



Report No.:
RHL23030301-9-PL

LM-79-08 Test Report

For

GREEN CREATIVE LTD

(Brand Name: GREEN CREATIVE)

Internal Driver/Line Voltage (UL Type B)Lamps

Room 3603, Level 36, Tower 1, Enterprise Square Five, 38 Wang Chiu Road, Kowloon Bay, KL, Hong Kong

Model name(s): 15T8/4F/8CCTS/EM

Remark: The color temperature can be adjusted to 3500K, 4000K,5000K

This is a multiple list report, the original report No. is RHL23030301-9.

Test & Report By:

Sun Liang

Review By:

Harry Wei

Engineer: Sun Liang

Manager: Harry Wei

Date: Mar.15, 2023

Note: 1. All the test results related only to the samples tested.

2. This report must not be used by the customer to claim product certification, approval, or endorsement By NVLAP, NIST, or any agency of the U. S. Government.

3. This report contains data that are not covered by the NVLAP accreditation.

Laboratory: Hopestar Test Lab Limited, NVLAP Code: 600245-0
Add: Room 212, 24 Building, 7 Qingyi Road, Hi-Tech Zone, Ningbo, China
www.hopestartest.com

Report Format Number HL-Report-EEL-001

1.1 Product Information:

Organization Name	GREEN CREATIVE LTD	
Brand Name	GREEN CREATIVE	
Model Number	15T8/4F/8CCTS/EM	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Internal Driver/Line Voltage (UL Type B) Lamps	
Rated Voltage / Frequency	120-277Vac, 50/60 Hz	
Nominal Power	15W	
Rated Initial Lamp Lumen	--	
Declared CCT	3500K,4000K,5000K (Color tunable)	
LED Manufacturer	SEOUL SEMICONDUCTOR	
LED Model	STW8A12D-D1-VN	
Sample Number	RHL23030301-901(3500K), (4000K), (5000K)	
Lamp Length	1200	mm
Lamp Width	--	mm
Number of Units (modular products)	N/A	s

Photo





1.2 Test Specifications:

Date of Receipt	Mar.03,2023
Date of Test	Mar.03,2023
Test item	<ol style="list-style-type: none">1. Total Luminous Flux2. Luminous Distribution Intensity3. Luminous Efficacy4. Correlated Color Temperature5. Color Rendering Index6. Chromaticity Coordinate7. Electrical Parameters
Reference Standard	<ol style="list-style-type: none">1. IES LM-79-2008 Electrical and Photometric Measurements of Solid-State Lighting Products and IES-LM-79-2019 OPTICAL AND ELECTRICAL MEASUREMENTS OF SOLID-STATE LIGHTING PRODUCTS2. ANSI C78.377-2008 Specifications for the Chromaticity of Solid State Lighting Products3. CIE 13.3-1995 Method of Measuring and Specifying Colour Rendering Properties of Light Sources4. CIE 15-2004 Technical Report Colorimetry5. IESNA LM-16-93 Practical Guide to Colorimetry of Light Source6. IESNA TM-16-05 Technical Memorandum on Light Emitting Diode (LED) Sources and Systems
Reference Work Instruction	HL-WI-EE-001, HL-WI-EE-002



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 $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$, measured at a point not more than 1 m from the sample and at the same height as the sample. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at 1° vertical intervals and 22.5° horizontal intervals.

The reference standard lamp D204 is rated 4.0241A,21.62V, The Series No.

M133806CA8391160 omni-directional Incandescent lamp and was calibrated by National Institute of Metrology, China.

2) Chromaticity Measurement – Sphere-Spectroradiometer Method:

Chromaticity parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral power distribution taken at 5 nm intervals over the range of 380 to 780 nm.

The reference standard lamp D204 is rated 4.0241A,21.62V, The Series No. M133806CA8391160 omni-directional Incandescent lamp and was calibrated by National Institute of Metrology, China.

3) Electrical Measurements:

Electrical parameters were measured using power meters incorporated in goniophotometer or sphere-spectroradiometer system. The ambient temperature surrounding the sample was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Voltage, frequency, current, power, power factor and total harmonic distortion were measured by and read from the power meter.



2.1 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction HL-WI-EE-001, HL-WI-EE-002)

Test date	2023-03-03	Test Ambient:	25.1 °C
Test Orientation	As intended	Total operation burning time(min):	90
Model Number	15T8/4F/8CCTS/EM (Switch on 3500K)	Stabilization Time(min):	60

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
RHL2303	120.00	60	0.1227	14.59	0.9897	9.63
0301-901	277.00	60	0.0607	15.33	0.9115	21.35
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

Chromaticity Measurement - Sphere-Spectroradiometer Method

(Self-absorption:1.110) (4π geometry):

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.00	R1	81	R9	4
Frequency (Hz)	60	R2	91	R10	79
CCT (K)	3382	R3	96	R11	78
Duv	-0.0017	R4	80	R12	68
Chromaticity (x, y)	x = 0.4102 y = 0.3893	R5	81	R13	83
Chromaticity (u', v')	u' = 0.2395 v' = 0.5114	R6	88	R14	98
Color Rendering Index (CRI)	82.0	R7	83	R15	74
R9	4	R8	59	--	--
Rf	84	--	--	--	--
Rg	95	--	--	--	--
Rcs,h1(%)	-13	--	--	--	--

Photometric Measurement – Sphere-Spectroradiometer Method (Self-absorption: 1.110) (4π geometry):

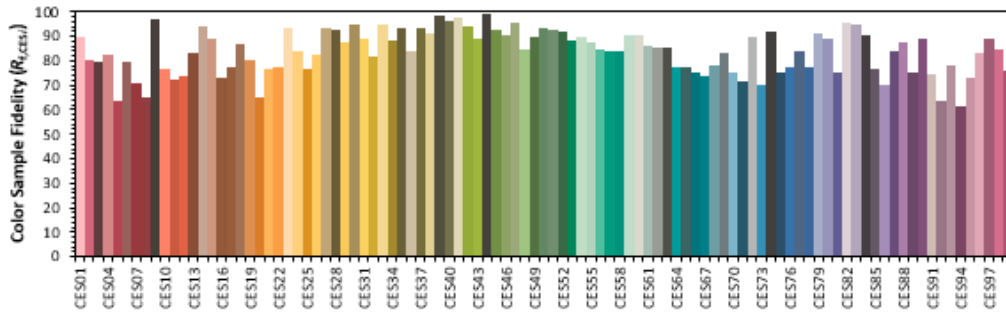
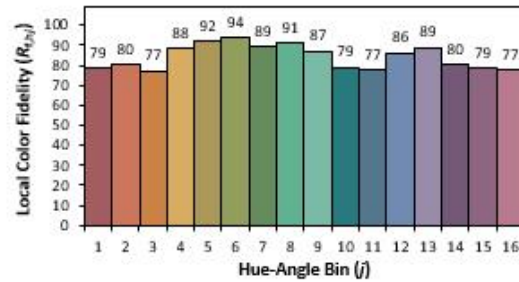
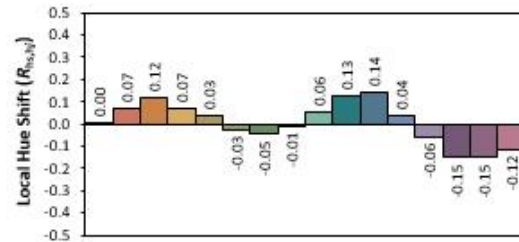
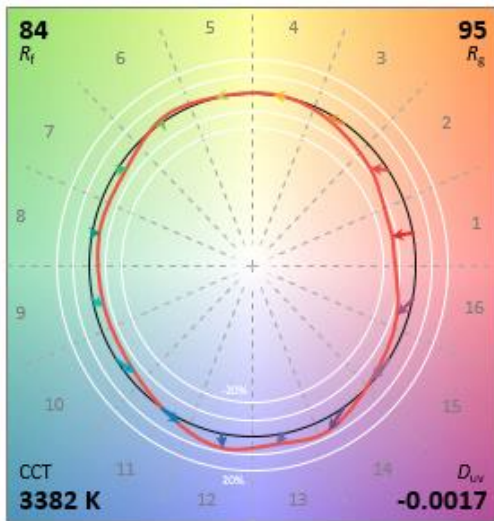
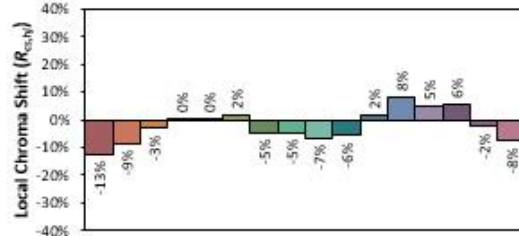
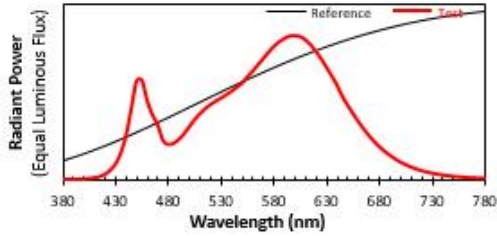
Parameter	Result		DLC V5.1 Pass Criteria
Test Voltage (V)	120.00	277.00	--
Frequency (Hz)	60	60	
Total Luminous (lm)	2153.5	2234.0	Bare Lamp: >= 1600(-10%)
Luminous Efficacy (lm/W)	147.60	145.73	Bare lamp: >= 120(-3%)
Most worst Luminous/Highest Watts	140.48		



Spectral Power Distribution & Chromaticity Diagram

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	0.0056	485	0.2534	590	0.9793	695	0.1462
385	0.0037	490	0.2790	595	0.9958	700	0.1245
390	0.0040	495	0.3190	600	0.9972	705	0.1059
395	0.0049	500	0.3685	605	0.9932	710	0.0902
400	0.0065	505	0.4175	610	0.9720	715	0.0760
405	0.0086	510	0.4582	615	0.9368	720	0.0644
410	0.0135	515	0.4924	620	0.8915	725	0.0550
415	0.0226	520	0.5215	625	0.8406	730	0.0465
420	0.0386	525	0.5451	630	0.7828	735	0.0396
425	0.0665	530	0.5664	635	0.7215	740	0.0336
430	0.1109	535	0.5892	640	0.6588	745	0.0285
435	0.1861	540	0.6125	645	0.5817	750	0.0243
440	0.3096	545	0.6413	650	0.5211	755	0.0209
445	0.4980	550	0.6710	655	0.4627	760	0.0176
450	0.6863	555	0.7123	660	0.4082	765	0.0149
455	0.6890	560	0.7525	665	0.3572	770	0.0130
460	0.5473	565	0.7954	670	0.3114	775	0.0112
465	0.4490	570	0.8387	675	0.2689	780	0.0103
470	0.3798	575	0.8830	680	0.2324		
475	0.2724	580	0.9225	685	0.1995		
480	0.2449	585	0.9554	690	0.1717		

TM-30



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

x **0.4102**
 y **0.3893**
 u' **0.2395**
 v' **0.5114**

CIE 13.3-1995 (CRI)	
R_a	82
R_9	4



2.2 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction HL-WI-EE-001, HL-WI-EE-002)

Test date	2023-03-03	Test Ambient:	25.1 ° C
Test Orientation	As intended	Total operation burning time(min):	90
Model Number	15T8/4F/8CCTS/EM (Switch on 3500K)	Stabilization Time(min):	60

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
RHL2303	120.00	60	0.1230	14.68	0.9930	9.81
0301-901	277.00	60	0.0600	15.36	0.9270	20.25
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

Photometric Measurement – Goniophotometer Method:

(Goniophotometer far field detector $f1'=1.42\%$, Test distance: 17.177m)

Parameter	Result		DLC V5.1 Pass Criteria
Test Voltage (V)	120.0	277.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	2139.5	2214.1	Bare Lamp: >= 1600(-10%)
Luminous Efficacy (lm/W)	145.74	144.15	Bare lamp: >= 120(-3%)
Most worst Luminous/Highest Watts	139.29		
Beam Angle (°)	136.5		140° (-5°)
Center Beam Candle Power (cd)	560		--



Zonal Lumen Tabulation

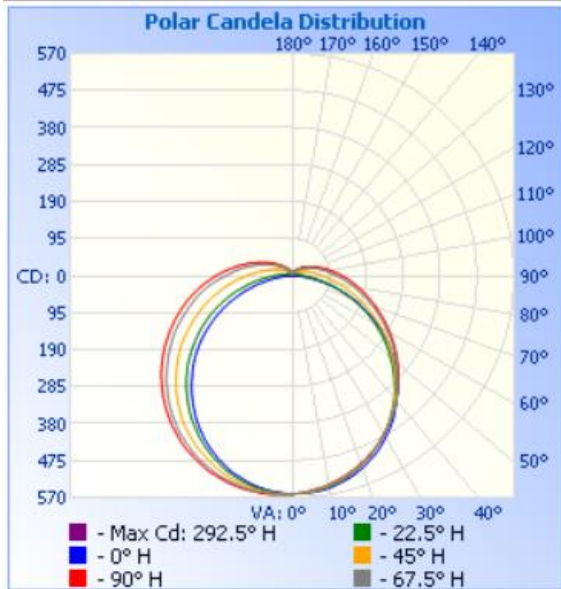
Zonal Lumen Summary

Zone	Lumens	% Lamp	% Luminaire
0-30	440.0	20.6%	20.6%
0-40	727.8	34%	34%
0-60	1,331.7	62.2%	62.2%
60-90	576.7	27%	27%
70-100	409.2	19.1%	19.1%
90-120	178.2	8.3%	8.3%
0-90	1,908.3	89.2%	89.2%
90-180	231.0	10.8%	10.8%
0-180	2,139.4	100%	100%

Lumens Per Zone

Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	53.1	2.5%	90-100	85.8	4%
10-20	152.8	7.1%	100-110	56.4	2.6%
20-30	234.1	10.9%	110-120	36.0	1.7%
30-40	287.8	13.5%	120-130	22.7	1.1%
40-50	308.4	14.4%	130-140	14.1	0.7%
50-60	295.5	13.8%	140-150	8.5	0.4%
60-70	253.3	11.8%	150-160	4.7	0.2%
70-80	192.8	9.0%	160-170	2.2	0.1%
80-90	130.6	6.1%	170-180	0.6	0%

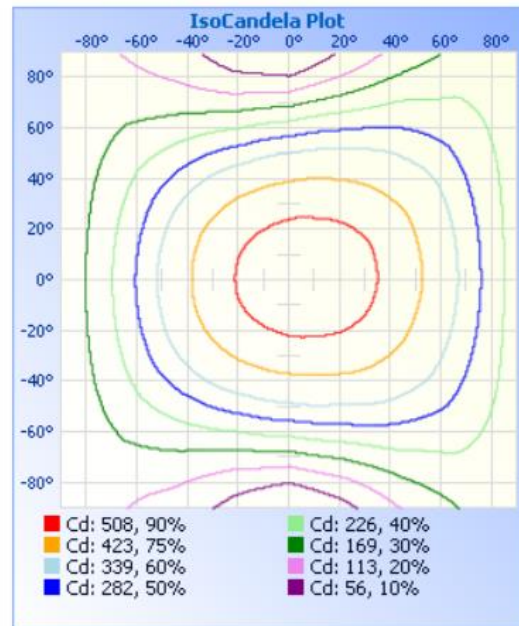
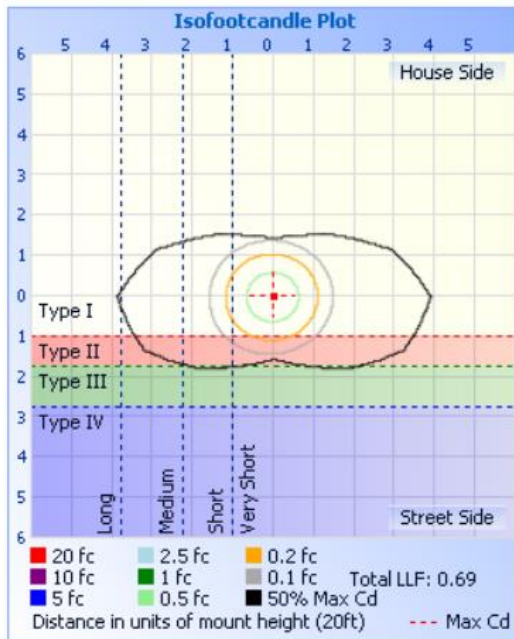
Photometric Data



Illuminance at a Distance

	Center Beam Fc	Beam Width	
17.0ft	1.94 fc	52.7 ft	85.1 ft
34.0ft	0.48 fc	105.4 ft	170.2 ft
51.0ft	0.22 fc	158.0 ft	255.4 ft
68.0ft	0.12 fc	210.7 ft	340.5 ft
85.0ft	0.08 fc	263.4 ft	425.6 ft
102.0ft	0.05 fc	316.1 ft	510.7 ft

■ Vert. Spread: 114.3°
■ Horiz. Spread: 136.5°





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	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560
1	560	560	560	560	559	559	559	560	560	561	561	561	561	562	560	561	560
2	560	560	560	559	559	558	558	560	559	561	561	562	562	563	561	561	560
3	559	560	559	558	557	557	556	558	558	561	562	563	562	562	561	562	559
4	559	559	558	556	556	555	555	557	557	559	562	563	562	563	562	562	559
5	558	558	557	555	553	555	554	555	556	558	561	562	564	564	563	561	558
6	558	557	555	554	552	553	552	553	555	557	560	562	564	564	563	561	558
7	557	556	553	552	550	551	549	552	553	556	559	562	564	565	562	560	557
8	556	554	551	549	549	548	547	550	551	554	559	561	564	564	562	560	556
9	555	551	549	547	547	547	546	548	550	553	557	561	563	564	561	559	555
10	553	549	547	545	544	544	544	545	547	551	556	561	562	564	560	557	553
11	551	547	545	543	541	541	541	543	545	550	555	560	562	563	559	555	551
12	548	545	543	541	539	538	539	540	542	547	554	559	562	563	558	553	548
13	546	543	540	538	536	536	535	537	539	545	552	558	561	561	557	553	546
14	544	540	538	536	534	533	532	534	536	542	550	557	560	559	556	550	544
15	541	537	533	533	530	531	529	529	533	540	547	555	559	559	555	549	541
16	539	533	530	529	527	528	525	526	530	536	545	553	558	557	553	546	539
17	536	531	527	525	524	524	522	522	527	533	542	551	557	556	551	543	536
18	533	527	524	522	521	520	519	519	524	529	540	549	555	555	549	539	533
19	529	522	521	519	517	517	515	515	519	527	538	548	553	553	546	537	529
20	526	519	516	515	513	513	510	510	515	523	535	547	551	552	544	534	526
21	522	515	513	512	510	509	506	505	510	518	532	544	549	549	541	530	522
22	518	510	508	508	506	505	502	502	506	514	528	541	548	547	539	527	518
23	513	506	505	504	502	501	498	496	502	510	525	538	546	544	537	523	513
24	509	502	499	499	497	497	493	491	497	506	522	536	544	542	533	520	509
25	505	497	495	495	494	492	489	486	492	502	518	533	540	539	530	515	505
26	501	492	490	490	489	488	484	481	487	497	514	530	537	537	526	511	501
27	496	486	486	486	485	483	479	476	482	492	510	527	535	534	523	506	496
28	490	481	481	481	480	478	474	471	477	488	507	524	531	531	519	501	490
29	485	476	476	476	475	473	468	465	471	482	504	521	529	528	515	498	485

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30	480	470	471	471	470	468	463	459	465	477	500	517	526	524	511	493	480
31	474	465	466	467	465	463	457	453	460	471	495	513	523	521	508	488	474
32	469	460	460	462	460	458	452	447	454	466	490	509	519	518	503	482	469
33	463	454	455	457	455	452	446	441	448	460	486	505	516	514	499	477	463
34	457	448	449	451	450	447	440	435	441	455	481	501	512	510	494	472	457
35	451	441	443	445	445	442	435	429	434	450	477	498	507	506	489	467	451
36	445	434	437	440	439	436	429	423	428	443	472	494	504	502	484	461	445
37	437	428	431	434	433	430	423	417	421	438	467	490	500	498	480	456	437
38	430	422	425	428	428	424	416	411	414	431	461	484	496	493	475	451	430
39	424	415	417	423	422	419	410	403	407	424	455	480	492	488	470	445	424
40	417	408	411	417	416	413	403	396	400	418	449	475	487	484	465	439	417
41	410	401	404	410	410	407	397	389	393	411	443	470	482	479	460	432	410
42	403	394	397	404	404	401	390	382	386	404	438	466	478	476	454	426	403
43	396	386	390	397	399	395	384	375	379	398	433	460	473	470	449	420	396
44	388	378	384	391	392	388	377	368	370	391	427	455	468	466	442	413	388
45	381	370	377	384	386	381	370	360	363	384	421	450	463	460	437	406	381
46	373	362	370	377	379	375	363	352	356	378	414	444	458	455	431	400	373
47	365	355	363	371	373	368	356	344	349	370	408	438	453	450	426	392	365
48	358	347	355	364	367	362	349	336	341	363	401	433	447	445	419	385	358
49	350	339	347	358	360	355	342	328	333	356	395	427	442	439	413	378	350
50	342	330	340	350	354	349	335	320	326	349	389	422	437	433	407	370	342
51	335	322	332	343	348	342	328	313	317	341	382	415	431	428	401	363	335
52	327	314	325	337	341	337	321	305	309	332	375	409	426	422	395	356	327
53	317	305	317	330	335	329	313	297	300	324	369	403	421	417	388	349	317
54	309	297	310	323	328	323	305	289	292	317	362	397	415	411	382	342	309
55	300	289	302	316	321	316	298	281	283	309	356	391	409	406	375	333	300
56	291	280	294	309	315	310	290	273	275	301	349	385	403	401	369	326	291
57	283	271	286	303	309	303	283	265	265	293	343	379	397	395	361	318	283
58	273	262	279	296	302	296	275	256	256	285	336	373	391	389	355	310	273
59	264	253	271	289	296	290	268	247	247	277	328	367	385	382	348	303	264
60	254	245	263	282	288	283	261	239	238	269	321	360	380	376	341	294	254
61	245	236	255	275	282	276	254	231	229	260	314	354	374	370	335	286	245
62	236	227	247	269	276	270	246	222	220	252	305	348	368	363	328	278	236

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63	226	218	238	262	270	264	239	213	210	244	298	342	361	356	320	269	226
64	217	209	230	255	263	258	232	205	202	236	290	336	355	349	313	261	217
65	207	200	223	249	257	251	225	196	192	228	283	330	349	343	306	253	207
66	197	191	216	242	251	245	218	188	183	219	276	323	343	336	300	245	197
67	188	182	208	235	244	239	211	179	173	211	268	316	336	330	293	235	188
68	178	173	200	229	238	232	205	171	163	202	261	309	330	324	286	227	178
69	168	164	193	223	233	226	198	163	154	193	254	302	324	317	278	218	168
70	158	155	186	217	227	219	191	155	145	185	248	296	318	311	270	210	158
71	149	146	179	210	221	213	185	147	135	176	241	289	311	304	263	202	149
72	139	137	172	204	215	207	178	139	126	168	234	283	305	297	256	193	139
73	129	129	166	199	210	202	172	132	116	159	226	277	299	289	249	185	129
74	120	121	159	193	204	197	166	124	107	151	219	270	293	282	242	177	120
75	110	112	152	187	198	192	160	117	98	142	212	265	286	276	235	169	110
76	101	104	146	181	193	187	154	110	89	135	204	259	280	270	229	161	101
77	91	97	140	176	188	181	148	104	80	126	197	253	274	263	222	153	91
78	82	89	134	171	183	175	142	97	71	119	190	247	268	257	215	146	82
79	73	82	128	166	177	169	137	91	63	111	183	241	262	250	208	139	73
80	64	76	123	161	173	164	132	85	55	103	177	234	255	244	201	130	64
81	56	69	118	156	168	159	126	79	47	96	171	228	249	239	194	123	56
82	47	63	112	150	163	153	121	74	40	89	164	221	243	233	188	116	47
83	40	58	107	146	158	147	116	69	32	82	158	215	236	228	180	109	40
84	33	53	102	141	154	142	112	64	26	76	152	210	231	221	173	102	33
85	26	48	98	136	149	137	108	59	20	69	146	203	225	215	166	96	26
86	20	43	93	131	145	132	103	55	15	63	140	196	219	207	161	89	20
87	15	39	89	126	140	128	98	51	11	58	134	190	212	201	156	82	15
88	11	36	85	122	136	125	93	48	8	53	128	184	207	195	151	77	11
89	8	33	80	117	132	121	89	44	6	47	122	177	201	189	144	73	8
90	6	30	76	113	128	118	86	41	5	44	115	171	195	184	138	67	6
91	5	28	73	109	124	114	83	38	4	40	112	164	190	179	133	63	5
92	5	26	70	104	120	111	80	36	4	36	108	159	184	174	129	59	5
93	5	23	68	101	116	108	77	34	4	33	103	155	178	169	123	55	5
94	4	22	65	98	113	104	74	32	3	31	96	151	172	163	118	51	4
95	4	20	62	95	109	101	71	30	3	28	92	146	167	159	114	48	4

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96	4	19	59	93	105	99	68	28	3	26	88	141	162	154	109	44	4
97	4	18	56	90	102	95	65	27	3	24	84	136	156	149	104	41	4
98	4	17	54	87	99	92	63	25	3	23	81	131	151	144	100	39	4
99	5	16	52	84	95	89	60	24	3	21	77	126	146	139	95	36	5
100	5	15	49	82	92	86	58	23	3	20	73	122	142	134	91	34	5
101	4	14	47	79	89	83	56	21	3	18	70	117	137	130	87	32	4
102	4	14	45	75	86	81	54	20	3	17	66	112	132	125	84	30	4
103	4	13	44	73	83	78	51	20	3	16	63	109	127	121	79	28	4
104	4	13	42	70	80	75	49	19	3	16	60	105	123	116	76	27	4
105	4	12	40	68	77	72	47	18	3	15	57	101	118	112	73	26	4
106	4	12	38	66	75	70	46	17	3	14	55	98	114	108	69	24	4
107	4	11	37	63	72	67	44	17	3	14	52	94	110	103	66	23	4
108	4	11	35	61	70	65	42	16	3	14	50	90	106	99	64	22	4
109	5	11	34	59	68	63	40	15	3	13	48	86	102	96	61	21	5
110	4	10	33	57	65	60	39	15	3	13	46	83	98	91	58	20	4
111	5	10	31	55	63	58	37	14	3	12	44	79	95	88	56	20	5
112	5	10	30	53	61	56	36	14	3	12	42	77	91	84	54	19	5
113	5	10	29	51	59	54	35	13	3	12	40	73	87	81	51	18	5
114	4	9	28	49	57	52	33	13	3	12	38	71	84	78	49	18	4
115	5	9	27	47	55	50	32	13	3	11	37	68	81	74	47	17	5
116	5	9	26	45	53	48	31	12	3	11	35	65	77	71	45	17	5
117	5	9	25	44	51	47	30	12	3	11	34	62	75	69	43	16	5
118	5	9	24	42	49	45	29	12	3	11	33	59	72	66	41	16	5
119	5	8	23	40	47	43	28	11	3	11	31	57	69	63	40	15	5
120	5	8	22	39	46	42	27	11	3	11	30	55	66	61	38	15	5
121	5	8	22	37	44	40	26	11	3	10	29	53	63	58	37	15	5
122	5	8	21	36	42	39	25	11	3	10	28	50	61	56	35	15	5
123	5	8	20	35	41	37	24	10	3	10	27	49	59	54	34	14	5
124	5	8	19	34	39	36	23	10	3	10	26	47	56	52	33	14	5
125	5	8	19	32	38	35	22	10	3	10	25	45	54	50	32	14	5
126	5	8	18	31	37	33	22	10	3	10	25	43	52	48	31	13	5
127	5	8	18	30	35	32	21	10	3	10	24	41	49	46	29	13	5
128	5	8	17	29	34	31	20	10	3	10	23	40	48	44	28	13	5

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129	5	8	17	28	33	30	20	9	3	10	22	38	46	42	28	13	5
130	5	7	16	27	32	29	19	9	3	10	22	37	44	40	27	13	5
131	5	7	16	26	31	27	18	9	3	9	21	35	42	39	26	12	5
132	5	7	15	25	29	27	18	9	3	9	21	34	40	37	25	12	5
133	5	7	15	24	28	26	17	9	3	10	20	33	39	36	24	12	5
134	5	7	14	23	27	24	17	9	3	10	19	32	37	34	23	12	5
135	5	7	14	22	26	24	16	9	3	9	19	30	36	33	23	12	5
136	5	7	14	22	25	23	16	9	3	9	18	29	34	32	22	11	5
137	5	7	13	21	24	22	15	8	3	9	18	28	33	31	21	11	5
138	5	7	13	20	23	21	15	8	3	9	17	27	32	29	21	11	5
139	5	7	12	19	22	20	14	8	3	9	17	26	30	28	20	11	5
140	5	7	12	19	21	20	14	8	3	9	16	25	29	27	19	11	5
141	5	7	12	18	21	19	14	8	3	9	16	24	28	26	19	11	5
142	5	7	12	17	20	18	13	8	4	9	16	23	27	25	18	11	5
143	5	7	11	17	19	18	13	8	3	9	16	23	26	24	18	11	5
144	5	7	11	16	18	17	12	8	3	9	15	22	25	23	17	10	5
145	5	7	11	15	18	16	12	8	3	9	15	21	24	23	17	10	5
146	5	6	10	15	17	16	12	8	3	9	14	20	23	22	16	10	5
147	5	7	10	15	16	15	11	8	3	9	14	20	22	21	16	10	5
148	5	7	10	14	16	15	11	7	3	8	14	19	21	20	15	10	5
149	5	7	10	14	15	14	11	7	4	8	13	18	20	19	15	10	5
150	5	6	10	13	14	13	10	7	3	8	13	18	20	19	15	10	5
151	5	6	9	13	14	13	10	7	4	8	13	17	19	18	14	9	5
152	5	6	9	12	13	13	10	7	4	8	12	17	18	17	14	9	5
153	5	6	9	12	13	12	10	7	4	8	12	16	18	17	13	9	5
154	5	6	9	11	12	12	9	7	4	8	12	16	17	16	13	9	5
155	5	6	8	11	12	11	9	7	4	8	11	15	16	16	13	9	5
156	5	6	8	11	12	11	9	7	4	8	11	14	16	15	12	9	5
157	5	6	8	10	11	10	8	7	4	7	10	14	15	15	12	9	5
158	5	6	8	10	11	10	8	6	4	7	10	14	15	14	12	9	5
159	5	6	8	9	10	10	8	6	4	7	10	13	14	14	12	9	5
160	5	6	8	9	10	10	8	6	4	7	9	13	14	13	11	9	5
161	5	6	8	9	9	9	7	6	4	7	9	12	13	13	11	8	5

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162	5	6	7	9	9	9	7	6	4	7	9	11	13	12	10	8	5
163	5	6	7	8	9	9	7	6	4	7	9	11	12	12	10	8	5
164	5	6	7	8	9	8	7	6	4	7	9	10	12	12	10	8	5
165	6	6	7	8	8	8	7	6	4	7	9	10	11	11	10	8	6
166	5	6	7	8	8	8	7	6	4	7	9	9	11	11	9	8	5
167	6	6	7	7	8	7	6	6	4	7	8	9	10	10	9	8	6
168	6	6	6	7	7	7	6	6	4	7	8	8	10	10	9	8	6
169	6	6	6	7	7	7	6	6	4	7	8	8	10	10	9	7	6
170	6	6	6	7	7	7	6	6	4	7	8	8	9	9	9	7	6
171	6	6	6	7	7	6	6	6	4	7	8	8	9	9	8	7	6
172	6	6	6	7	6	6	6	6	4	6	7	7	9	9	8	7	6
173	6	6	6	6	6	6	6	6	4	6	7	7	8	8	8	7	6
174	6	6	6	6	6	6	6	6	4	6	7	7	8	8	8	7	6
175	6	6	6	6	6	6	6	6	4	6	7	7	8	8	7	6	6
176	6	6	6	6	6	6	6	6	4	6	7	7	7	7	7	6	6
177	6	6	6	6	6	6	6	6	4	6	6	7	7	7	7	6	6
178	5	6	6	6	6	6	6	6	4	6	6	6	6	7	6	6	5
179	5	6	6	6	6	6	6	6	4	6	6	6	6	6	6	6	5
180	5	6	6	6	6	6	6	6	4	6	6	6	6	6	6	6	5



2.3 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction HL-WI-EE-001, HL-WI-EE-002)

Test date	2023-03-03	Test Ambient:	25.1 °C
Test Orientation	As intended	Total operation burning time(min):	90
Model Number	15T8/4F/8CCTS/EM (Switch on 4000K)	Stabilization Time(min):	60

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
RHL230303	120.01	60	0.1195	14.18	0.9893	9.68
01-901	276.96	60	0.0595	14.92	0.9052	21.45
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

Chromaticity Measurement - Sphere-Spectroradiometer Method

(Self-absorption:1.110) (4π geometry):

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.01	R1	84	R9	15
Frequency (Hz)	60	R2	93	R10	81
CCT (K)	4071	R3	96	R11	81
Duv	-0.0013	R4	82	R12	64
Chromaticity (x, y)	x = 0.3765 y = 0.3716	R5	83	R13	86
Chromaticity (u', v')	u' = 0.2246 v' = 0.4987	R6	87	R14	98
Color Rendering Index (CRI)	85.0	R7	85	R15	78
R9	15	R8	66	--	--
Rf	84	--	--	--	--
Rg	94	--	--	--	--
Rcs,h1(%)	-12	--	--	--	--

Photometric Measurement – Sphere-Spectroradiometer Method

(Self-absorption:1.110) (4π geometry):

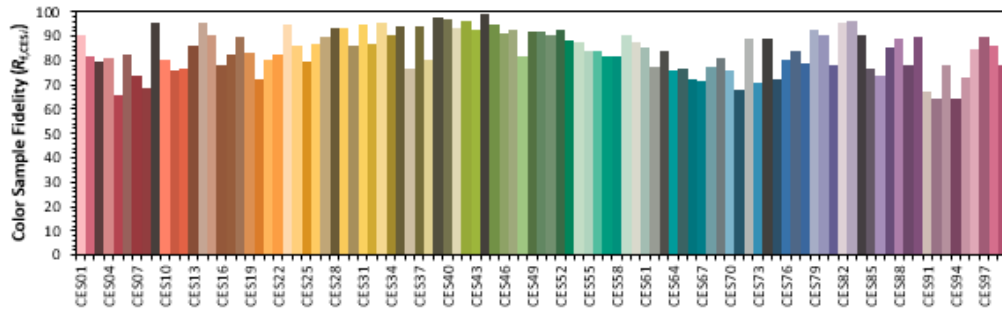
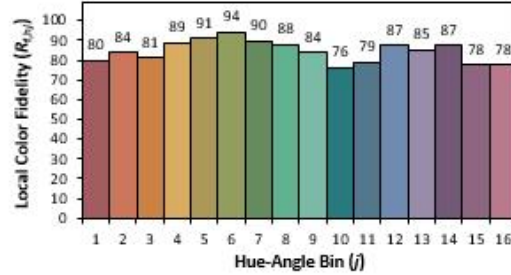
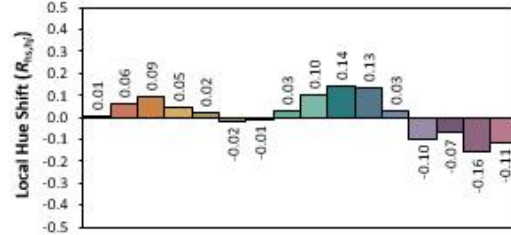
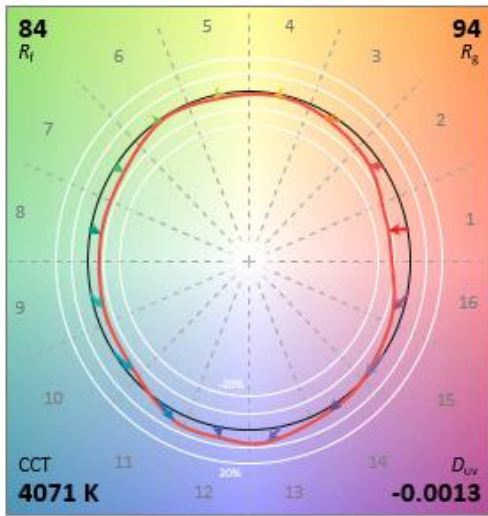
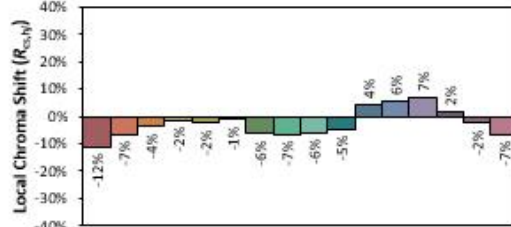
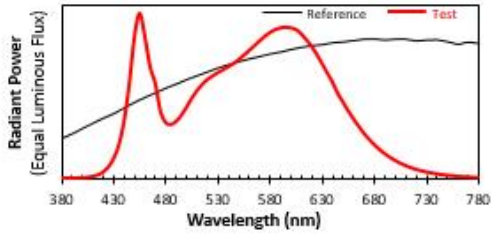
Parameter	Result		DLC V5.1 Pass Criteria
Test Voltage (V)	120.01	276.96	--
Frequency (Hz)	60	60	
Total Luminous (lm)	2192.2	2295.2	Bare Lamp: >= 1600(-10%)
Luminous Efficacy (lm/W)	154.60	153.83	Bare lamp: >= 120(-3%)
Most worst Luminous/Highest Watts	146.93		



Spectral Power Distribution & Chromaticity Diagram

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	0.0060	485	0.3286	590	0.9125	695	0.1323
385	0.0056	490	0.3479	595	0.9163	700	0.1130
390	0.0053	495	0.3845	600	0.9120	705	0.0959
395	0.0063	500	0.4336	605	0.9033	710	0.0817
400	0.0070	505	0.4870	610	0.8776	715	0.0693
405	0.0100	510	0.5334	615	0.8424	720	0.0586
410	0.0149	515	0.5706	620	0.8017	725	0.0499
415	0.0248	520	0.6003	625	0.7541	730	0.0430
420	0.0426	525	0.6222	630	0.6994	735	0.0364
425	0.0730	530	0.6417	635	0.6419	740	0.0309
430	0.1240	535	0.6580	640	0.5877	745	0.0264
435	0.2068	540	0.6774	645	0.5203	750	0.0224
440	0.3495	545	0.6964	650	0.4674	755	0.0193
445	0.5733	550	0.7204	655	0.4145	760	0.0164
450	0.8604	555	0.7467	660	0.3659	765	0.0138
455	1.0000	560	0.7749	665	0.3215	770	0.0119
460	0.8578	565	0.8030	670	0.2793	775	0.0102
465	0.6775	570	0.8323	675	0.2423	780	0.0092
470	0.5762	575	0.8603	680	0.2092		
475	0.4077	580	0.8840	685	0.1804		
480	0.3409	585	0.9013	690	0.1544		

TM-30



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

x **0.3765**
 y **0.3716**
 u' **0.2246**
 v' **0.4987**

CIE 13.3-1995 (CRI)	
R_a	85
R_9	15



2.4 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction HL-WI-EE-001, HL-WI-EE-002)

Test date	2023-03-03	Test Ambient:	25.1 °C
Test Orientation	As intended	Total operation burning time(min):	90
Model Number	15T8/4F/8CCTS/EM (Switch on 5000K)	Stabilization Time(min):	60

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
RHL230303	120.01	60	0.1226	14.56	0.9897	8.86
01-901	276.96	60	0.0608	15.33	0.9107	14.79
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

Chromaticity Measurement - Sphere-Spectroradiometer Method

(Self-absorption:1.110) (4π geometry):

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.01	R1	83	R9	15
Frequency (Hz)	60	R2	92	R10	79
CCT (K)	4864	R3	95	R11	80
Duv	0.0016	R4	81	R12	59
Chromaticity (x, y)	x = 0.3494 y = 0.3583	R5	83	R13	86
Chromaticity (u', v')	u' = 0.2117 v' = 0.4885	R6	87	R14	98
Color Rendering Index (CRI)	85.0	R7	87	R15	78
R9	15	R8	68	--	--
Rf	84	--	--	--	--
Rg	94	--	--	--	--
Rcs,h1(%)	-12	--	--	--	--

Photometric Measurement – Sphere-Spectroradiometer Method

(Self-absorption:1.110) (4π geometry):

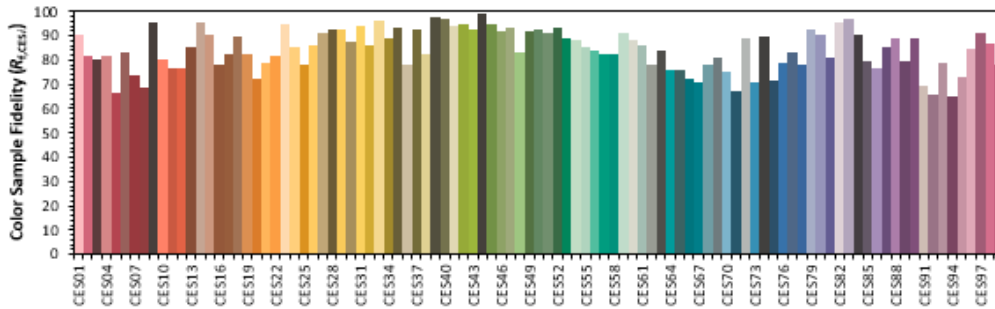
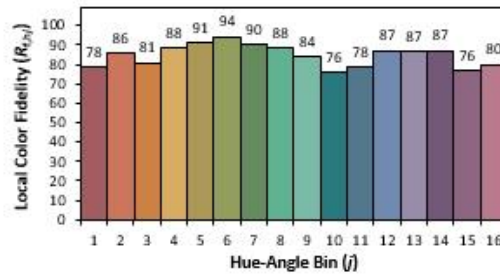
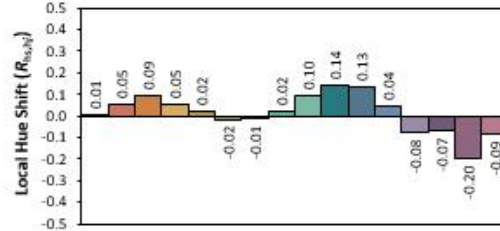
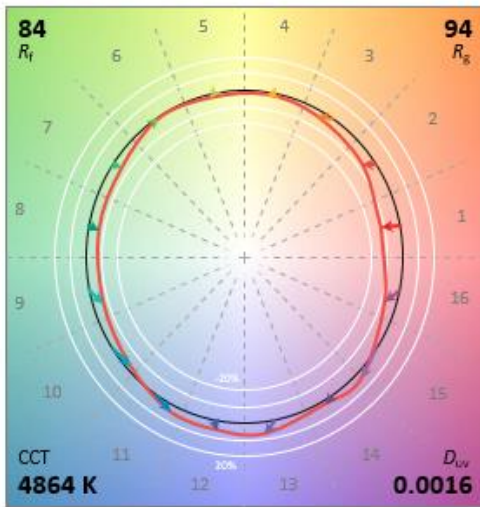
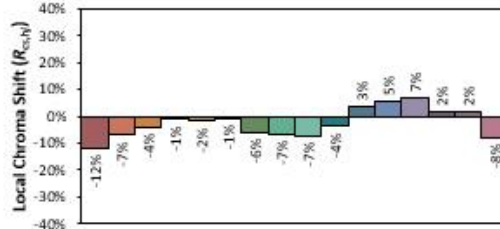
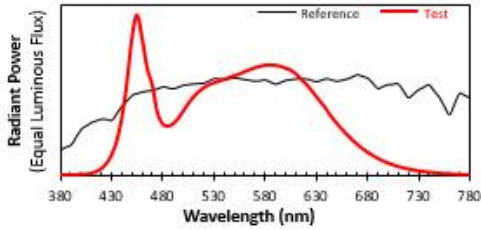
Parameter	Result		DLC V5.1 Pass Criteria
Test Voltage (V)	120.01	276.96	--
Frequency (Hz)	60	60	
Total Luminous (lm)	2183.3	2287.4	Bare Lamp: >= 1600(-10%)
Luminous Efficacy (lm/W)	149.95	149.21	Bare lamp: >= 120(-3%)
Most worst Luminous/Highest Watts	142.42		



Spectral Power Distribution & Chromaticity Diagram

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	0.0066	485	0.3081	590	0.6869	695	0.0946
385	0.0058	490	0.3212	595	0.6814	700	0.0807
390	0.0055	495	0.3529	600	0.6703	705	0.0691
395	0.0060	500	0.3980	605	0.6593	710	0.0586
400	0.0077	505	0.4467	610	0.6372	715	0.0501
405	0.0102	510	0.4872	615	0.6065	720	0.0428
410	0.0148	515	0.5206	620	0.5740	725	0.0363
415	0.0252	520	0.5456	625	0.5380	730	0.0309
420	0.0437	525	0.5641	630	0.4976	735	0.0263
425	0.0751	530	0.5769	635	0.4580	740	0.0225
430	0.1256	535	0.5875	640	0.4173	745	0.0193
435	0.2104	540	0.5980	645	0.3699	750	0.0163
440	0.3509	545	0.6103	650	0.3310	755	0.0138
445	0.5656	550	0.6219	655	0.2945	760	0.0121
450	0.8477	555	0.6317	660	0.2597	765	0.0101
455	0.9998	560	0.6457	665	0.2278	770	0.0088
460	0.8591	565	0.6588	670	0.1987	775	0.0075
465	0.6693	570	0.6706	675	0.1725	780	0.0070
470	0.5658	575	0.6792	680	0.1488		
475	0.3946	580	0.6865	685	0.1288		
480	0.3240	585	0.6892	690	0.1106		

TM-30



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

x **0.3494**
 y **0.3583**
 u' **0.2117**
 v' **0.4885**

CIE 13.3-1995	
(CRI)	
R_a	85
R_9	15



3. Test Equipment

Equipment Name	Model No.	Serial No.	Next Calibration Date
Goniophotometric System	GPM-3000	91N827816	2023-11-03
AC Power Source	CHP-1000	213630	2023-09-16
Total Luminous Flux Standard Lamp	24V150W	24V150W	2023-11-07
Digital Power Meter	WT500	TBS1012 C020506	2023-09-16
Integral Sphere (2M)	2m sphere	N.A	2023-11-03
Digital Power Meter	PF310A	P609877CD1391157	2023-07-01
Optical Color and Electrical Measurement System	HAAS-2000	M108544CM5351115	2023-11-03
Standard Lamp	D204	M133806CJ6391158	2023-11-03
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 *******