LM-79-08 Test Report

For

Reno LED Lighting Inc

(Brand Name: RENO)

615 Denison unit 5 Markham L3R 1B8 CA

High Bay Luminaires (Commercial and Industrial)

Model name(s):
RENO-HBU-240W-DV-XK-R2-ECO [@]
Remark: [@] - XK" can be 3K, 4K, 5K to indicate color temperature

Representative (Tested) Model:
RENO-HBU-240W-DV-XK-R2-ECO [@](0%,3500K)
RENO-HBU-240W-DV-XK-R2-ECO [@](50%,4000K)
RENO-HBU-240W-DV-XK-R2-ECO [@](100%,5000K)

Model Different: N/A

Test & Report By:

Ferrum Li

Engineer: Ferrum Li

Date: May.23,2023

Review By:

Garman Mo

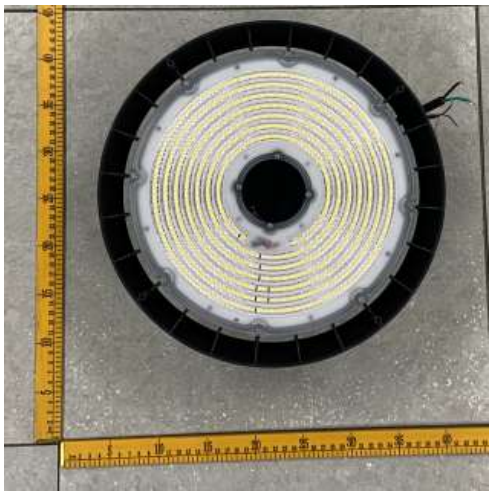
Manager: Garman Mo

Note: 1.The results contained in this report pertain only to the tested samples.
2.This report does not imply product certification, approval, or endorsement by A2LA, or any agency of the Federal Government.

1.1 Product Information:

Organization Name	Reno LED Lighting Inc	
Brand Name	RENO	
Model Number	RENO-HBU-240W-DV-XK-R2-ECO [@]	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	High Bay Luminaires (Commercial and Industrial)	
Rated Voltage / Frequency	120-347 Vac, 50/60 Hz	
Nominal Power	150W/200W/240W	
Rated Initial Lamp Lumen	--	
Declared CCT	3500K,4000K,5000K	
LED Manufacturer	Lumileds Holding B.V.	
LED Model	L128-3580RB35001M1 L128-5080RB35001M1	
Integral Controls Availability	Yes	
Dimming	Continuous	
Sample Number	JDE230312-C1	
Luminaire Aperture (for downlights)	--	in.
Luminaire Length	--	mm
Luminaires Width	--	mm
Number of Units (modular products)	N/A	s

Photo



1.2 Test Specifications:

Date of Receipt	May.20,2023
Date of Test	May.22,2023
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 C78.377-2017 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

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.
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.

2.1 Electrical, Photometric and Chromaticity Measurements

Test date	2023-05-22	Test Ambient:	25±1 ℃
Test Orientation	As intended	Stabilization Time (min)	60
Model Number	RENO-HBU-240W-DV-XK-R2-ECO [@](0%,3500K)	Total Operating Time (min)	75

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JDE230312-C1	120.0	60	1.955	234.1	0.9981	2.91
	346.9	60	0.7245	231.4	0.9206	16.82
				DLC Pass Criteria	>= 0.9(-3%)	<= 20(+5)

Photometric Measurement – Goniophotometer Method(Test Distance: 26.000m):

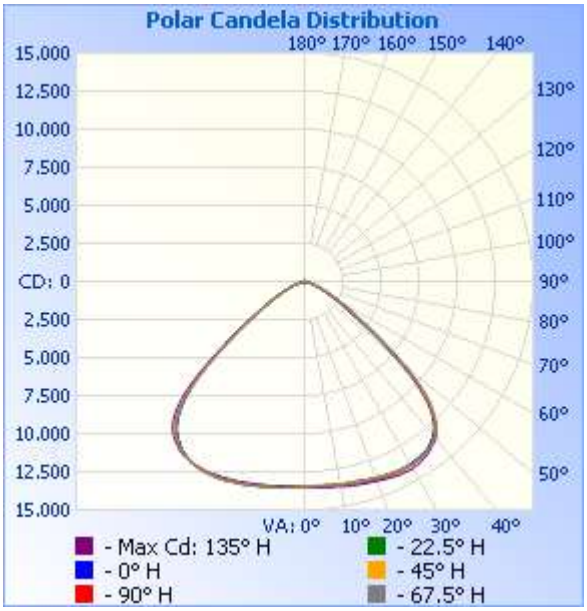
Parameter	Result		DLC V5.1 Pass Criteria	
Test Voltage (V)	120	347	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	35414	35802	>=10000(-10%)	
Luminous Efficacy (lm/W)	151.26	154.72	Standard: >= 120(-3%)	Premium: >= 135(-3%)
Zonal lumens in the 20-50 °zone (%)	67.1	--	>=30(-10)	
Corrected UGR (Crosswise)	27.0	--	Premium: <28.0	
Corrected UGR (Endwise)	26.8	--	Premium: <28.0	
Beam Angle (°)	103.8	--	--	
Center Beam Candle Power (cd)	13437	--	--	

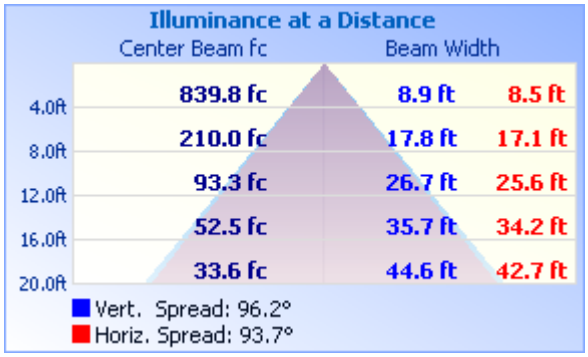
Zonal Lumen Tabulation

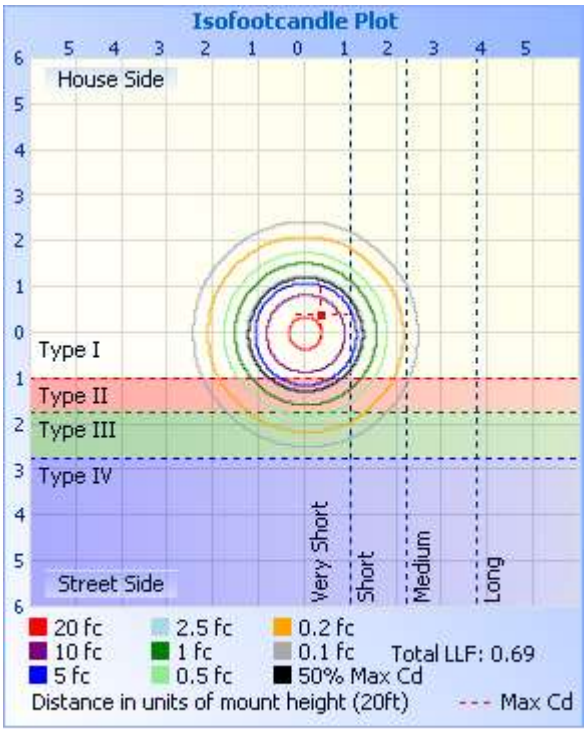
Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	11,659.6	32.9%
0-40	20,277.1	57.3%
0-60	33,182.0	93.7%
60-90	2,077.1	5.9%
70-100	529.6	1.5%
90-120	22.5	0.1%
0-90	35,259.2	99.6%
90-180	150.1	0.4%
0-180	35,409.3	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	1,292.4	3.6%	90-100	0.9	0%
10-20	3,896.4	11.0%	100-110	5.7	0%
20-30	6,470.8	18.3%	110-120	16.0	0%
30-40	8,617.5	24.3%	120-130	29.1	0.1%
40-50	8,675.6	24.5%	130-140	31.9	0.1%
50-60	4,229.4	11.9%	140-150	28.0	0.1%
60-70	1,548.4	4.4%	150-160	21.0	0.1%
70-80	466.5	1.3%	160-170	12.3	0%
80-90	62.2	0.2%	170-180	5.2	0%

Photometric Data







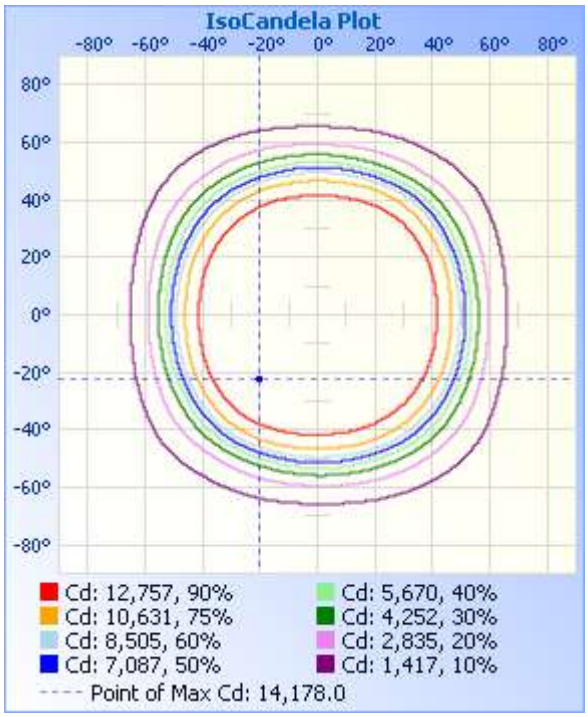


Table--1 UNIT: X10cd

C (DEG) / γ (DEG)	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5
0	1344	1344	1344	1344	1344	1344	1344	1344	1344	1344	1344	1344	1344	1344	1344	1344
5	1352	1351	1349	1347	1346	1344	1342	1345	1349	1349	1356	1354	1356	1355	1354	1357
10	1364	1364	1360	1353	1350	1350	1350	1354	1356	1363	1363	1370	1368	1370	1369	1368
15	1380	1375	1371	1364	1358	1356	1360	1364	1365	1375	1379	1383	1379	1387	1382	1385
20	1396	1393	1383	1377	1373	1369	1372	1375	1381	1389	1393	1396	1399	1396	1399	1393
25	1410	1405	1398	1388	1381	1381	1383	1391	1393	1402	1409	1411	1409	1410	1407	1408
30	1407	1410	1401	1394	1385	1388	1394	1394	1395	1406	1418	1412	1407	1409	1410	1404
35	1378	1384	1389	1375	1371	1374	1381	1383	1375	1385	1395	1384	1374	1380	1382	1377
40	1306	1321	1333	1322	1315	1321	1327	1327	1317	1325	1338	1319	1306	1308	1321	1312
45	1134	1165	1189	1186	1177	1188	1186	1176	1158	1164	1176	1155	1132	1138	1148	1147
50	790	791	825	839	858	845	828	819	813	776	784	775	791	774	768	778
55	458	430	433	448	490	469	465	466	473	422	408	413	445	435	438	436
60	261	265	247	266	273	285	270	276	261	255	230	249	252	261	253	265
65	149	153	142	154	155	164	157	157	150	149	132	143	146	150	146	155
70	82.3	82.7	78.2	84.3	85.4	88.5	87.8	84.9	83.3	81.5	72.3	77.0	81.2	80.9	80.8	84.9
75	41.9	40.9	40.0	42.5	42.9	43.7	44.8	42.0	42.7	41.1	37.5	37.5	40.2	39.5	40.8	42.5
80	19.5	19.1	18.4	18.7	18.6	18.9	19.8	19.2	19.8	18.4	17.0	16.0	16.8	16.4	18.0	18.9
85	5.47	5.02	3.89	3.34	2.73	3.32	3.90	5.19	5.78	4.69	3.51	2.51	1.78	2.53	3.35	4.68
90	0.05	0.04	0.03	0.03	0.05	0.05	0.06	0.05	0.03	0.03	0.01	0.03	0.03	0.03	0.04	0.03
95	0.05	0.03	0.03	0.03	0.04	0.05	0.05	0.06	0.06	0.06	0.06	0.07	0.07	0.07	0.07	0.07
100	0.26	0.26	0.21	0.24	0.18	0.25	0.24	0.24	0.19	0.21	0.19	0.22	0.19	0.22	0.21	0.21
105	0.62	0.60	0.56	0.51	0.53	0.56	0.60	0.57	0.45	0.44	0.45	0.41	0.41	0.43	0.48	0.47
110	1.27	1.15	1.04	0.96	1.07	1.06	1.09	1.15	0.84	0.82	0.75	0.78	0.84	0.78	0.79	0.84
115	2.33	2.18	2.05	1.55	1.82	1.55	2.05	2.18	1.43	1.39	1.35	0.98	1.37	1.06	1.35	1.42
120	3.38	3.24	3.10	2.91	2.42	2.69	2.97	3.16	2.01	1.94	2.04	1.91	1.81	1.89	2.04	1.99
125	4.23	4.11	3.35	4.26	4.46	4.31	3.34	4.02	2.40	2.52	2.29	2.90	3.10	2.92	2.32	2.54
130	4.89	4.58	3.33	4.86	5.05	4.92	3.74	4.49	3.17	2.96	2.49	3.51	3.61	3.56	2.62	3.00
135	5.17	4.67	3.96	5.19	5.29	5.28	4.30	4.54	3.67	3.24	3.04	4.09	4.11	3.98	3.07	3.33
140	5.40	4.76	4.32	5.18	5.18	5.18	4.27	4.67	4.04	3.76	3.30	4.03	4.38	4.09	3.20	3.85
145	5.50	4.37	4.74	5.49	5.21	5.37	4.09	4.65	4.29	3.87	3.47	3.97	4.20	4.12	3.62	3.99
150	5.31	4.33	5.36	5.29	5.74	5.41	4.81	4.73	4.27	3.88	4.12	3.96	4.52	4.11	4.60	3.99
155	4.73	4.30	5.48	5.30	5.58	5.31	5.07	4.85	3.95	3.88	4.03	4.10	3.75	3.88	4.23	3.98
160	4.51	4.05	5.22	5.06	5.14	5.00	5.03	4.30	3.85	4.00	3.85	4.13	3.64	3.56	3.89	3.99
165	4.60	4.00	5.01	4.58	4.70	4.81	4.63	3.93	3.83	3.84	3.61	3.93	3.62	3.66	3.58	4.01
170	5.04	4.34	5.60	5.67	5.58	5.81	5.39	4.03	4.66	4.61	4.47	5.45	5.81	5.64	5.14	5.16
175	5.36	4.64	5.78	5.72	6.45	5.86	5.59	4.18	5.37	5.34	4.68	5.81	6.15	6.63	5.62	5.64
180	4.93	4.76	5.34	5.66	6.27	5.45	5.45	4.35	4.99	5.03	4.67	5.35	5.65	6.28	5.46	5.45

2.2 Electrical, Photometric and Chromaticity Measurements

Test date	2023-05-22	Test Ambient:	25±1 ºC
Test Orientation	As intended	Stabilization Time (min)	60
Model Number	RENO-HBU-240W-DV-XK-R2-ECO [@](0%,3500K)	Total Operating Time (min)	61

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JDE230312-C1	120.0	60	1.966	235.3	0.9972	2.98
	347.0	60	0.7288	232.6	0.9197	16.88
				DLC Pass Criteria	>= 0.9(-3%)	<= 20(+5)

Chromaticity Measurement - Sphere-Spectroradiometer Method(Self-absorption:1.1382)(4π geometry):

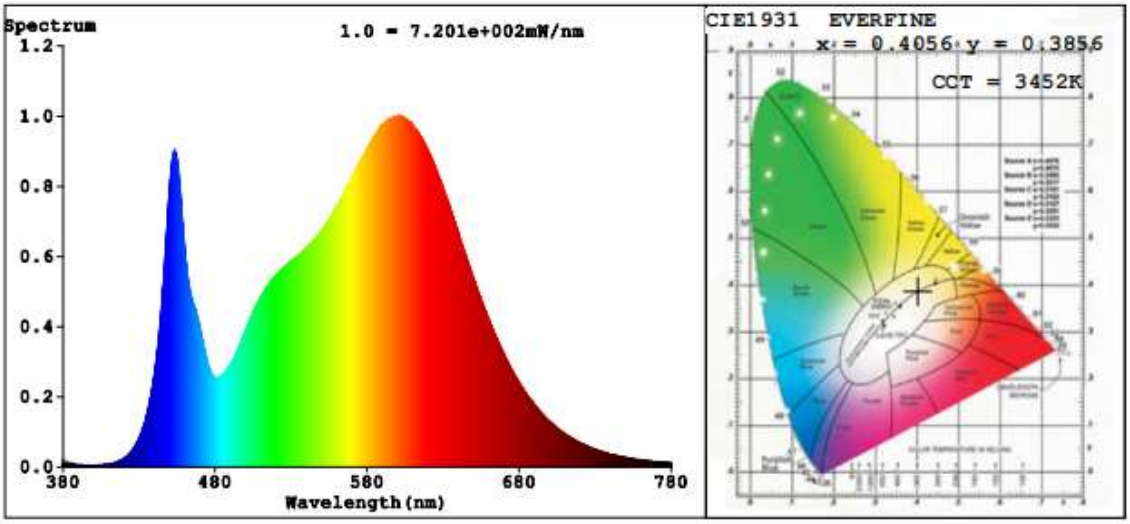
Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3452
Duv	-0.0023
Chromaticity (x, y)	x=0.4056 y=0.3856
Chromaticity (u', v')	u'=0.2380 v'=0.5092

Parameter	Result
Color Rendering Index (CRI)	84.1
R9	12
Rg	96
Rf	84
Rcs,h1(%)	-12

Photometric Measurement –Sphere-Spectroradiometer Method:

Parameter	Result		DLC V5.1 Pass Criteria	
Test Voltage (V)	120	347	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	35645	36036	>=10000(-10%)	
Luminous Efficacy (lm/W)	151.49	154.93	Standard: >= 120(-3%)	Premium: >= 135(-3%)

Spectral Power Distribution & Chromaticity Diagram



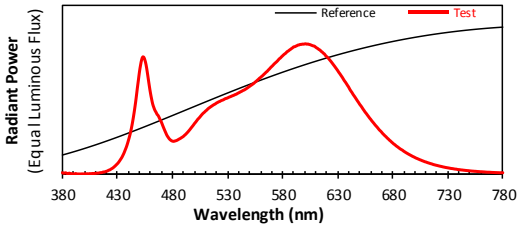
Special Color Rendering Indices

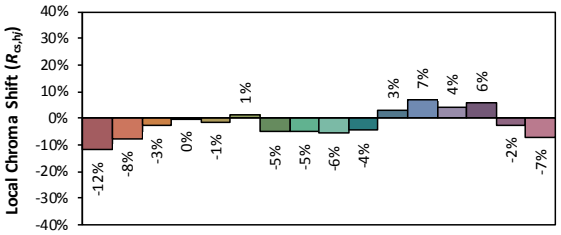
R1 =83	R2 =93	R3 =96	R4 =82	R5 =84	R6 =90	R7 =83	
R8 =62	R9 =12	R10=82	R11=81	R12=69	R13=86	R14=98	R15=77

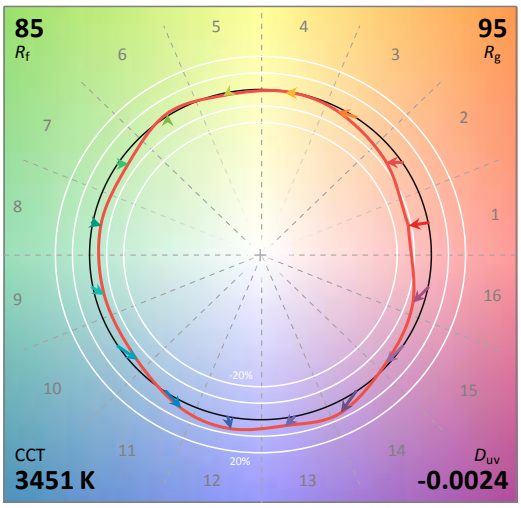
TM30

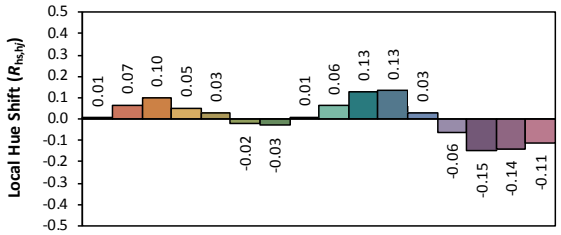
ANSI/IES TM-30-18 Color Rendition Report

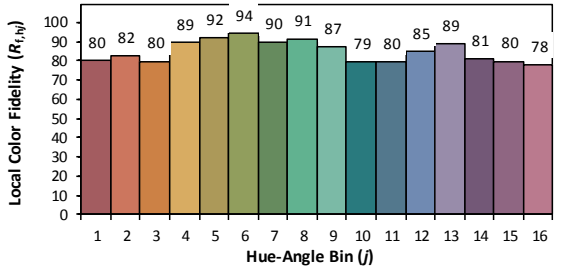
Source:	L128-3580RB35001M1	Manufacturer:	Reno LED Lighting Inc
Date:	2023-05-22	Model:	RENO-HBU-240W-DV-XK-R2-ECO[@](0%,3500K)

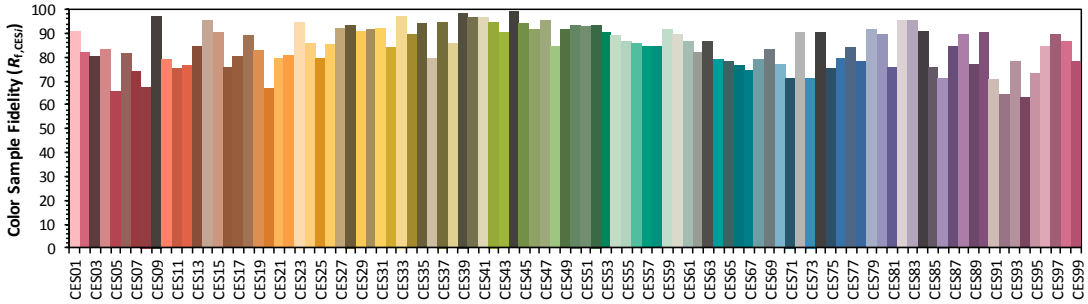












Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x	0.4056
y	0.3855
u'	0.2381
v'	0.5091

CIE 13.3-1995 (CRI)

R_a	84
R_9	12

lors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.0

2.3 Electrical, Photometric and Chromaticity Measurements

Test date	2023-05-22	Test Ambient:	25±1 ºC
Test Orientation	As intended	Stabilization Time (min)	60
Model Number	RENO-HBU-240W-DV-XK-R2-ECO [@](50%,4000K)	Total Operating Time (min)	61

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JDE230312-C1	120.0	60	1.943	232.4	0.9970	2.99
	347.0	60	0.7199	229.7	0.9195	16.89
				DLC Pass Criteria	>= 0.9(-3%)	<= 20(+5)

Chromaticity Measurement - Sphere-Spectroradiometer Method(Self-absorption:1.1380)(4π geometry):

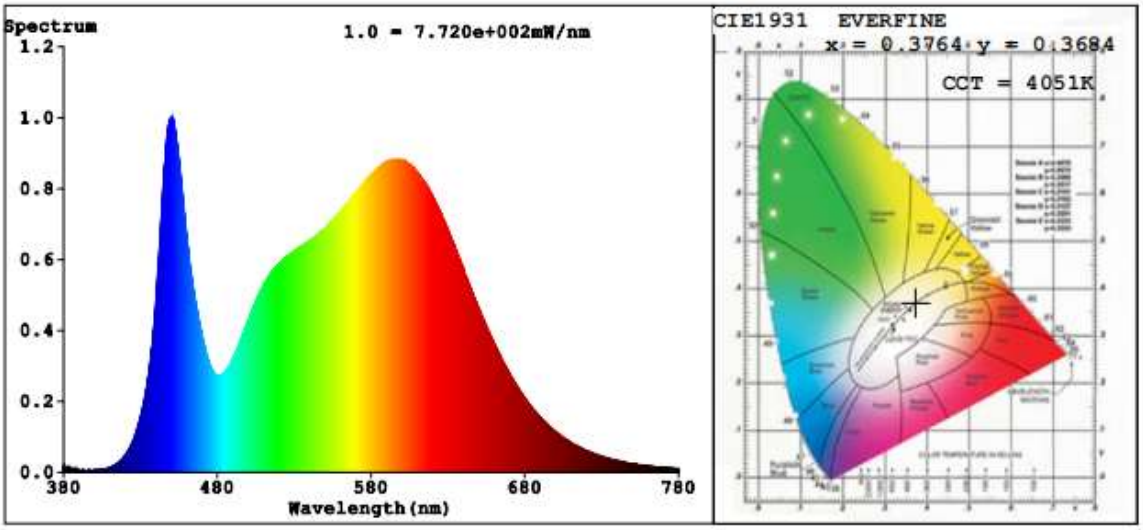
Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	4051
Duv	-0.0028
Chromaticity (x, y)	x=0.3764 y=0.3684
Chromaticity (u', v')	u'=0.2258 v'=0.4973

Parameter	Result
Color Rendering Index (CRI)	85.3
R9	19
Rg	97
Rf	85
Rcs,h1(%)	--11

Photometric Measurement –Sphere-Spectroradiometer Method:

Parameter	Result		DLC V5.1 Pass Criteria	
Test Voltage (V)	120	347	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	38134	38552	>=10000(-10%)	
Luminous Efficacy (lm/W)	164.09	167.84	Standard: >= 120(-3%)	Premium: >= 135(-3%)

Spectral Power Distribution & Chromaticity Diagram



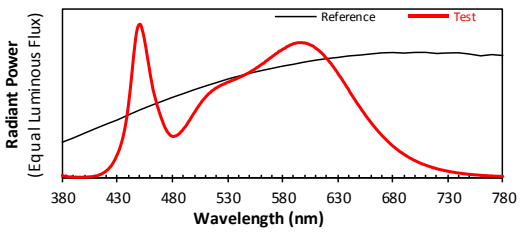
Special Color Rendering Indices

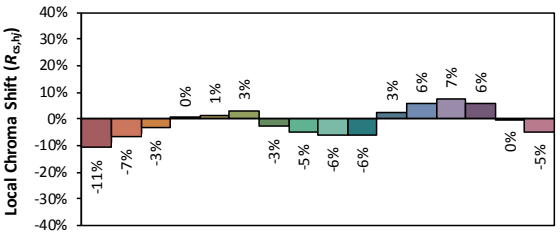
R1 =85	R2 =91	R3 =95	R4 =85	R5 =85	R6 =87	R7 =86	
R8 =68	R9 =19	R10=79	R11=84	R12=67	R13=86	R14=98	R15=79

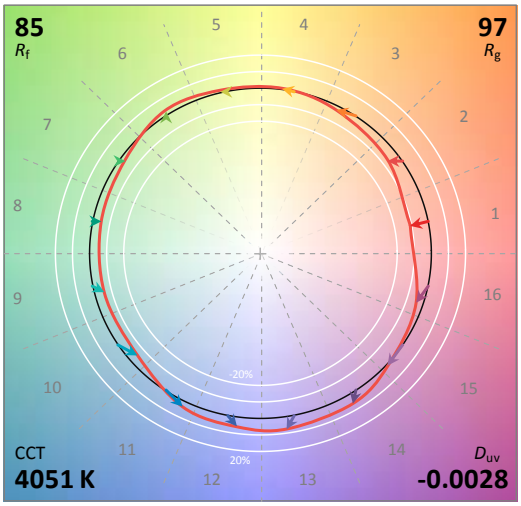
TM30

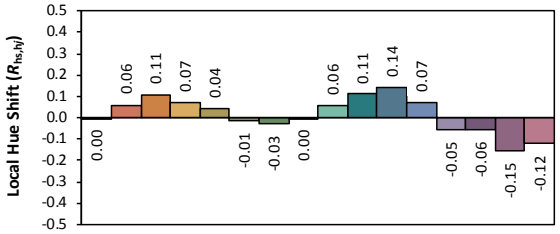
ANSI/IES TM-30-18 Color Rendition Report

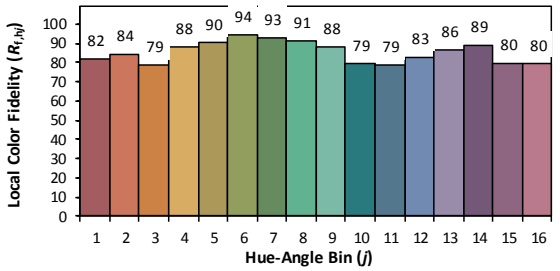
Source:	L128-3580RB35001M1 L128-5080RB35001M1	Manufacturer:	Reno LED Lighting Inc
Date:	2023-05-22	Model:	RENO-HBU-240W-DV-XK-R2-ECO[@](50%, 4000K)

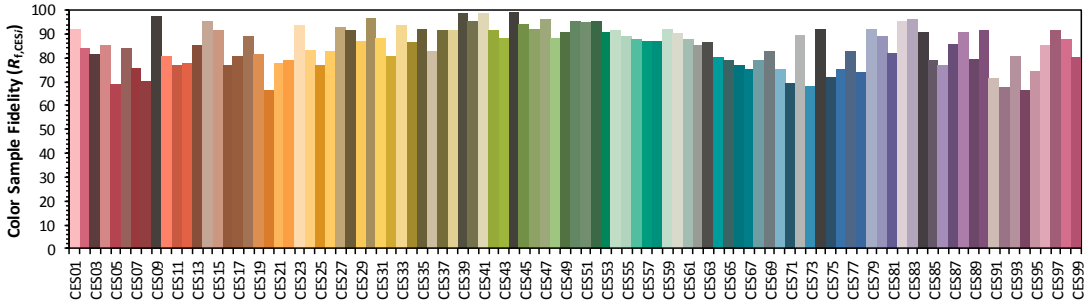












Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x	0.3764
y	0.3683
u'	0.2258
v'	0.4972

CIE 13.3-1995 (CRI)

R_a	85
R_9	19

lors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.0

2.4 Electrical, Photometric and Chromaticity Measurements

Test date	2023-05-22	Test Ambient:	25±1 ºC
Test Orientation	As intended	Stabilization Time (min)	60
Model Number	RENO-HBU-240W-DV-XK-R2-ECO [@](100%,5000K)	Total Operating Time (min)	61

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JDE230312-C1	120.0	60	1.949	233.3	0.9973	2.97
	347.0	60	0.7225	230.6	0.9198	16.87
				DLC Pass Criteria	>= 0.9(-3%)	<= 20(+5)

Chromaticity Measurement - Sphere-Spectroradiometer Method(Self-absorption:1.1384)(4π geometry):

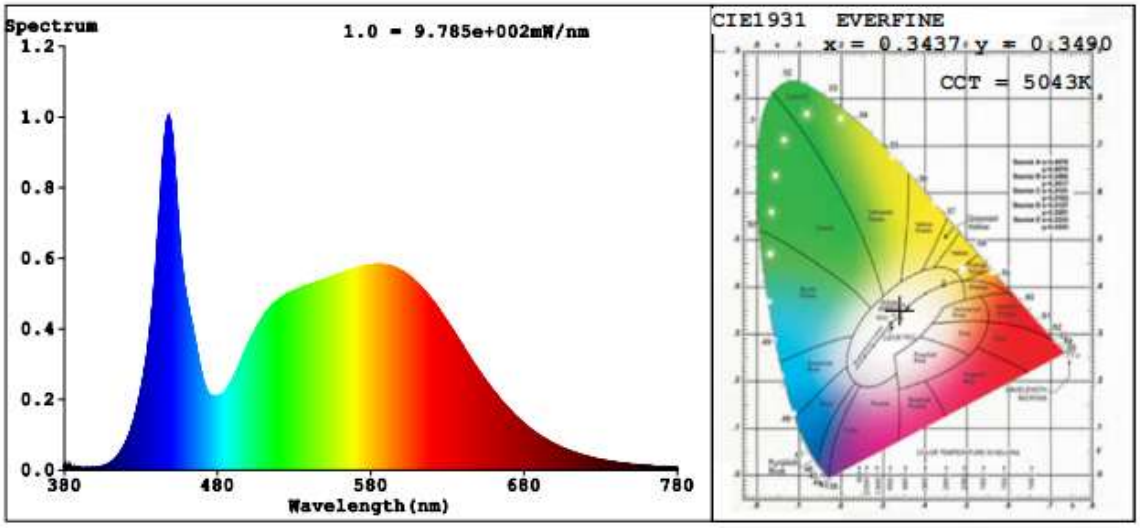
Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	5043
Duv	-0.0008
Chromaticity (x, y)	x=0.3437 y=0.3490
Chromaticity (u', v')	u'=0.2115 v'=0.4832

Parameter	Result
Color Rendering Index (CRI)	83.6
R9	15
Rg	98
Rf	83
Rcs,h1(%)	-12

Photometric Measurement –Sphere-Spectroradiometer Method:

Parameter	Result		DLC V5.1 Pass Criteria	
Test Voltage (V)	120	347	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	36403	36802	>=10000(-10%)	
Luminous Efficacy (lm/W)	156.04	159.59	Standard: >= 120(-3%)	Premium: >= 135(-3%)

Spectral Power Distribution & Chromaticity Diagram



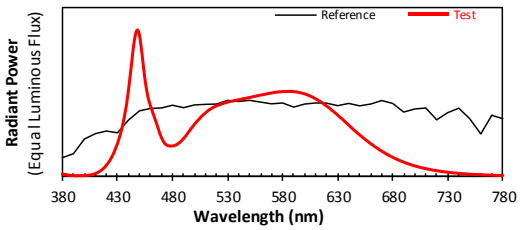
Special Color Rendering Indices

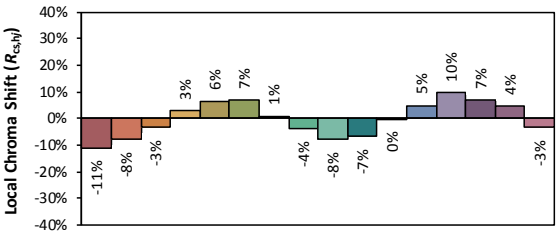
R1 =83	R2 =87	R3 =90	R4 =85	R5 =84	R6 =83	R7 =86	
R8 =70	R9 =15	R10=69	R11=85	R12=67	R13=84	R14=94	R15=78

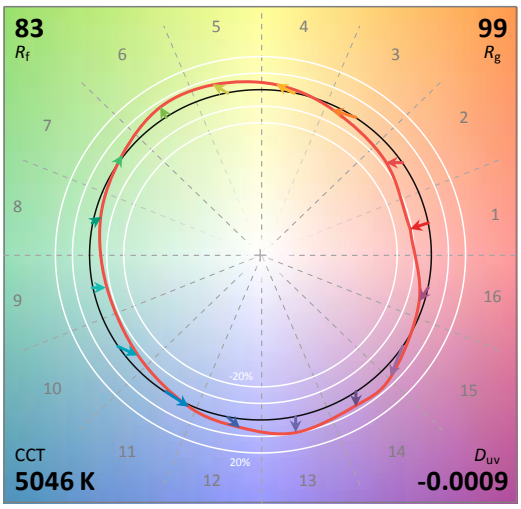
TM30

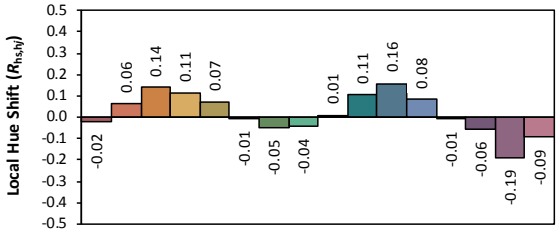
ANSI/IES TM-30-18 Color Rendition Report

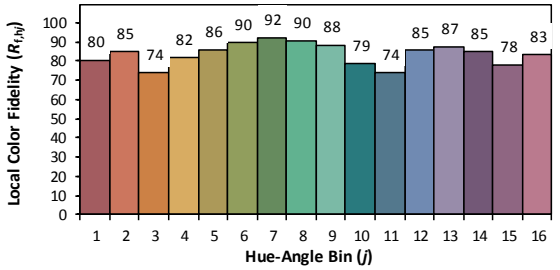
Source:	L128-5080RB35001M1	Manufacturer:	Reno LED Lighting Inc
Date:	2023-05-22	Model:	RENO-HBU-240W-DV-XK-R2-ECO[@](100%, 5000 K)

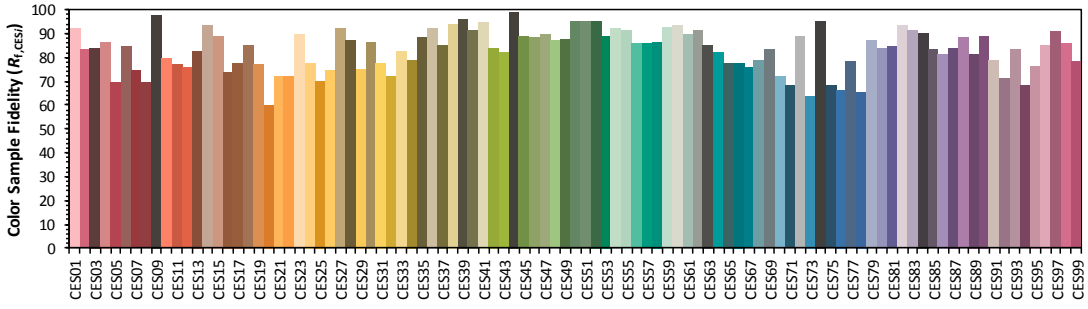












Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x	0.3437
y	0.3488
u'	0.2116
v'	0.4831

CIE 13.3-1995 (CRI)

R_a	84
R_9	15

lors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.0

3. Test Equipment

Equipment ID	Equipment Name	Last Calibration Date	Next Calibration Date
ST-R-423	2 meter Integrating Sphere	Verified by D204 standard lamp	
ST-R-327	Spectral analysis system HAAS-2000	Verified by D204 standard lamp	
ST-R-332	Standard Lamp	2022-07-06	2023-07-05
ST-R-333	Power Meter for Integrating Sphere	2022-07-11	2023-07-10
ST-R-405	Temperature Probe for Integrating Sphere	2023-01-18	2024-01-17
ST-R-355	Goniophotometer system	Verified by D908S standard lamp	
ST-R-359	Standard Lamp	2022-07-06	2023-07-05
ST-R-358	Power Meter for Goniophotometer	2022-07-11	2023-07-10
ST-R-354	hygrothermograph for Goniophotometer	2022-07-11	2023-07-10
Expand Uncertainty: Photometric Measurement (Sphere):3.06%, k=2 Chromaticity Measurement(Sphere):43.20K, k=2 Photometric Measurement(Goniophotometer):3.36%, k=2			

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