

LM-79-19 Test Report

For

Reno LED Lighting Inc

7-615 Denison St, Markham L3R 1B8 Canada

Outdoor Pole/Arm-Mounted Area and Roadway Luminaires

Model Name(s):

RENO-SB-450W-MW-DV-MCCT-G2-R5

Representative (Tested) Model:

RENO-SB-450W-MW-DV-MCCT-G2-R5

Model Difference:

1. Product is wattage tunable, can be tunable from 320W, 350W, 400W and 450W;
2. Product is color tunable, can be tunable from 3000K, 4000K and 5000K;
3. All is the same construction, except function, mount mean and model design.

Prepared by:

Alan Wang

Engineer: Alan Wang

Date: 2024-01-24

Reviewed by:

Vincent Yuan

Technical Lead: Vincent Yuan

Issue Date: 2024-01-24

Revised Date: N/A

Note:

1. The results contained in this report pertain only to the tested samples.
2. This report shall not be reproduced, no limited part or full, without approval of Dongguan New Testing Centre Co., Ltd
3. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the U.S. Government.

Laboratory: Dongguan New Testing Centre Co., Ltd

Address: 3F, No. 1 the 1st North Industry Road, Songshan Lake Science & Technology Park, Dongguan, Guangdong, China

Tel: 86-769-22212079

Website: <http://www.ntc-cert.com>

Client Information:

Applicant Name:	Reno LED Lighting Inc
Brand Name:	RENO
Manufacturer Name:	Reno LED Lighting Inc
Manufacturer Address:	7-615 Denison St, Markham L3R 1B8 Canada

Product Information:

Model Number:	RENO-SB-450W-MW-DV-MCCT-G2-R5				
Product Type:	Outdoor Pole/Arm-Mounted Area and Roadway Luminaires				
Rating Input:	120-347Vac, 50/60Hz, 320W/350W/400W/450W				
Declared CCT:	3000K, 4000K and 5000K				
Declared Light Output:		320W	350W	400W	450W
	3000K	48960 lm	53550 lm	61200 lm	68850 lm
	4000K	52800 lm	57750 lm	66000 lm	74250 lm
	5000K	51200 lm	56000 lm	64000 lm	72000 lm
Declared Efficacy:	3000K: 153 lm/W 4000K: 165 lm/W 5000K: 160 lm/W				
LED Manufacturer:	LUMILEDS				
LED Model:	L130-3070003000X21 and L130-5070003000X21				
LED Driver Manufacturer:	KERHAM				
LED Driver Model:	KHM-NISG200H67M-1100, 2 pcs				

Test Information:

Standard Lamp:	Total Spectral Radiant Flux Standard Lamp, trace to NIST. 1. D908S for Gonio 2. D215S for Integrating Sphere
Date of Receipt Samples:	2023-12-07
Quantity of Receipt Samples:	1 pc
Sample Number:	231207018-S1
Test Representation:	N/A

Laboratory Information:

Test Laboratory:	Dongguan New Testing Centre Co., Ltd
Laboratory Address:	3F, No. 1 the 1 st North Industry Road, Songshan Lake Science & Technology Park, Dongguan, Guangdong, China
Laboratory Contact Name:	Neil Zhong
Laboratory Contact E-mail:	Neil_zhong@ntc-cert.com

Report Information:

Test Report Form:	LM-79_TRF_V1.5
Issued Date of Test Report:	2024-01-24
Revised Date of Test Report:	N/A
Test Report No.:	NTCLR24010184
Remark (If applicable):	1. This report is copied from NTCLR24010033, due to the same product.

Test Specification:	
Date of Test	2023-12-19
Test Item	<ol style="list-style-type: none"> 1. Total Luminous Flux 2. Luminous Distribution Intensity 3. Luminous Efficacy 4. Correlated Color Temperature 5. Color Rendering Index 6. Chromaticity Coordinate 7. Fidelity Index 8. Gamut Index 9. Local Chroma Shift 10. THD and PF
Reference Standard	ANSI/IES LM-79:2019 Optical and Electrical Measurements of Solid-State Lighting Products – Chromaticity Uniformity Measurements ANSI C78.377-2017 Specifications for the Chromaticity of Solid State Lighting Products CIE 13.3-1995 Method of Measuring and Specifying Color Rendering Properties of Light Sources CIE 15-2018 Technical Report Colorimetry ANSI IES TM-30-18 IES Method for Evaluating Light Source Color Rendition IES TM-15-11 Luminaire Classification System for Outdoor Luminaires Addendum A for IES TM-15-11 Backlight, Uplight, and Glare (BUG) Ratings ANSI C82.77-10:2020 Harmonic Emission Limits – Related Power Quality Requirements for Lighting Equipment – Solid State

Test Methods:
<p>1. Photometric and Electrical Measurements – Light Distribution Method:</p> <p>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 required Voltage and Frequency. It was stabilized before measurement was made. Luminous Flux, Luminaire Efficacy and Zonal Lumen were calculated from the software taken at 1° vertical intervals and 15° horizontal intervals.</p>
<p>2. Photometric and Electrical Measurements – Integrating Sphere Method:</p> <p>Photometric parameters were measured using an integrating sphere, as spectroradiometer and software. The ambient temperature condition inside the sphere was measured at 25 °C± 1°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 require Voltage and Frequency. It was stabilized before measurement was made. Chromaticity Coordinates, Correlated Color Temperature and Color Rendering Index were calculated from the spectral radiant flux measurements taken at least 1 nm intervals over the rage of 380 to 780 nm.</p>
<p>3. THD and PF Measurements:</p> <p>The sample was tested according to the ANSI C82.77, the sample was operated at requirement Voltage and Frequency, and was stabilized before measurement. The Total Harmonic Distortion was calculated from the Digital Power Meter.</p>

Integrating Sphere Test Results:

Test Condition:

Test Ambient (°C)	Test Humidity (%)	Orientation	Stabilization Time (minute)	Test Time (minute)
25.4	41.0	Face Down	90	10

Electrical Data:

CCT Setting	Voltage (V)	Frequency (Hz)	Current (A)	Wattage (W)	Power Factor
3000K	120.0	60	3.7266	446.25	0.9979
4000K	120.0	60	3.5817	428.81	0.9977
5000K	120.0	60	3.7114	444.43	0.9979

Color Data:

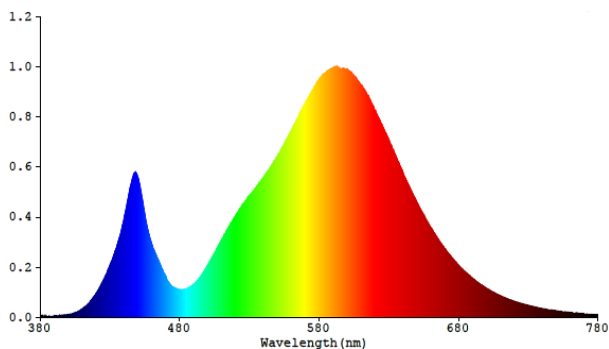
CCT Setting	Test CCT (K)	R _a	R ₉	R _f	R _g	R _{cs, h1}	Chromaticity		
							(x, y)	(u', v')	Duv
3000K	3066	71.9	-31	74	95	-16%	(0.4305, 0.3986)	(0.2488, 0.5183)	-0.0013
4000K	3873	73.6	-23	74	96	-16%	(0.3846, 0.3747)	(0.2287, 0.5013)	-0.0021
5000K	5070	72.1	-27	72	96	-17%	(0.3432, 0.3500)	(0.2107, 0.4836)	0.0000

Specify Color Rendering:

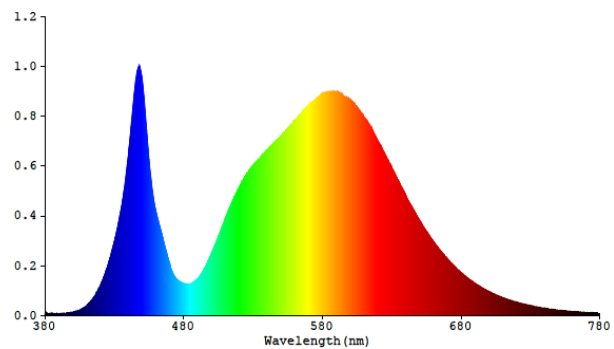
CCT Setting	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
3000K	68	82	93	68	68	75	78	44	-31	58	62	52	71	96	61
4000K	71	80	87	73	71	72	81	54	-23	53	69	48	73	92	66
5000K	70	76	80	73	71	68	80	58	-27	43	70	46	71	89	65

Spectrum Diagram:

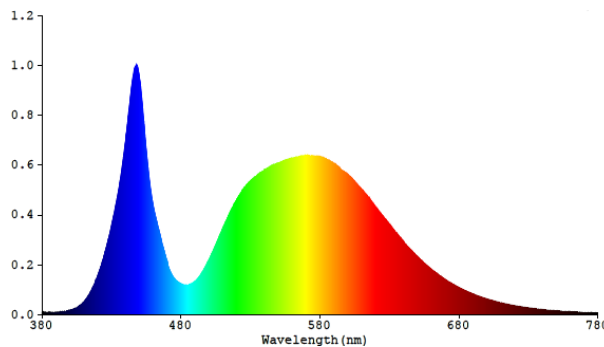
CCT Setting=3000K



CCT Setting=4000K



CCT Setting=5000K



IES TM-30-18 Color Rendition Result (CCT Setting=3000K):

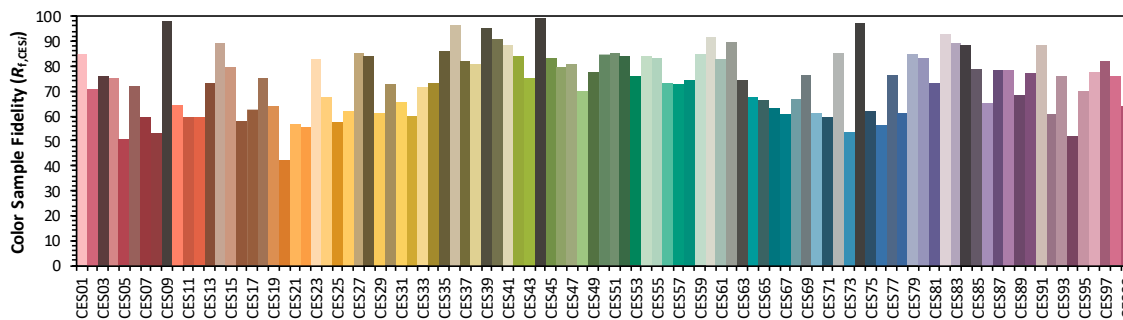
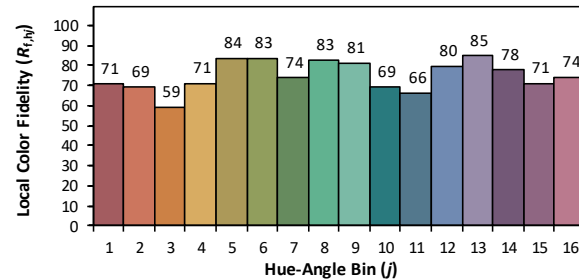
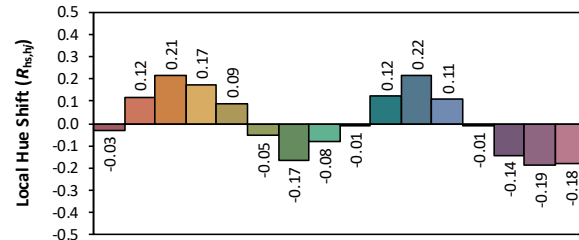
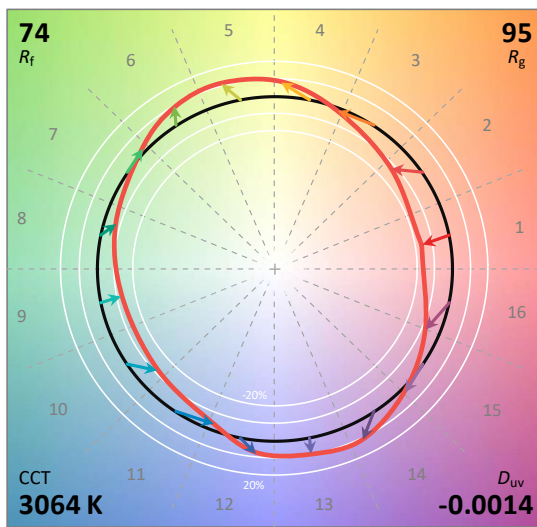
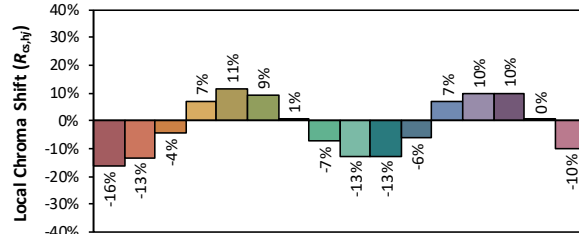
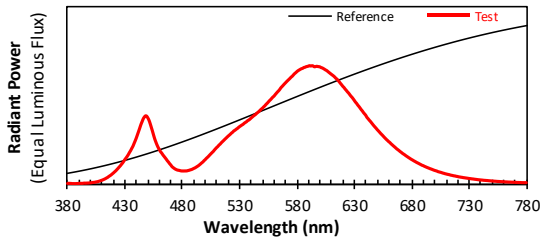
ANSI/IES TM-30-18 Color Rendition Report

Source: 1 CIE F1

Manufacturer: Reno LED Lighting Inc

Date: 2024/1/24

Model: RENO-SB-450W-MW-DV-MCCT-G2-R5



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

x 0.4305
 y 0.3985
 u' 0.2489
 v' 0.5182

CIE 13.3-1995
(CRI)

R_a 72
 R_g -31

Spectrum Data (CCT Setting=3000K):

Spectral Distribution over Visible Wavelength											
WL (nm)	Radiant (W/nm)	WL (nm)	Radiant (W/nm)	WL (nm)	Radiant (W/nm)	WL (nm)	Radiant (W/nm)	WL (nm)	Radiant (W/nm)	WL (nm)	Radiant (W/nm)
380	5.50E-06	447	5.66E-04	514	3.48E-04	581	9.56E-04	648	4.82E-04	715	7.42E-05
381	6.90E-06	448	5.76E-04	515	3.58E-04	582	9.62E-04	649	4.71E-04	716	7.18E-05
382	6.10E-06	449	5.72E-04	516	3.67E-04	583	9.68E-04	650	4.59E-04	717	6.97E-05
383	5.70E-06	450	5.58E-04	517	3.77E-04	584	9.73E-04	651	4.49E-04	718	6.83E-05
384	4.30E-06	451	5.38E-04	518	3.86E-04	585	9.76E-04	652	4.38E-04	719	6.57E-05
385	4.30E-06	452	5.10E-04	519	3.95E-04	586	9.83E-04	653	4.27E-04	720	6.43E-05
386	4.20E-06	453	4.79E-04	520	4.05E-04	587	9.85E-04	654	4.17E-04	721	6.14E-05
387	4.10E-06	454	4.47E-04	521	4.13E-04	588	9.90E-04	655	4.07E-04	722	6.02E-05
388	4.80E-06	455	4.13E-04	522	4.22E-04	589	9.92E-04	656	3.96E-04	723	5.82E-05
389	5.10E-06	456	3.81E-04	523	4.31E-04	590	9.95E-04	657	3.86E-04	724	5.70E-05
390	6.20E-06	457	3.54E-04	524	4.39E-04	591	9.99E-04	658	3.76E-04	725	5.49E-05
391	6.60E-06	458	3.30E-04	525	4.49E-04	592	9.95E-04	659	3.68E-04	726	5.37E-05
392	6.40E-06	459	3.09E-04	526	4.54E-04	593	9.98E-04	660	3.58E-04	727	5.21E-05
393	6.40E-06	460	2.92E-04	527	4.63E-04	594	9.96E-04	661	3.51E-04	728	5.08E-05
394	7.90E-06	461	2.74E-04	528	4.69E-04	595	9.90E-04	662	3.40E-04	729	4.92E-05
395	8.50E-06	462	2.63E-04	529	4.77E-04	596	9.90E-04	663	3.32E-04	730	4.75E-05
396	8.10E-06	463	2.48E-04	530	4.85E-04	597	9.93E-04	664	3.23E-04	731	4.65E-05
397	9.00E-06	464	2.36E-04	531	4.92E-04	598	9.92E-04	665	3.15E-04	732	4.50E-05
398	9.10E-06	465	2.23E-04	532	4.98E-04	599	9.90E-04	666	3.06E-04	733	4.38E-05
399	1.01E-05	466	2.11E-04	533	5.04E-04	600	9.88E-04	667	2.97E-04	734	4.27E-05
400	1.07E-05	467	1.97E-04	534	5.13E-04	601	9.83E-04	668	2.90E-04	735	4.11E-05
401	1.22E-05	468	1.86E-04	535	5.20E-04	602	9.80E-04	669	2.83E-04	736	4.00E-05
402	1.40E-05	469	1.72E-04	536	5.26E-04	603	9.74E-04	670	2.74E-04	737	3.86E-05
403	1.49E-05	470	1.61E-04	537	5.35E-04	604	9.69E-04	671	2.68E-04	738	3.73E-05
404	1.64E-05	471	1.48E-04	538	5.40E-04	605	9.62E-04	672	2.60E-04	739	3.63E-05
405	1.87E-05	472	1.40E-04	539	5.48E-04	606	9.57E-04	673	2.53E-04	740	3.53E-05
406	2.03E-05	473	1.33E-04	540	5.57E-04	607	9.49E-04	674	2.47E-04	741	3.44E-05
407	2.31E-05	474	1.26E-04	541	5.65E-04	608	9.41E-04	675	2.39E-04	742	3.34E-05
408	2.61E-05	475	1.22E-04	542	5.74E-04	609	9.33E-04	676	2.33E-04	743	3.21E-05
409	2.96E-05	476	1.18E-04	543	5.81E-04	610	9.26E-04	677	2.26E-04	744	3.16E-05
410	3.32E-05	477	1.16E-04	544	5.88E-04	611	9.18E-04	678	2.20E-04	745	3.06E-05
411	3.71E-05	478	1.14E-04	545	5.98E-04	612	9.11E-04	679	2.13E-04	746	3.01E-05
412	4.15E-05	479	1.12E-04	546	6.06E-04	613	9.02E-04	680	2.07E-04	747	2.90E-05
413	4.62E-05	480	1.11E-04	547	6.14E-04	614	8.91E-04	681	2.02E-04	748	2.81E-05
414	5.20E-05	481	1.11E-04	548	6.24E-04	615	8.84E-04	682	1.96E-04	749	2.74E-05
415	5.74E-05	482	1.11E-04	549	6.33E-04	616	8.73E-04	683	1.91E-04	750	2.64E-05
416	6.50E-05	483	1.11E-04	550	6.41E-04	617	8.61E-04	684	1.85E-04	751	2.56E-05
417	7.11E-05	484	1.12E-04	551	6.51E-04	618	8.48E-04	685	1.80E-04	752	2.48E-05
418	7.80E-05	485	1.14E-04	552	6.60E-04	619	8.37E-04	686	1.75E-04	753	2.43E-05
419	8.63E-05	486	1.17E-04	553	6.72E-04	620	8.24E-04	687	1.70E-04	754	2.34E-05
420	9.44E-05	487	1.20E-04	554	6.81E-04	621	8.15E-04	688	1.65E-04	755	2.27E-05
421	1.03E-04	488	1.23E-04	555	6.92E-04	622	8.01E-04	689	1.59E-04	756	2.22E-05
422	1.12E-04	489	1.27E-04	556	7.03E-04	623	7.91E-04	690	1.56E-04	757	2.16E-05
423	1.23E-04	490	1.32E-04	557	7.12E-04	624	7.78E-04	691	1.51E-04	758	2.10E-05
424	1.33E-04	491	1.37E-04	558	7.23E-04	625	7.68E-04	692	1.47E-04	759	2.04E-05
425	1.44E-04	492	1.42E-04	559	7.34E-04	626	7.55E-04	693	1.42E-04	760	1.97E-05
426	1.55E-04	493	1.49E-04	560	7.42E-04	627	7.42E-04	694	1.38E-04	761	1.95E-05
427	1.67E-04	494	1.55E-04	561	7.54E-04	628	7.32E-04	695	1.35E-04	762	1.87E-05
428	1.79E-04	495	1.63E-04	562	7.65E-04	629	7.19E-04	696	1.30E-04	763	1.85E-05
429	1.93E-04	496	1.71E-04	563	7.77E-04	630	7.06E-04	697	1.27E-04	764	1.76E-05
430	2.08E-04	497	1.80E-04	564	7.87E-04	631	6.92E-04	698	1.23E-04	765	1.72E-05
431	2.20E-04	498	1.87E-04	565	7.98E-04	632	6.81E-04	699	1.20E-04	766	1.70E-05
432	2.34E-04	499	1.98E-04	566	8.12E-04	633	6.67E-04	700	1.16E-04	767	1.64E-05
433	2.50E-04	500	2.06E-04	567	8.22E-04	634	6.55E-04	701	1.13E-04	768	1.61E-05
434	2.67E-04	501	2.17E-04	568	8.33E-04	635	6.42E-04	702	1.10E-04	769	1.53E-05
435	2.83E-04	502	2.26E-04	569	8.44E-04	636	6.29E-04	703	1.05E-04	770	1.51E-05
436	3.02E-04	503	2.36E-04	570	8.54E-04	637	6.17E-04	704	1.03E-04	771	1.48E-05
437	3.20E-04	504	2.46E-04	571	8.64E-04	638	6.03E-04	705	1.00E-04	772	1.41E-05
438	3.43E-04	505	2.56E-04	572	8.74E-04	639	5.92E-04	706	9.74E-05	773	1.38E-05
439	3.66E-04	506	2.66E-04	573	8.83E-04	640	5.80E-04	707	9.38E-05	774	1.34E-05
440	3.91E-04	507	2.75E-04	574	8.92E-04	641	5.63E-04	708	9.13E-05	775	1.33E-05
441	4.19E-04	508	2.87E-04	575	9.03E-04	642	5.52E-04	709	8.82E-05	776	1.25E-05
442	4.46E-04	509	2.98E-04	576	9.10E-04	643	5.40E-04	710	8.58E-05	777	1.25E-05
443	4.75E-04	510	3.09E-04	577	9.22E-04	644	5.29E-04	711	8.33E-05	778	1.22E-05
444	5.04E-04	511	3.17E-04	578	9.32E-04	645	5.17E-04	712	8.12E-05	779	1.23E-05
445	5.27E-04	512	3.29E-04	579	9.40E-04	646	5.05E-04	713	7.91E-05	780	1.23E-05
446	5.51E-04	513	3.37E-04	580	9.49E-04	647	4.93E-04	714	7.59E-05	N/A	N/A

IES TM-30-18 Color Rendition Result (CCT Setting=4000K):

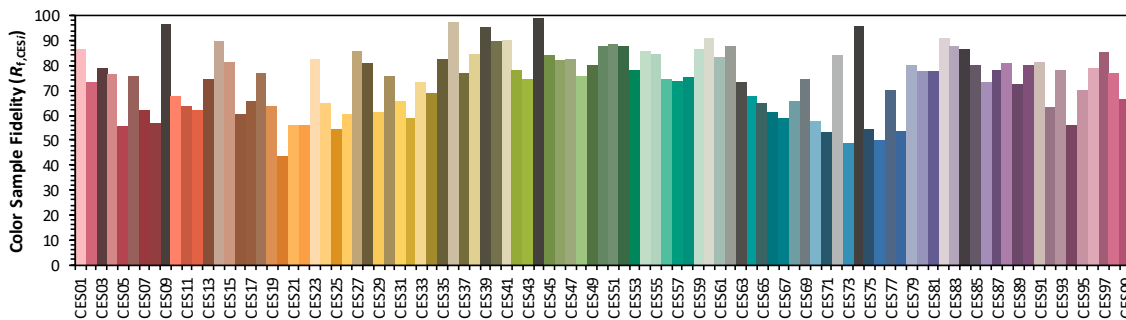
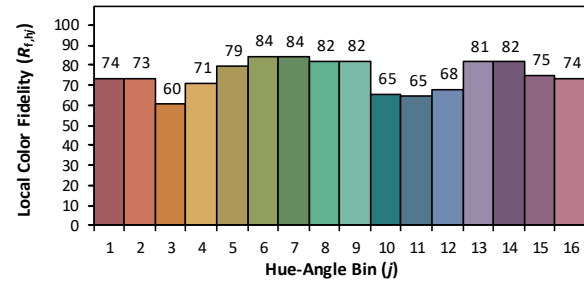
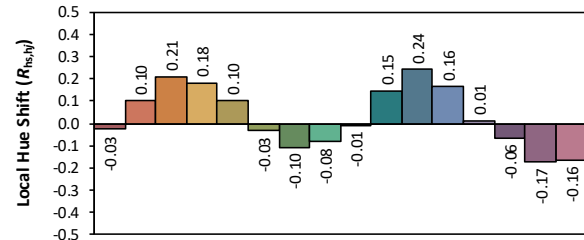
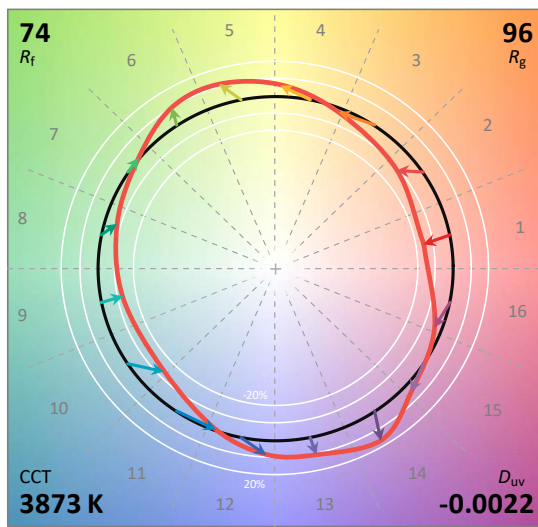
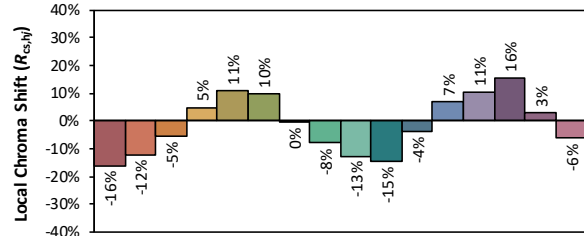
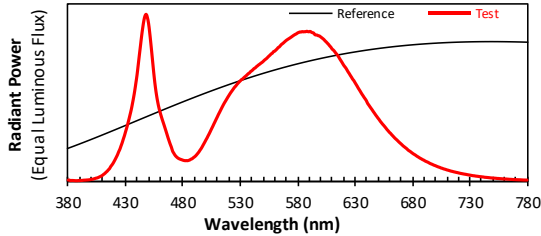
ANSI/IES TM-30-18 Color Rendition Report

Source: 1 CIE F1

Manufacturer: Reno LED Lighting Inc

Date: 2024/1/24

Model: RENO-SB-450W-MW-DV-MCCT-G2-R5



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

x 0.3845
 y 0.3745
 u' 0.2287
 v' 0.5012

CIE 13.3-1995
(CRI)

R_a 74
 R_g -23

Spectrum Data (CCT Setting=4000K):

Spectral Distribution over Visible Wavelength											
WL (nm)	Radiant (W/nm)	WL (nm)	Radiant (W/nm)	WL (nm)	Radiant (W/nm)	WL (nm)	Radiant (W/nm)	WL (nm)	Radiant (W/nm)	WL (nm)	Radiant (W/nm)
380	1.00E-05	447	9.92E-04	514	4.43E-04	581	8.92E-04	648	4.00E-04	715	6.17E-05
381	1.00E-05	448	1.00E-03	515	4.56E-04	582	8.95E-04	649	3.90E-04	716	5.97E-05
382	6.60E-06	449	9.81E-04	516	4.69E-04	583	8.95E-04	650	3.81E-04	717	5.82E-05
383	7.80E-06	450	9.48E-04	517	4.80E-04	584	8.97E-04	651	3.72E-04	718	5.64E-05
384	7.40E-06	451	8.93E-04	518	4.92E-04	585	8.96E-04	652	3.62E-04	719	5.51E-05
385	7.10E-06	452	8.28E-04	519	5.04E-04	586	8.96E-04	653	3.53E-04	720	5.34E-05
386	6.40E-06	453	7.60E-04	520	5.15E-04	587	8.97E-04	654	3.45E-04	721	5.17E-05
387	6.20E-06	454	6.89E-04	521	5.25E-04	588	8.99E-04	655	3.37E-04	722	5.01E-05
388	6.30E-06	455	6.22E-04	522	5.36E-04	589	8.97E-04	656	3.29E-04	723	4.88E-05
389	7.20E-06	456	5.64E-04	523	5.45E-04	590	8.96E-04	657	3.20E-04	724	4.74E-05
390	6.80E-06	457	5.17E-04	524	5.55E-04	591	8.98E-04	658	3.11E-04	725	4.60E-05
391	7.70E-06	458	4.77E-04	525	5.64E-04	592	8.93E-04	659	3.04E-04	726	4.49E-05
392	8.00E-06	459	4.44E-04	526	5.72E-04	593	8.91E-04	660	2.95E-04	727	4.37E-05
393	8.90E-06	460	4.17E-04	527	5.81E-04	594	8.88E-04	661	2.89E-04	728	4.23E-05
394	9.50E-06	461	3.94E-04	528	5.89E-04	595	8.79E-04	662	2.81E-04	729	4.10E-05
395	9.70E-06	462	3.71E-04	529	5.96E-04	596	8.77E-04	663	2.74E-04	730	3.98E-05
396	1.04E-05	463	3.50E-04	530	6.03E-04	597	8.76E-04	664	2.67E-04	731	3.86E-05
397	1.08E-05	464	3.29E-04	531	6.10E-04	598	8.72E-04	665	2.59E-04	732	3.73E-05
398	1.16E-05	465	3.08E-04	532	6.14E-04	599	8.71E-04	666	2.53E-04	733	3.61E-05
399	1.25E-05	466	2.86E-04	533	6.21E-04	600	8.66E-04	667	2.47E-04	734	3.55E-05
400	1.37E-05	467	2.63E-04	534	6.27E-04	601	8.61E-04	668	2.40E-04	735	3.42E-05
401	1.49E-05	468	2.43E-04	535	6.33E-04	602	8.55E-04	669	2.33E-04	736	3.33E-05
402	1.67E-05	469	2.23E-04	536	6.39E-04	603	8.49E-04	670	2.27E-04	737	3.25E-05
403	1.86E-05	470	2.05E-04	537	6.46E-04	604	8.41E-04	671	2.21E-04	738	3.14E-05
404	2.10E-05	471	1.83E-04	538	6.50E-04	605	8.35E-04	672	2.14E-04	739	3.05E-05
405	2.25E-05	472	1.71E-04	539	6.58E-04	606	8.27E-04	673	2.09E-04	740	2.99E-05
406	2.49E-05	473	1.60E-04	540	6.63E-04	607	8.20E-04	674	2.03E-04	741	2.89E-05
407	2.82E-05	474	1.52E-04	541	6.69E-04	608	8.11E-04	675	1.98E-04	742	2.83E-05
408	3.14E-05	475	1.45E-04	542	6.76E-04	609	8.04E-04	676	1.92E-04	743	2.68E-05
409	3.49E-05	476	1.40E-04	543	6.80E-04	610	7.94E-04	677	1.86E-04	744	2.63E-05
410	3.94E-05	477	1.37E-04	544	6.87E-04	611	7.88E-04	678	1.82E-04	745	2.57E-05
411	4.50E-05	478	1.34E-04	545	6.92E-04	612	7.80E-04	679	1.76E-04	746	2.50E-05
412	5.01E-05	479	1.31E-04	546	6.98E-04	613	7.71E-04	680	1.71E-04	747	2.43E-05
413	5.72E-05	480	1.29E-04	547	7.03E-04	614	7.63E-04	681	1.66E-04	748	2.34E-05
414	6.31E-05	481	1.27E-04	548	7.09E-04	615	7.54E-04	682	1.62E-04	749	2.28E-05
415	7.14E-05	482	1.26E-04	549	7.13E-04	616	7.43E-04	683	1.58E-04	750	2.20E-05
416	7.82E-05	483	1.26E-04	550	7.19E-04	617	7.31E-04	684	1.53E-04	751	2.18E-05
417	9.04E-05	484	1.26E-04	551	7.26E-04	618	7.21E-04	685	1.49E-04	752	2.12E-05
418	9.94E-05	485	1.28E-04	552	7.32E-04	619	7.10E-04	686	1.44E-04	753	2.06E-05
419	1.09E-04	486	1.30E-04	553	7.37E-04	620	6.98E-04	687	1.40E-04	754	1.97E-05
420	1.21E-04	487	1.35E-04	554	7.44E-04	621	6.89E-04	688	1.36E-04	755	1.95E-05
421	1.34E-04	488	1.37E-04	555	7.51E-04	622	6.80E-04	689	1.32E-04	756	1.88E-05
422	1.48E-04	489	1.43E-04	556	7.57E-04	623	6.69E-04	690	1.29E-04	757	1.83E-05
423	1.62E-04	490	1.48E-04	557	7.64E-04	624	6.57E-04	691	1.25E-04	758	1.78E-05
424	1.79E-04	491	1.54E-04	558	7.68E-04	625	6.47E-04	692	1.21E-04	759	1.72E-05
425	1.94E-04	492	1.62E-04	559	7.78E-04	626	6.35E-04	693	1.18E-04	760	1.68E-05
426	2.14E-04	493	1.70E-04	560	7.80E-04	627	6.25E-04	694	1.15E-04	761	1.65E-05
427	2.32E-04	494	1.79E-04	561	7.87E-04	628	6.13E-04	695	1.11E-04	762	1.63E-05
428	2.55E-04	495	1.90E-04	562	7.93E-04	629	6.05E-04	696	1.08E-04	763	1.56E-05
429	2.75E-04	496	1.99E-04	563	8.02E-04	630	5.93E-04	697	1.05E-04	764	1.51E-05
430	2.99E-04	497	2.11E-04	564	8.06E-04	631	5.81E-04	698	1.02E-04	765	1.45E-05
431	3.22E-04	498	2.24E-04	565	8.13E-04	632	5.70E-04	699	9.87E-05	766	1.44E-05
432	3.48E-04	499	2.36E-04	566	8.21E-04	633	5.58E-04	700	9.63E-05	767	1.38E-05
433	3.75E-04	500	2.49E-04	567	8.26E-04	634	5.47E-04	701	9.33E-05	768	1.32E-05
434	4.03E-04	501	2.61E-04	568	8.32E-04	635	5.36E-04	702	9.03E-05	769	1.30E-05
435	4.33E-04	502	2.75E-04	569	8.38E-04	636	5.25E-04	703	8.78E-05	770	1.26E-05
436	4.67E-04	503	2.88E-04	570	8.44E-04	637	5.14E-04	704	8.56E-05	771	1.22E-05
437	5.04E-04	504	3.02E-04	571	8.49E-04	638	5.04E-04	705	8.23E-05	772	1.21E-05
438	5.45E-04	505	3.17E-04	572	8.53E-04	639	4.94E-04	706	8.05E-05	773	1.17E-05
439	5.91E-04	506	3.31E-04	573	8.58E-04	640	4.83E-04	707	7.76E-05	774	1.16E-05
440	6.39E-04	507	3.45E-04	574	8.62E-04	641	4.69E-04	708	7.56E-05	775	1.11E-05
441	6.97E-04	508	3.59E-04	575	8.67E-04	642	4.59E-04	709	7.37E-05	776	1.08E-05
442	7.56E-04	509	3.74E-04	576	8.72E-04	643	4.49E-04	710	7.11E-05	777	1.03E-05
443	8.14E-04	510	3.88E-04	577	8.77E-04	644	4.39E-04	711	6.93E-05	778	1.02E-05
444	8.72E-04	511	4.03E-04	578	8.81E-04	645	4.30E-04	712	6.73E-05	779	1.01E-05
445	9.22E-04	512	4.16E-04	579	8.84E-04	646	4.19E-04	713	6.51E-05	780	1.01E-05
446	9.65E-04	513	4.30E-04	580	8.89E-04	647	4.10E-04	714	6.31E-05	N/A	N/A

IES TM-30-18 Color Rendition Result (CCT Setting=5000K):

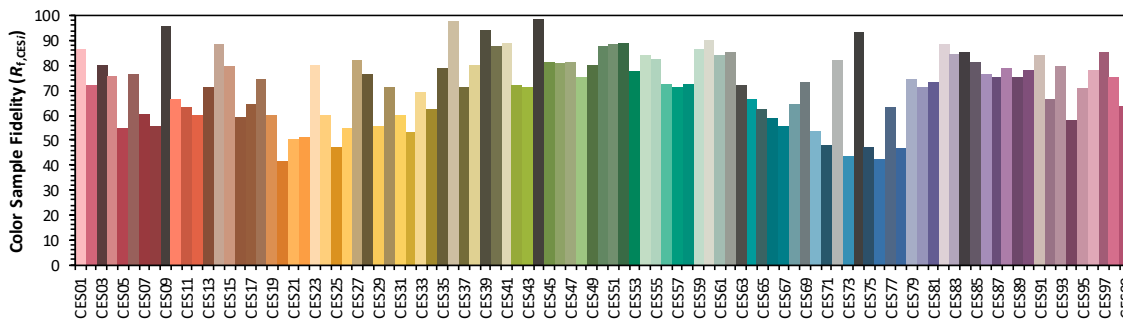
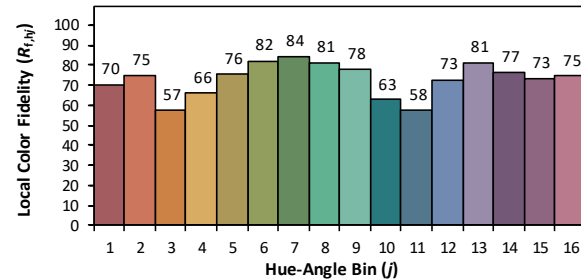
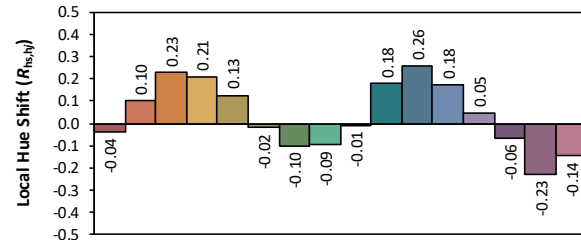
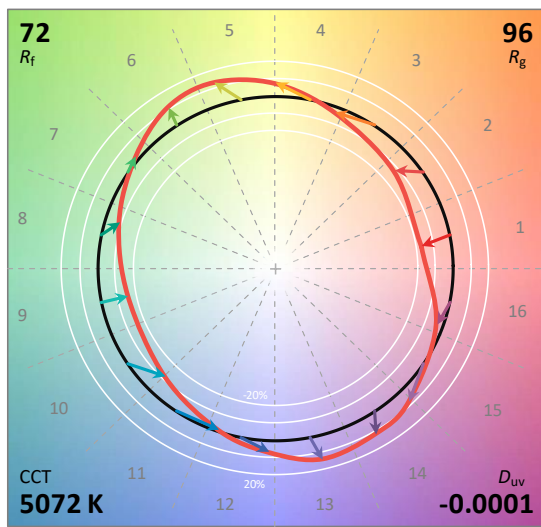
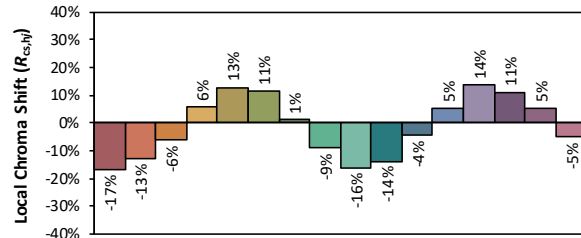
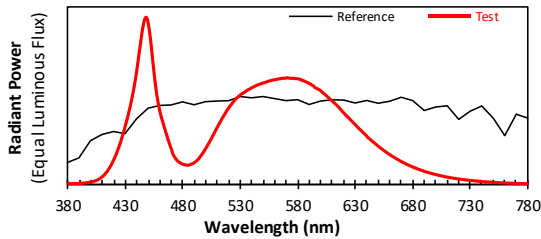
ANSI/IES TM-30-18 Color Rendition Report

Source: 1 CIE F1

Manufacturer: Reno LED Lighting Inc

Date: 2024/1/24

Model: RENO-SB-450W-MW-DV-MCCT-G2-R5



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

x 0.3431
 y 0.3498
 u' 0.2108
 v' 0.4835

CIE 13.3-1995
(CRI)

R_a 72
 R_g -27

Spectrum Data (CCT Setting=5000K):

Spectral Distribution over Visible Wavelength											
WL (nm)	Radiant (W/nm)	WL (nm)	Radiant (W/nm)	WL (nm)	Radiant (W/nm)	WL (nm)	Radiant (W/nm)	WL (nm)	Radiant (W/nm)	WL (nm)	Radiant (W/nm)
380	9.80E-06	447	9.94E-04	514	3.95E-04	581	6.32E-04	648	2.44E-04	715	4.14E-05
381	8.60E-06	448	1.00E-03	515	4.06E-04	582	6.31E-04	649	2.38E-04	716	3.99E-05
382	8.80E-06	449	9.87E-04	516	4.17E-04	583	6.27E-04	650	2.33E-04	717	3.89E-05
383	7.30E-06	450	9.54E-04	517	4.28E-04	584	6.25E-04	651	2.28E-04	718	3.80E-05
384	7.90E-06	451	9.08E-04	518	4.40E-04	585	6.21E-04	652	2.22E-04	719	3.68E-05
385	9.00E-06	452	8.52E-04	519	4.50E-04	586	6.19E-04	653	2.16E-04	720	3.60E-05
386	9.10E-06	453	7.88E-04	520	4.60E-04	587	6.16E-04	654	2.12E-04	721	3.47E-05
387	7.90E-06	454	7.21E-04	521	4.69E-04	588	6.12E-04	655	2.06E-04	722	3.38E-05
388	8.80E-06	455	6.58E-04	522	4.79E-04	589	6.10E-04	656	2.01E-04	723	3.29E-05
389	8.60E-06	456	6.01E-04	523	4.87E-04	590	6.05E-04	657	1.96E-04	724	3.20E-05
390	8.90E-06	457	5.48E-04	524	4.97E-04	591	6.03E-04	658	1.92E-04	725	3.13E-05
391	9.70E-06	458	5.05E-04	525	5.04E-04	592	5.97E-04	659	1.87E-04	726	3.03E-05
392	9.70E-06	459	4.68E-04	526	5.12E-04	593	5.94E-04	660	1.82E-04	727	2.96E-05
393	1.18E-05	460	4.36E-04	527	5.19E-04	594	5.89E-04	661	1.78E-04	728	2.86E-05
394	1.07E-05	461	4.09E-04	528	5.24E-04	595	5.81E-04	662	1.73E-04	729	2.81E-05
395	1.19E-05	462	3.85E-04	529	5.31E-04	596	5.77E-04	663	1.69E-04	730	2.72E-05
396	1.29E-05	463	3.62E-04	530	5.36E-04	597	5.75E-04	664	1.65E-04	731	2.64E-05
397	1.35E-05	464	3.39E-04	531	5.42E-04	598	5.70E-04	665	1.61E-04	732	2.58E-05
398	1.50E-05	465	3.16E-04	532	5.46E-04	599	5.68E-04	666	1.57E-04	733	2.50E-05
399	1.69E-05	466	2.94E-04	533	5.51E-04	600	5.62E-04	667	1.53E-04	734	2.45E-05
400	1.76E-05	467	2.71E-04	534	5.54E-04	601	5.55E-04	668	1.49E-04	735	2.35E-05
401	1.93E-05	468	2.51E-04	535	5.61E-04	602	5.51E-04	669	1.45E-04	736	2.30E-05
402	2.08E-05	469	2.30E-04	536	5.64E-04	603	5.45E-04	670	1.41E-04	737	2.26E-05
403	2.33E-05	470	2.13E-04	537	5.68E-04	604	5.39E-04	671	1.37E-04	738	2.18E-05
404	2.57E-05	471	1.88E-04	538	5.72E-04	605	5.33E-04	672	1.34E-04	739	2.11E-05
405	2.72E-05	472	1.75E-04	539	5.75E-04	606	5.26E-04	673	1.31E-04	740	2.06E-05
406	3.18E-05	473	1.63E-04	540	5.81E-04	607	5.20E-04	674	1.27E-04	741	2.02E-05
407	3.57E-05	474	1.54E-04	541	5.83E-04	608	5.13E-04	675	1.24E-04	742	1.95E-05
408	3.96E-05	475	1.46E-04	542	5.87E-04	609	5.08E-04	676	1.20E-04	743	1.89E-05
409	4.51E-05	476	1.39E-04	543	5.90E-04	610	5.01E-04	677	1.17E-04	744	1.86E-05
410	5.03E-05	477	1.34E-04	544	5.93E-04	611	4.96E-04	678	1.14E-04	745	1.78E-05
411	5.67E-05	478	1.30E-04	545	5.97E-04	612	4.89E-04	679	1.11E-04	746	1.74E-05
412	6.45E-05	479	1.26E-04	546	5.98E-04	613	4.83E-04	680	1.08E-04	747	1.71E-05
413	7.29E-05	480	1.23E-04	547	6.01E-04	614	4.76E-04	681	1.05E-04	748	1.66E-05
414	8.07E-05	481	1.21E-04	548	6.03E-04	615	4.69E-04	682	1.03E-04	749	1.62E-05
415	9.13E-05	482	1.19E-04	549	6.06E-04	616	4.62E-04	683	9.96E-05	750	1.58E-05
416	1.02E-04	483	1.19E-04	550	6.08E-04	617	4.54E-04	684	9.68E-05	751	1.54E-05
417	1.14E-04	484	1.18E-04	551	6.10E-04	618	4.47E-04	685	9.45E-05	752	1.51E-05
418	1.26E-04	485	1.18E-04	552	6.12E-04	619	4.38E-04	686	9.19E-05	753	1.46E-05
419	1.41E-04	486	1.21E-04	553	6.15E-04	620	4.32E-04	687	8.94E-05	754	1.40E-05
420	1.54E-04	487	1.23E-04	554	6.17E-04	621	4.25E-04	688	8.73E-05	755	1.38E-05
421	1.70E-04	488	1.26E-04	555	6.20E-04	622	4.16E-04	689	8.47E-05	756	1.33E-05
422	1.86E-04	489	1.29E-04	556	6.22E-04	623	4.10E-04	690	8.23E-05	757	1.28E-05
423	2.05E-04	490	1.33E-04	557	6.23E-04	624	4.03E-04	691	8.01E-05	758	1.27E-05
424	2.23E-04	491	1.38E-04	558	6.25E-04	625	3.96E-04	692	7.76E-05	759	1.22E-05
425	2.43E-04	492	1.44E-04	559	6.27E-04	626	3.89E-04	693	7.58E-05	760	1.20E-05
426	2.63E-04	493	1.51E-04	560	6.27E-04	627	3.82E-04	694	7.41E-05	761	1.18E-05
427	2.86E-04	494	1.58E-04	561	6.29E-04	628	3.75E-04	695	7.20E-05	762	1.14E-05
428	3.08E-04	495	1.68E-04	562	6.30E-04	629	3.69E-04	696	7.02E-05	763	1.11E-05
429	3.33E-04	496	1.76E-04	563	6.32E-04	630	3.62E-04	697	6.80E-05	764	1.08E-05
430	3.60E-04	497	1.86E-04	564	6.33E-04	631	3.54E-04	698	6.61E-05	765	1.05E-05
431	3.85E-04	498	1.96E-04	565	6.34E-04	632	3.47E-04	699	6.44E-05	766	1.03E-05
432	4.10E-04	499	2.08E-04	566	6.36E-04	633	3.40E-04	700	6.27E-05	767	1.00E-05
433	4.39E-04	500	2.19E-04	567	6.36E-04	634	3.33E-04	701	6.12E-05	768	9.90E-06
434	4.67E-04	501	2.30E-04	568	6.37E-04	635	3.27E-04	702	5.92E-05	769	9.30E-06
435	4.99E-04	502	2.43E-04	569	6.37E-04	636	3.20E-04	703	5.73E-05	770	9.00E-06
436	5.33E-04	503	2.54E-04	570	6.37E-04	637	3.14E-04	704	5.61E-05	771	9.00E-06
437	5.68E-04	504	2.67E-04	571	6.40E-04	638	3.07E-04	705	5.43E-05	772	8.70E-06
438	6.07E-04	505	2.79E-04	572	6.38E-04	639	3.00E-04	706	5.32E-05	773	8.50E-06
439	6.49E-04	506	2.92E-04	573	6.37E-04	640	2.94E-04	707	5.16E-05	774	8.20E-06
440	6.94E-04	507	3.05E-04	574	6.36E-04	641	2.84E-04	708	5.00E-05	775	7.90E-06
441	7.44E-04	508	3.19E-04	575	6.37E-04	642	2.79E-04	709	4.85E-05	776	7.90E-06
442	7.97E-04	509	3.31E-04	576	6.36E-04	643	2.73E-04	710	4.72E-05	777	7.60E-06
443	8.43E-04	510	3.46E-04	577	6.35E-04	644	2.67E-04	711	4.61E-05	778	7.60E-06
444	8.95E-04	511	3.57E-04	578	6.34E-04	645	2.61E-04	712	4.46E-05	779	7.60E-06
445	9.37E-04	512	3.70E-04	579	6.34E-04	646	2.56E-04	713	4.35E-05	780	7.60E-06
446	9.72E-04	513	3.81E-04	580	6.33E-04	647	2.50E-04	714	4.26E-05	N/A	N/A

Goniophotometer Test Results:

Test Condition:

Test Ambient (°C)	Test Humidity (%)	Orientation	Stabilization Time (minute)	Test Time (minute)
24.8	41.9	Face Down	90	25

Electrical Data:

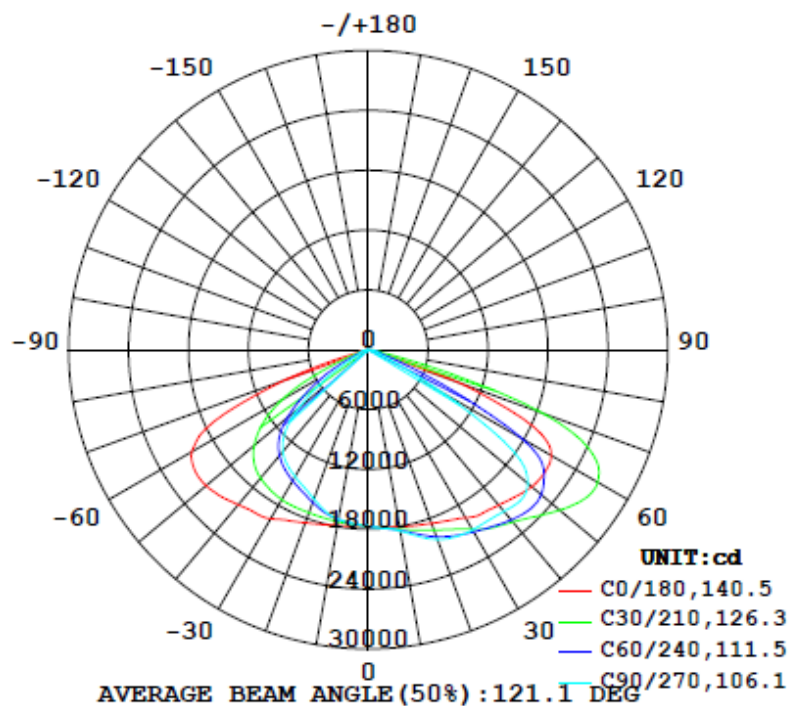
Voltage (V)	Frequency (Hz)	Current (A)	Wattage (W)	Power Factor
120.0	60	3.7266	446.25	0.9979

Goniophotometer Data:

Parameter	Results		
	3000K	4000K	5000K
Total Luminous (lm)	69125.1	74475.6	70799.1
Luminous Efficacy (lm/W)	154.90	173.68	159.30
Zonal Lumens Distribution (0-90°)	100.0%	100.0%	100.0%
Zonal Lumens Distribution (80-90°)	0.4%	0.4%	0.4%
Beam Angle (°)	121.1	121.3	121.3
BUG	B5-U0-G4	B5-U0-G4	B5-U0-G4

Luminous Intensity Distribution Diagram (CCT Setting=3000K):

LUMINOUS INTENSITY DISTRIBUTION DIAGRAM

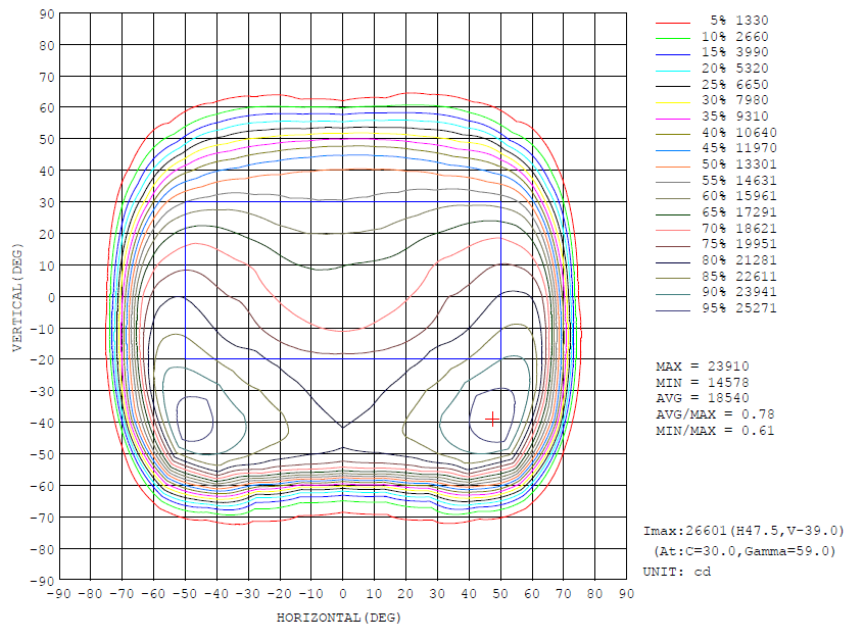


Zonal Flux Diagram (CCT Setting=3000K):

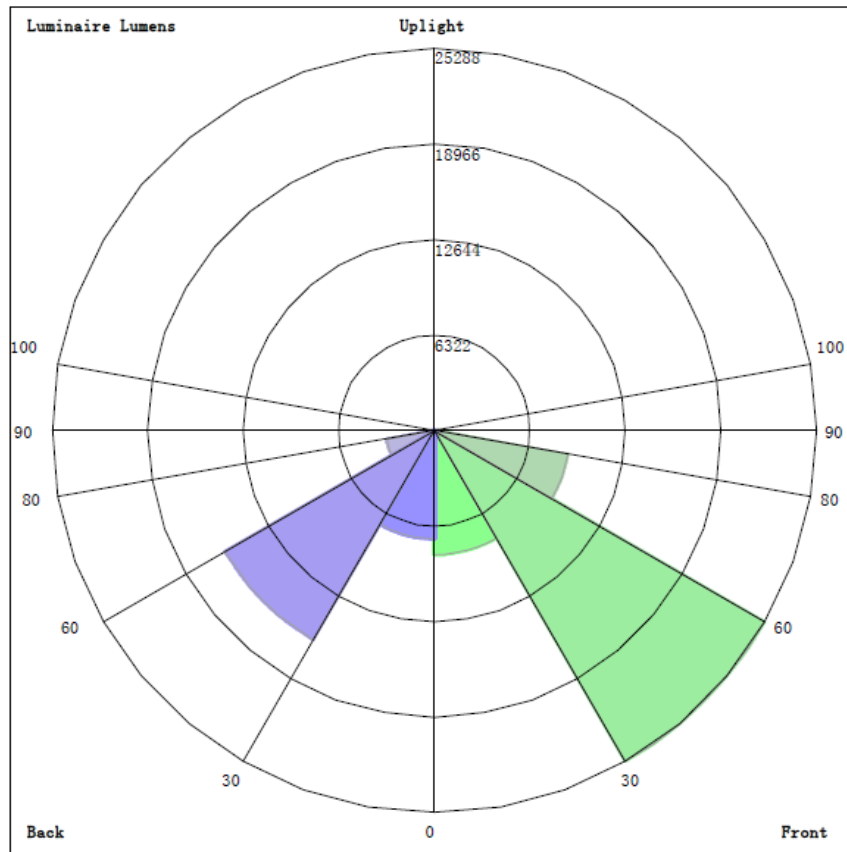
ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	zone	total	%lum,Lamp
10	1804	1834	1844	1830	1790	1736	1726	1753	0- 10	1699	1699	2.46,2.46
20	1852	1962	2023	1960	1846	1679	1592	1703	10- 20	5133	6833	9.88,9.88
30	1946	2114	2085	2129	1956	1602	1468	1632	20- 30	8545	15377	22.2,22.2
40	2032	2277	2115	2275	2028	1492	1333	1524	30- 40	11813	27190	39.3,39.3
50	2137	2427	2083	2426	2121	1225	916.4	1262	40- 50	14508	41699	60.3,60.3
60	2117	2341	842.3	2362	2040	658.9	248.6	692.2	50- 60	14943	56642	81.9,81.9
70	982.7	969.8	118.6	1026	894.8	114.4	88.85	114.5	60- 70	9852	66494	96.2,96.2
80	58.03	68.21	62.66	66.33	58.06	33.27	35.93	34.07	70- 80	2334	68828	99.6,99.6
90	0	0	0	0	0	0	0	0	80- 90	296.9	69125	100,100
100	0	0	0	0	0	0	0	0	90-100	0	69125	100,100
110	0	0	0	0	0	0	0	0	100-110	0	69125	100,100
120	0	0	0	0	0	0	0	0	110-120	0	69125	100,100
130	0	0	0	0	0	0	0	0	120-130	0	69125	100,100
140	0	0	0	0	0	0	0	0	130-140	0	69125	100,100
150	0	0	0	0	0	0	0	0	140-150	0	69125	100,100
160	0	0	0	0	0	0	0	0	150-160	0	69125	100,100
170	0	0	0	0	0	0	0	0	160-170	0	69125	100,100
180	0	0	0	0	0	0	0	0	170-180	0	69125	100,100
DEG	LUMINOUS INTENSITY:×10cd									UNIT:lm		

Isocandela Diagram (CCT Setting=3000K):



BUG Rating (CCT Setting=3000K):



LUMINAIRE CLASSIFICATION SYSTEM (LCS)

	Lumens	% Lamp	% Luminaire
FL - Front-Low (0-30)	8210.4	N.A.	11.9
FM - Front-Medium (30-60)	25288.4	N.A.	36.6
FH - Front-High (60-80)	8969.3	N.A.	13.0
FVH - Front-Very High (80-90)	208.8	N.A.	0.3
BL - Back-Low (0-30)	7167.1	N.A.	10.4
BM - Back-Medium (30-60)	15976.2	N.A.	23.1
BH - Back-High (60-80)	3216.8	N.A.	4.7
BVH - Back-Very High (80-90)	88.0	N.A.	0.1
UL - Uplight-Low (90-100)	0.0	N.A.	0.0
UH - Uplight-High (100-180)	0.0	N.A.	0.0
Total	69125.0	N.A.	100.0
BUG Rating	B5-U0-G4		

THD and PF Measurement Test Results:

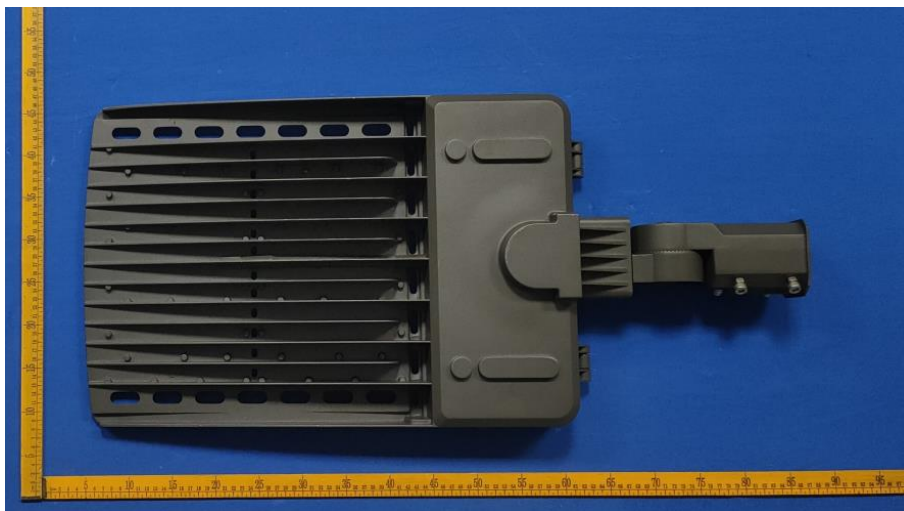
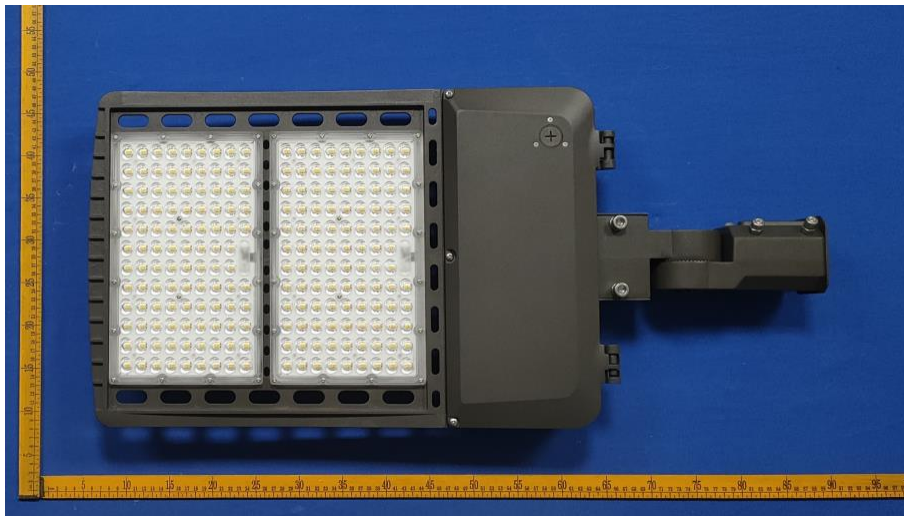
Electrical Measurement:

CCT Setting	Voltage (V)	Frequency (Hz)	Current (A)	Wattage (W)	Power Factor	iTHD(%)
3000K	120.0	60	3.7266	446.25	0.9979	6.23
	277.0	60	1.6310	439.60	0.9730	8.69
	347.0	60	1.3373	438.30	0.9445	11.13
4000K	120.0	60	3.5817	428.81	0.9977	6.74
	277.0	60	1.5662	421.70	0.9720	9.06
	347.0	60	1.2885	420.50	0.9405	11.56
5000K	120.0	60	3.7114	444.43	0.9979	7.03
	277.0	60	1.6207	436.80	0.9730	9.11
	347.0	60	1.3293	435.20	0.9435	11.90

Annex:

ANSI CCT Quadrangle (omit any outside product range)/Worst-Case Value	Actual CCT (K)	Power Consumption (W)	Lumen Output (lm)	Efficacy (lm/W)	Input Control Signal Applied
3000K	3066	446.25	69125.1	154.90	Set Switch 0% to 3000K
4000K	3873	428.81	74475.6	173.68	Set Switch 50% to 4000K
5000K	5070	444.43	70799.1	159.30	Set Switch 100% to 5000K
Lowest Efficacy	154.90 lm/W (@3000K)				
Maximum Power	446.25 W				

Photo of Sample:



Equipment List:

Equipment ID	Equipment Name	Last Cal.	Due Cal.
NTC-F01-001	Goniophotometer System	2023-11-08	2024-11-07
NTC-F01-006	2.0 meter Integrating Sphere	2023-11-08	2024-11-07
NTC-F01-012	Standard Lamp	2023-11-02	2024-11-01
NTC-F01-013	Standard Lamp	2023-11-02	2024-11-01
NTC-F01-031	Digital Power Meter	2023-08-25	2024-08-24
NTC-F01-020	Temperature & Humidity Meter	2023-11-06	2024-11-05

*******End of Report*******