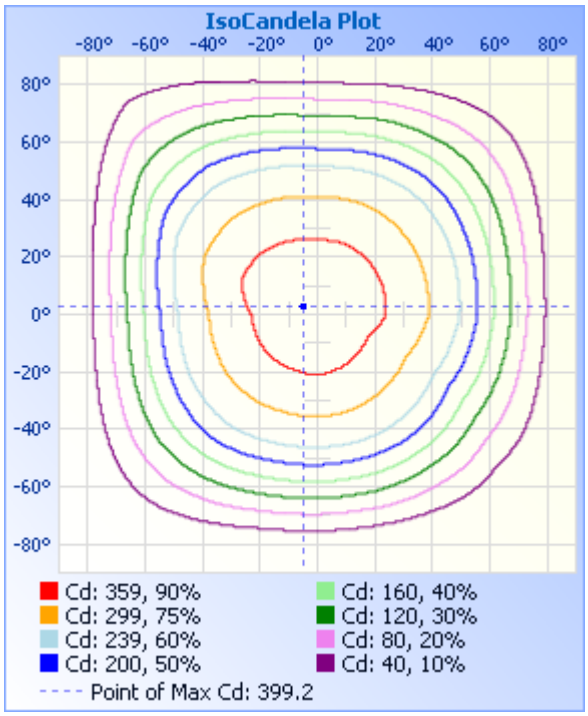
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	37.6	3.4%	90-100	0.1	0%
10-20	107.6	9.8%	100-110	0.0	0%
20-30	163.1	14.8%	110-120	0.0	0%
30-40	196.8	17.9%	120-130	0.1	0%
40-50	203.8	18.5%	130-140	0.1	0%
50-60	180.8	16.4%	140-150	0.1	0%
60-70	131.5	11.9%	150-160	0.1	0%
70-80	66.9	6.1%	160-170	0.1	0%
80-90	13.1	1.2%	170-180	0.0	0%

Photometric Data









Candela Table - Type C

	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5	360
0	397	397	397	397	397	397	397	397	397	397	397	397	397	397	397	397	397
1	397	397	398	398	397	397	397	397	396	396	396	396	397	397	397	397	397
2	398	398	398	398	397	396	396	396	396	396	395	395	397	397	397	398	398
3	398	398	399	399	396	396	395	395	395	395	394	394	397	397	397	397	398
4	398	398	399	399	396	395	395	394	394	394	393	393	396	396	397	397	398
5	397	398	399	399	395	395	394	393	393	392	392	391	395	396	396	397	397
6	397	398	399	399	395	394	393	392	392	391	390	390	394	395	396	397	397
7	397	398	399	399	394	393	392	391	391	389	388	388	394	394	395	396	397
8	396	397	399	399	393	391	390	389	389	388	387	386	392	393	395	396	396
9	395	397	398	398	391	390	389	388	387	386	385	384	391	392	394	395	395
10	394	396	397	398	390	389	387	386	386	384	383	382	390	391	393	394	394
11	393	395	397	397	389	387	385	384	384	382	380	380	389	390	392	393	393
12	392	394	396	396	387	385	383	382	382	380	378	378	387	388	390	392	392
13	391	393	395	395	385	383	382	379	380	378	376	375	385	387	388	390	391
14	389	391	394	394	383	381	379	377	377	375	373	373	383	385	387	389	389
15	388	390	393	392	381	379	377	375	375	373	370	370	381	383	385	387	388
16	386	388	391	391	379	377	375	372	372	370	368	367	379	381	383	385	386
17	384	386	389	389	377	375	372	370	370	367	365	364	377	379	381	384	384
18	382	385	388	388	374	372	369	367	367	364	361	361	374	377	379	382	382
19	379	383	386	386	372	369	367	364	364	361	358	358	372	374	377	379	379
20	377	380	384	384	369	366	364	361	361	358	355	354	369	372	374	377	377
21	375	378	382	382	366	363	361	358	357	354	351	351	366	369	372	375	375
22	372	376	379	380	363	361	357	354	354	351	348	347	364	366	369	372	372
23	370	373	377	377	360	357	354	351	351	347	344	344	360	363	366	369	370
24	367	370	375	374	357	354	351	348	347	344	341	340	357	360	363	367	367
25	364	368	372	372	354	351	347	344	344	340	337	336	354	357	360	364	364
26	361	365	369	369	350	347	344	340	340	336	333	332	350	354	357	361	361
27	358	362	366	366	347	344	340	336	336	332	328	328	347	350	354	358	358
28	354	359	363	363	343	340	336	332	332	328	324	324	343	347	351	354	354
29	351	355	360	360	339	336	332	328	328	324	320	319	340	343	347	351	351

30	347	352	357	357	335	332	328	324	324	319	316	315	336	340	344	347	347
31	344	348	353	353	332	328	324	319	319	315	311	311	332	336	339	344	344
32	340	345	350	350	328	324	320	315	315	311	306	305	328	331	336	340	340
33	336	341	346	347	323	320	315	311	310	306	302	301	323	328	332	336	336
34	332	337	342	343	319	315	311	306	305	301	297	296	319	323	328	332	332
35	328	333	339	339	315	310	306	301	301	296	292	291	315	319	324	328	328
36	324	329	335	335	310	306	302	296	295	291	287	286	310	315	319	324	324
37	319	325	330	331	305	301	296	292	291	286	282	281	306	310	315	319	319
38	315	321	326	327	300	296	292	286	286	281	277	276	301	306	310	315	315
39	310	316	322	322	296	291	287	281	280	276	271	270	296	301	306	311	310
40	306	312	318	318	290	287	282	276	275	271	266	264	291	296	301	306	306
41	301	307	313	314	285	281	276	270	269	265	260	259	286	291	296	301	301
42	296	302	309	309	280	276	271	265	264	259	255	253	281	286	291	296	296
43	291	298	304	304	275	270	265	260	258	254	249	247	276	281	287	291	291
44	286	293	299	299	269	265	260	254	252	248	243	240	270	276	282	286	286
45	281	288	294	295	263	259	255	248	246	242	237	234	264	271	276	281	281
46	275	283	289	290	258	254	249	241	239	235	231	228	259	265	271	276	275
47	270	277	284	284	252	248	243	235	233	229	226	221	253	259	266	270	270
48	264	272	279	279	245	241	237	228	227	222	219	215	246	254	261	265	264
49	258	266	274	273	239	235	231	222	220	216	212	208	240	248	254	260	258
50	252	261	269	268	232	229	225	216	213	209	205	201	234	242	249	254	252
51	246	255	263	263	226	222	219	209	206	202	199	194	227	235	243	248	246
52	240	249	258	257	220	216	212	202	200	195	191	187	221	229	238	242	240
53	233	243	252	251	213	209	206	195	193	189	185	181	214	223	231	235	233
54	227	236	246	245	206	202	199	189	186	182	177	174	208	216	225	228	227
55	221	230	240	239	199	195	192	182	179	175	170	167	201	209	219	222	221
56	213	224	234	232	193	188	185	175	173	168	162	160	194	203	213	216	213
57	207	217	228	225	185	182	178	168	166	161	155	153	188	196	206	209	207
58	200	210	222	219	179	175	170	161	159	154	147	146	181	189	200	202	200
59	193	204	216	213	172	168	162	154	151	147	140	139	174	183	193	195	193
60	187	197	209	206	165	161	155	147	145	140	132	132	167	176	185	189	187
61	180	190	202	199	158	154	148	140	138	133	125	125	160	169	177	182	180

62	173	183	195	192	151	147	140	133	131	126	117	118	154	162	170	175	173
63	166	176	187	185	144	140	133	126	124	119	110	111	146	155	163	168	166
64	159	169	180	179	137	133	126	118	116	111	103	104	139	148	155	161	159
65	152	162	172	171	131	126	118	112	109	105	96	97	133	142	148	155	152
66	145	155	165	165	123	119	111	104	103	98	89	90	126	134	141	147	145
67	138	148	157	158	116	112	103	98	96	90	82	83	119	127	134	140	138
68	131	142	150	150	109	105	96	91	89	83	74	76	112	121	126	133	131
69	124	134	143	143	102	98	89	83	82	76	67	68	105	114	119	127	124
70	117	127	136	137	96	91	82	76	75	69	61	61	98	106	112	119	117
71	110	120	128	130	89	83	75	69	68	62	54	55	91	99	104	112	110
72	103	113	120	122	81	76	68	62	61	55	48	49	85	92	97	105	103
73	96	106	113	115	74	69	61	55	54	48	41	42	78	85	90	98	96
74	90	99	106	108	68	62	55	48	47	41	35	36	71	78	83	91	90
75	82	92	98	101	62	55	48	41	40	35	29	29	64	71	75	84	82
76	76	84	91	94	55	49	41	34	34	28	23	24	58	64	69	77	76
77	68	77	84	87	49	43	35	28	27	23	18	18	52	57	62	70	68
78	61	70	77	80	42	36	30	22	20	18	13	12	46	51	56	63	61
79	54	63	70	72	36	30	24	17	15	13	8	6	39	44	48	55	54
80	47	55	63	66	30	24	18	13	11	8	4	2	33	38	42	48	47
81	41	48	57	59	24	19	14	8	7	4	2	1	28	32	36	41	41
82	33	42	50	52	19	13	9	4	2	2	1	1	21	26	30	35	33
83	27	36	43	45	13	8	5	2	1	1	0	0	15	20	25	29	27
84	21	29	37	39	8	4	2	1	1	0	0	0	9	15	19	23	21
85	16	24	31	33	2	2	1	0	0	0	0	0	3	9	14	18	16
86	11	19	25	27	1	1	0	0	0	0	0	0	2	4	10	13	11
87	7	14	20	21	1	0	0	0	0	0	0	0	1	2	6	9	7
88	3	9	15	16	0	0	0	0	0	0	0	0	0	1	2	5	3
89	2	5	10	11	0	0	0	0	0	0	0	0	0	0	1	2	2
90	1	2	6	6	0	0	0	0	0	0	0	0	0	0	1	1	1
91	0	1	3	2	0	0	0	0	0	0	0	0	0	0	0	1	0
92	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
93	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0

94	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
96	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
101	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
102	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
103	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
104	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
105	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
106	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
107	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
108	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
109	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
112	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
113	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
114	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
115	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
116	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
117	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
118	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
119	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
121	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
122	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
123	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
124	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
125	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

126	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
127	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
128	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
129	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
130	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
131	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
132	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
133	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
134	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
135	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
136	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
137	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
138	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
139	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
140	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
141	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
142	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
143	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
144	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
145	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
146	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
147	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
148	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
149	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
150	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
151	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
152	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
153	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
154	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
155	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
156	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
157	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

158	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
160	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
161	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
162	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
163	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
164	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
165	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
166	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
167	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
168	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
169	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
170	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
171	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
173	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
174	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
175	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
176	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
177	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
178	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
179	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
180	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2.2 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction BL-QP-033)

Test date	2022-12-10	**Test Ambient:**	25.0 ℃
Test Orientation	As intended	**Stabilization Time (min)**	90
Model Number	S11873 (Setting at 3000K)		

Sphere-Spectroradiometer Method:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
BLC2212001E-D1-PL	120.0	60	0.127	14.69	0.967

Sphere-Spectroradiometer Method:

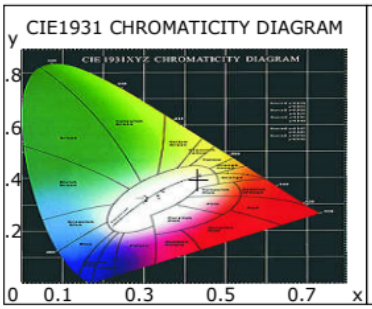
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
CCT (K)	3030
Duv	-0.00165
Chromaticity (x, y)	x=0.4325 y=0.3984
Chromaticity (u', v')	u(u')=0.2501 v'=0.5185
Color Rendering Index (CRI)	96.2
R9	78

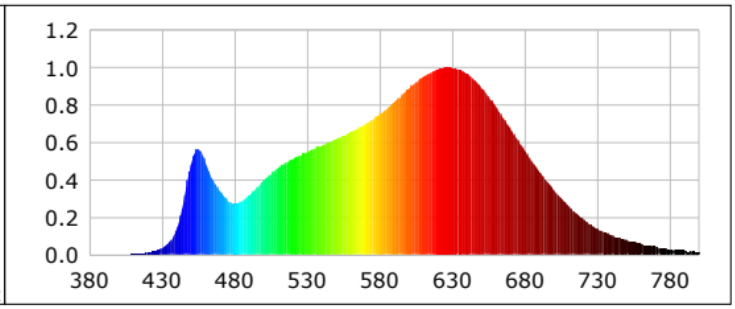
Special Color Rendering Indices			
R1	98	R9	78
R2	99	R10	99
R3	99	R11	99
R4	97	R12	83
R5	98	R13	99
R6	96	R14	99
R7	93	R15	95
R8	89	--	--

Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	1151.7
Luminous Efficacy (lm/W)	78.40

Spectral Power Distribution and Chromaticity Diagram





WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)
380	0.0001	0.0013	535	0.5298	12.6584	690	0.6704	16.0183
385	0.0006	0.0137	540	0.5473	13.0759	695	0.6104	14.5835
390	0.0011	0.0273	545	0.5652	13.5034	700	0.5535	13.2254
395	0.0008	0.0202	550	0.5815	13.8938	705	0.4986	11.9132
400	0.0009	0.0224	555	0.5994	14.3213	710	0.4439	10.6057
405	0.0012	0.0275	560	0.6181	14.7690	715	0.3921	9.3695
410	0.0017	0.0413	565	0.6358	15.1914	720	0.3446	8.2329
415	0.0046	0.1092	570	0.6536	15.6165	725	0.3010	7.1920
420	0.0108	0.2570	575	0.6738	16.0993	730	0.2583	6.1715
425	0.0191	0.4573	580	0.6950	16.6054	735	0.2219	5.3009
430	0.0345	0.8243	585	0.7226	17.2657	740	0.1893	4.5222
435	0.0653	1.5593	590	0.7509	17.9408	745	0.1611	3.8486
440	0.1339	3.1986	595	0.7807	18.6535	750	0.1369	3.2710
445	0.2829	6.7583	600	0.8142	19.4546	755	0.1154	2.7572
450	0.4792	11.4495	605	0.8506	20.3232	760	0.1031	2.4624
455	0.5652	13.5055	610	0.8888	21.2361	765	0.0924	2.2071
460	0.4934	11.7901	615	0.9226	22.0441	770	0.0776	1.8538
465	0.4008	9.5764	620	0.9519	22.7432	775	0.0693	1.6555
470	0.3401	8.1250	625	0.9741	23.2750	780	0.0602	1.4382
475	0.2935	7.0128	630	0.9903	23.6618	785	0.0487	1.1647
480	0.2713	6.4815	635	0.9988	23.8653	790	0.0442	1.0569
485	0.2856	6.8248	640	0.9981	23.8489	795	0.0349	0.8328
490	0.3160	7.5508	645	0.9871	23.5842	800	0.0287	0.6863
495	0.3550	8.4826	650	0.9652	23.0609			
500	0.3961	9.4641	655	0.9360	22.3634			
505	0.4312	10.3021	660	0.8917	21.3052			
510	0.4635	11.0753	665	0.8443	20.1727			
515	0.4882	11.6641	670	0.7898	18.8703			
520	0.5104	12.1946	675	0.7289	17.4165			
525	0.5298	12.6584	680	0.6704	16.0183			
530	0.5473	13.0759	685	0.6104	14.5835			

2.3 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction BL-QP-033)

Test date	2022-12-10	Test Ambient:	25.2 ℃
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	S11873 (Setting at 3500K)		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
BLC2212001E-D1-PL	120.0	60	0.125	14.51	0.966

Sphere-Spectroradiometer Method:

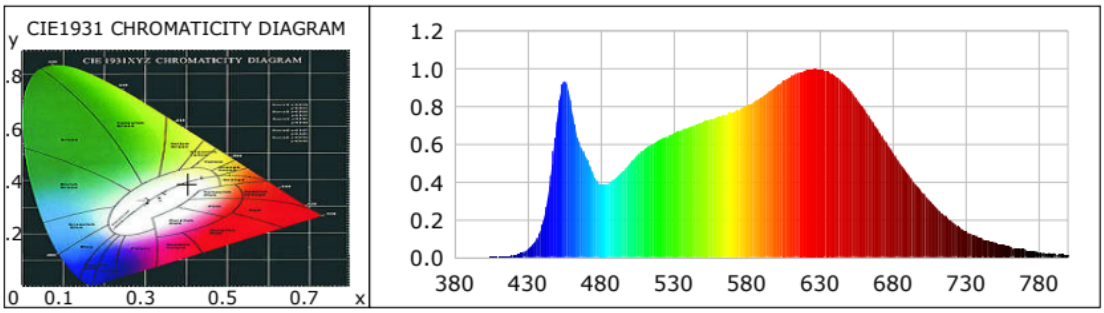
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
CCT (K)	3536
Duv	-0.00256
Chromaticity (x, y)	x=0.4008 y=0.3827
Chromaticity (u', v')	u(u')=0.2361 v'=0.5072
Color Rendering Index (CRI)	96.4
R9	88

Special Color Rendering Indices			
R1	98	R9	88
R2	98	R10	98
R3	99	R11	99
R4	97	R12	77
R5	97	R13	99
R6	95	R14	99
R7	94	R15	97
R8	93	--	--

Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	1221.2
Luminous Efficacy (lm/W)	84.16

Spectral Power Distribution and Chromaticity Diagram



WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)
380	0.0002	0.0043	535	0.6410	14.6083	690	0.6697	15.2623
385	0.0007	0.0163	540	0.6576	14.9886	695	0.6103	13.9095
390	0.0006	0.0143	545	0.6744	15.3697	700	0.5546	12.6392
395	0.0011	0.0255	550	0.6879	15.6782	705	0.4976	11.3411
400	0.0018	0.0411	555	0.7040	16.0454	710	0.4470	10.1870
405	0.0019	0.0428	560	0.7188	16.3836	715	0.3913	8.9187
410	0.0012	0.0280	565	0.7329	16.7043	720	0.3445	7.8518
415	0.0043	0.0973	570	0.7449	16.9773	725	0.3020	6.8825
420	0.0114	0.2597	575	0.7551	17.2109	730	0.2603	5.9319
425	0.0213	0.4860	580	0.7704	17.5585	735	0.2230	5.0823
430	0.0418	0.9517	585	0.7847	17.8836	740	0.1907	4.3460
435	0.0834	1.9015	590	0.8042	18.3295	745	0.1632	3.7187
440	0.1728	3.9386	595	0.8245	18.7908	750	0.1390	3.1682
445	0.3734	8.5093	600	0.8495	19.3609	755	0.1165	2.6560
450	0.7150	16.2966	605	0.8780	20.0112	760	0.1044	2.3796
455	0.9365	21.3448	610	0.9069	20.6688	765	0.0922	2.1024
460	0.7962	18.1464	615	0.9379	21.3769	770	0.0778	1.7737
465	0.6163	14.0468	620	0.9573	21.8180	775	0.0713	1.6252
470	0.5326	12.1394	625	0.9792	22.3168	780	0.0605	1.3780
475	0.4423	10.0804	630	0.9926	22.6219	785	0.0488	1.1120
480	0.3852	8.7787	635	0.9979	22.7427	790	0.0459	1.0463
485	0.3909	8.9090	640	0.9963	22.7067	795	0.0357	0.8140
490	0.4185	9.5386	645	0.9859	22.4699	800	0.0273	0.6230
495	0.4568	10.4101	650	0.9660	22.0169			
500	0.5009	11.4152	655	0.9299	21.1942			
505	0.5407	12.3227	660	0.8943	20.3832			
510	0.5739	13.0797	665	0.8445	19.2464			
515	0.5994	13.6616	670	0.7895	17.9947			
520	0.6224	14.1843	675	0.7312	16.6661			
525	0.6410	14.6083	680	0.6697	15.2623			
530	0.6576	14.9886	685	0.6103	13.9095			

2.4 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction BL-QP-033)

Test date	2022-12-10	Test Ambient:	25.2 ℃
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	S11873 (Setting at 4000K)		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
BLC2212001E-D1-PL	120.0	60	0.126	14.55	0.966

Sphere-Spectroradiometer Method:

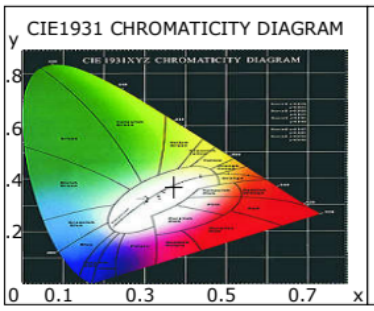
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
CCT (K)	4190
Duv	-0.00098
Chromaticity (x, y)	x=0.3719 y=0.3692
Chromaticity (u', v')	u(u')=0.2225 v'=0.4969
Color Rendering Index (CRI)	96.1
R9	91

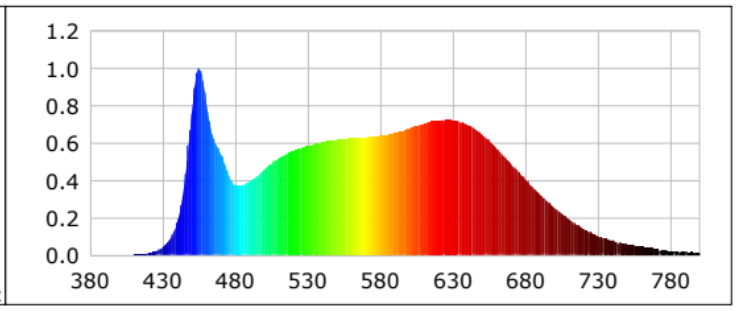
Special Color Rendering Indices			
R1	98	R9	91
R2	99	R10	100
R3	99	R11	97
R4	95	R12	71
R5	96	R13	99
R6	96	R14	99
R7	94	R15	96
R8	94	--	--

Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	1260.6
Luminous Efficacy (lm/W)	86.64

Spectral Power Distribution and Chromaticity Diagram





WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)
380	0.0001	0.0027	535	0.5707	16.3391	690	0.4854	13.8986
385	0.0011	0.0314	540	0.5822	16.6694	695	0.4439	12.7080
390	0.0011	0.0304	545	0.5955	17.0492	700	0.4027	11.5296
395	0.0007	0.0187	550	0.6037	17.2842	705	0.3608	10.3290
400	0.0012	0.0345	555	0.6106	17.4822	710	0.3242	9.2827
405	0.0015	0.0428	560	0.6175	17.6781	715	0.2889	8.2725
410	0.0016	0.0450	565	0.6216	17.7977	720	0.2516	7.2024
415	0.0042	0.1203	570	0.6265	17.9381	725	0.2204	6.3101
420	0.0106	0.3041	575	0.6285	17.9946	730	0.1907	5.4605
425	0.0202	0.5785	580	0.6270	17.9517	735	0.1624	4.6483
430	0.0415	1.1884	585	0.6343	18.1603	740	0.1410	4.0363
435	0.0858	2.4571	590	0.6382	18.2726	745	0.1208	3.4578
440	0.1748	5.0047	595	0.6438	18.4331	750	0.1006	2.8805
445	0.3778	10.8165	600	0.6539	18.7208	755	0.0859	2.4601
450	0.7516	21.5179	605	0.6640	19.0109	760	0.0777	2.2254
455	1.0000	28.6305	610	0.6781	19.4143	765	0.0681	1.9503
460	0.8222	23.5411	615	0.6896	19.7436	770	0.0575	1.6463
465	0.6295	18.0219	620	0.7036	20.1449	775	0.0494	1.4133
470	0.5452	15.6083	625	0.7155	20.4854	780	0.0437	1.2507
475	0.4414	12.6364	630	0.7213	20.6525	785	0.0358	1.0242
480	0.3746	10.7244	635	0.7244	20.7411	790	0.0327	0.9366
485	0.3757	10.7572	640	0.7199	20.6105	795	0.0251	0.7176
490	0.3946	11.2967	645	0.7130	20.4143	800	0.0219	0.6280
495	0.4231	12.1138	650	0.6990	20.0133			
500	0.4592	13.1484	655	0.6769	19.3798			
505	0.4889	13.9980	660	0.6453	18.4756			
510	0.5197	14.8792	665	0.6127	17.5423			
515	0.5388	15.4265	670	0.5709	16.3465			
520	0.5570	15.9477	675	0.5294	15.1573			
525	0.5707	16.3391	680	0.4854	13.8986			
530	0.5822	16.6694	685	0.4439	12.7080			

2.5 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction BL-QP-033)

Test date	2022-12-10	Test Ambient:	25.2 ℃
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	S11873 (Setting at 5000K)		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
BLC2212001E-D1-PL	120.0	60	0.125	14.52	0.965

Sphere-Spectroradiometer Method:

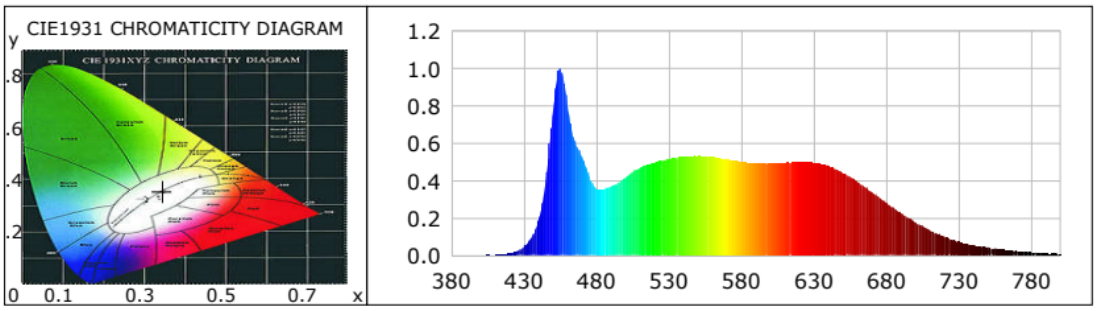
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
CCT (K)	5142
Duv	0.00355
Chromaticity (x, y)	x=0.3417 y=0.3560
Chromaticity (u', v')	u(u')=0.2075 v'=0.4863
Color Rendering Index (CRI)	94.8
R9	83

Special Color Rendering Indices			
R1	96	R9	83
R2	99	R10	95
R3	98	R11	93
R4	92	R12	69
R5	93	R13	97
R6	95	R14	99
R7	94	R15	94
R8	91	--	--

Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	1264.9
Luminous Efficacy (lm/W)	87.11

Spectral Power Distribution and Chromaticity Diagram



WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)
380	0.0000	0.0010	535	0.5073	17.8771	690	0.3376	11.8991
385	0.0006	0.0218	540	0.5156	18.1703	695	0.3092	10.8973
390	0.0012	0.0410	545	0.5209	18.3559	700	0.2796	9.8537
395	0.0009	0.0327	550	0.5253	18.5120	705	0.2539	8.9488
400	0.0012	0.0407	555	0.5289	18.6381	710	0.2256	7.9509
405	0.0015	0.0513	560	0.5308	18.7049	715	0.2005	7.0677
410	0.0017	0.0590	565	0.5297	18.6673	720	0.1763	6.2148
415	0.0049	0.1726	570	0.5262	18.5438	725	0.1553	5.4737
420	0.0111	0.3926	575	0.5208	18.3545	730	0.1341	4.7261
425	0.0224	0.7879	580	0.5139	18.1094	735	0.1146	4.0375
430	0.0461	1.6254	585	0.5071	17.8700	740	0.0986	3.4763
435	0.0926	3.2636	590	0.5010	17.6568	745	0.0849	2.9929
440	0.1867	6.5813	595	0.4956	17.4658	750	0.0727	2.5628
445	0.3901	13.7488	600	0.4941	17.4121	755	0.0595	2.0980
450	0.7601	26.7866	605	0.4903	17.2779	760	0.0540	1.9048
455	1.0000	35.2420	610	0.4910	17.3042	765	0.0482	1.6984
460	0.8074	28.4561	615	0.4936	17.3963	770	0.0414	1.4600
465	0.6143	21.6479	620	0.4954	17.4600	775	0.0384	1.3524
470	0.5282	18.6142	625	0.4969	17.5133	780	0.0299	1.0535
475	0.4262	15.0194	630	0.4992	17.5936	785	0.0263	0.9251
480	0.3568	12.5757	635	0.4978	17.5438	790	0.0236	0.8334
485	0.3513	12.3818	640	0.4941	17.4148	795	0.0207	0.7295
490	0.3674	12.9486	645	0.4889	17.2312	800	0.0143	0.5045
495	0.3899	13.7412	650	0.4784	16.8594			
500	0.4183	14.7416	655	0.4620	16.2807			
505	0.4454	15.6972	660	0.4408	15.5354			
510	0.4678	16.4857	665	0.4192	14.7732			
515	0.4858	17.1202	670	0.3943	13.8960			
520	0.4969	17.5112	675	0.3657	12.8884			
525	0.5073	17.8771	680	0.3376	11.8991			
530	0.5156	18.1703	685	0.3092	10.8973			

3. Test Equipment

Equipment Name	Model No.	Serial No.	Calibration Date
Goniophotometeric System	GPM-3000	DYHXF120001	2022-01-18
AC Power Source	CHP-500C	DYBWD010159	2022-01-25
Total Luminous Flux Standard Lamp	24V/150W	DYJYR040040	2022-01-25
Digital Power Meter	WT500	DYDWQ20010	2022-01-25
Integral Sphere (2M)	2M	DYJCE120067	2022-01-18
Digital Power Meter	WT500	DYDWQ200006	2022-01-25
Optical Color and Electrical Measurement System	CMS-3000S	DYJCE120067	2022-01-18
Expand Uncertainty: Photometric Measurement (Sphere): 2.08%, k=2 Chromaticity Measurement(Sphere):25.6K, k=2 Photometric Measurement(Goniophotometer):2.645%, k=2			

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