



LM-79-19 Test Report

For

RAB Lighting INC.

(Brand Name:RAB)

408 W 14th St, New York, NY 10014, USA

**Model name(s):
ENCT-BN**

Report Type: Testing and Report According to IES LM-79-2019

**Type of
Luminaire:** LED luminaire

Report Date: 2024-11-27

Ningbo TengLi Testing Co., Ltd

Prepared By: 2nd floor, Block B, Ningbo Testing and Certification Base,
No. 66 Qingyi Road, Ningbo National Hi-Tech Zone,
Ningbo, Zhejiang

Test & Report By:

Engineer: Holly Wang

Review By:

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:		
Model Number	ENCT-BN	
Remark	N/A	
Representative (Tested) Model	ENCT-BN(mode:2700K) ENCT-BN(mode:3000K) ENCT-BN(mode:3500K) ENCT-BN(mode:4000K) ENCT-BN(mode:5000K)	
Model Difference	N/A	
SKU (if available)	-	
Type of Luminaire (for integral lamps, list base type and lamp type)	LED luminaire	
LED Manufacturer	Lumileds Holding B.V.	
LED Model	L128-xx90RC35xxxxx	
Dimming	Continuous	
Integral Controls	N/A	
Sample Number	STD241047NB-A1	
Date of Receipt	Nov.18,2024	
Luminaire Aperture (for downlights)	--	in.
Luminaire Length	--	mm
Luminaires Width	--	mm
Number of Units (modular products)	N/A	s

1.2 Rated Values:	
Rated Voltage / Frequency	120Vac, 60Hz
Nominal Power	20W
Rated Initial Lamp Lumen	--
Declared CCT	2700K,3000K,3500K,4000K,5000K (Color Tunable)



1.3 Test Specifications:

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. Electrical Parameters
Reference Standard	<ol style="list-style-type: none"> 1. IES LM-79-2019 Optical and Electrical 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

1.4 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 $25^{\circ}\text{C} \pm 1.2^{\circ}\text{C}$, measured at a point not more than 1.5 m from the sample and at the same height as the sample. The humidity should be maintained between 10% and 65%. 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 $25^{\circ}\text{C} \pm 1.2^{\circ}\text{C}$. The humidity should be maintained between 10% and 65%. 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 $25^{\circ}\text{C} \pm 1.2^{\circ}\text{C}$. 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

Test date	2024-11-22	Test Ambient:	25 ± 1 ° C
Test Orientation	As intended	Stabilization Time (min)	60
Model Number	ENCT-BN(mode:2700K)	Total Operating Time(min)	75

Electrical Measurement:

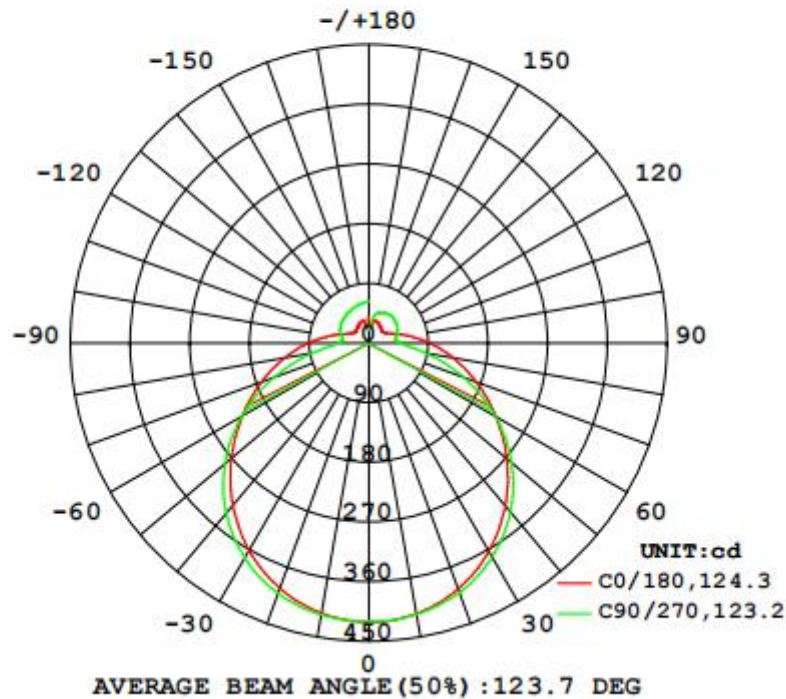
Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD241047 NB-A1	120.0	60.01	0.1842	20.06	0.9077	46.22

Photometric Measurement – Goniophotometer Method(Test Distance: 26.00m):

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	1751.9
Luminous Efficacy (lm/W)	87.33
Beam Angle (°)	123.7
Center Beam Candle Power (cd)	421

Zonal Lumen Tabulation

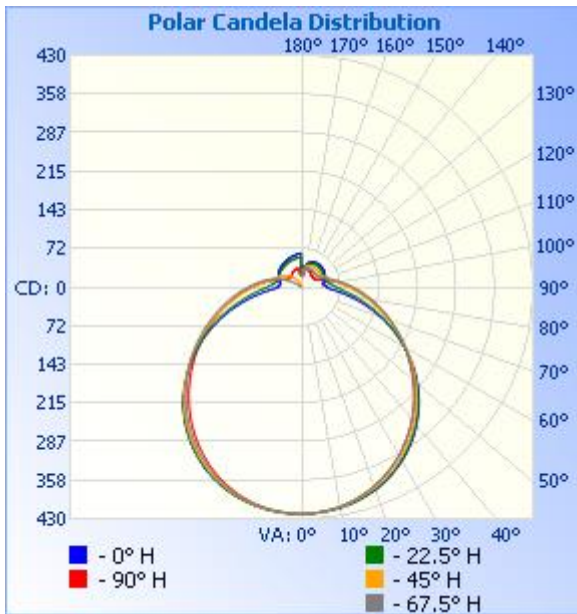
LUMINOUS INTENSITY DISTRIBUTION DIAGRAM



Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	332.3	19%
0-40	550.9	31.4%
0-60	1,010.4	57.7%
60-90	449.2	25.6%
70-100	329.8	18.8%
90-120	172.0	9.8%
0-90	1,459.6	83.3%
90-180	292.3	16.7%
0-180	1,751.8	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	39.9	2.3%	90-100	74.3	4.2%
10-20	115.2	6.6%	100-110	54.8	3.1%
20-30	177.3	10.1%	110-120	42.8	2.4%
30-40	218.6	12.5%	120-130	35.1	2%
40-50	234.6	13.4%	130-140	29.7	1.7%
50-60	224.9	12.8%	140-150	24.3	1.4%
60-70	193.7	11.1%	150-160	17.8	1%
70-80	149.7	8.5%	160-170	10.5	0.6%
80-90	105.8	6.0%	170-180	2.8	0.2%

Photometric Data



Illuminance at a Distance

	Center Beam fc	Beam Width	
4.0ft	26.3 fc	14.8 ft	15.1 ft
8.0ft	6.6 fc	29.6 ft	30.3 ft
12.0ft	2.9 fc	44.4 ft	45.4 ft
16.0ft	1.6 fc	59.2 ft	60.5 ft
20.0ft	1.1 fc	74.0 ft	75.6 ft

■ Vert. Spread: 123.2°
■ Horiz. Spread: 124.3°

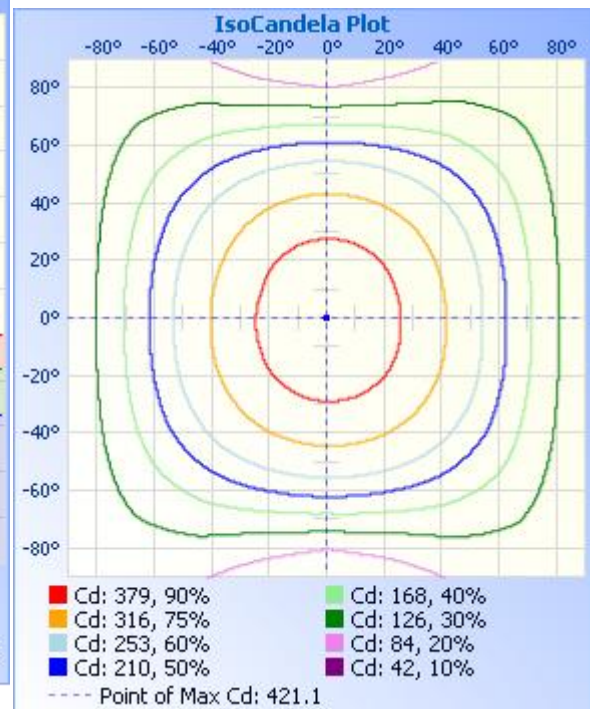
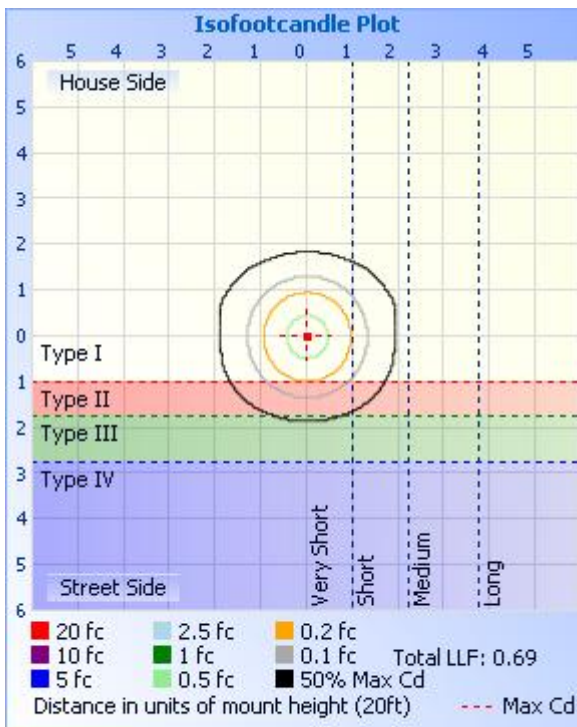




Table--1

UNIT: cd

T (DEG)	C (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	421	421	421	421	421	421	421	421	421	421	421	421	421	421	421	421
5	419	419	419	419	419	419	419	419	419	419	419	419	419	420	419	420
10	415	414	415	416	416	415	414	413	414	414	415	416	416	416	416	415
15	406	406	408	409	409	409	406	404	405	406	408	410	410	410	409	408
20	394	395	398	400	400	399	396	393	393	394	397	400	402	402	400	397
25	380	381	385	387	388	387	383	378	379	380	385	388	390	390	387	384
30	363	364	368	372	372	371	367	361	361	364	369	373	374	374	371	367
35	342	345	349	353	354	352	347	341	341	344	350	354	356	356	353	349
40	320	323	328	331	332	330	326	320	319	323	329	333	335	335	332	327
45	297	300	305	307	308	306	302	297	296	300	305	308	311	311	309	304
50	272	276	279	281	281	280	277	272	271	275	280	281	283	283	283	280
55	247	251	253	252	252	251	250	247	246	250	253	252	254	255	256	255
60	221	225	226	222	220	220	223	222	220	225	225	222	222	224	229	230
65	196	201	199	191	187	189	196	198	196	201	198	190	188	192	201	205
70	173	177	173	160	152	158	170	174	172	177	172	159	153	160	174	180
75	150	155	148	131	118	128	145	152	150	154	147	129	117	129	149	158
80	129	134	126	104	86.6	102	123	131	129	133	125	102	84.7	102	126	136
85	109	114	107	83.2	59.9	80.2	104	112	109	114	105	80.6	58.0	80.3	106	117
90	91.7	96.9	89.8	67.8	47.1	64.8	87.1	94.8	90.9	95.9	87.5	64.8	43.9	64.3	88.8	98.9
95	76.2	81.7	75.8	57.8	42.6	55.5	73.1	80.0	75.3	80.6	73.8	54.8	42.0	54.7	75.0	83.4
100	62.5	68.4	64.6	52.1	40.8	49.8	62.6	67.1	61.6	67.6	62.7	49.0	40.1	49.4	63.9	70.1
105	51.1	57.5	56.5	48.8	43.4	46.1	54.7	56.6	50.2	56.7	54.4	45.2	42.8	47.3	55.6	56.7
110	41.8	48.9	50.5	47.1	45.6	44.6	49.3	48.2	40.9	48.1	48.7	44.0	45.6	46.8	50.0	43.4
115	34.7	42.4	46.5	46.6	47.9	44.6	45.7	42.4	34.0	41.9	45.0	44.3	47.9	47.1	45.5	30.1
120	30.1	38.1	44.2	46.7	49.6	45.7	43.6	38.5	29.9	37.8	42.9	45.2	49.8	47.7	41.0	16.8
125	28.0	35.7	42.8	47.0	51.2	47.0	42.7	36.2	27.6	35.5	41.8	46.3	51.4	48.4	36.5	3.50
130	27.0	34.1	42.3	47.8	52.2	48.1	42.5	35.2	27.0	34.6	41.8	47.4	52.4	49.1	32.0	0.00
135	27.1	33.8	41.9	48.8	52.9	49.0	42.6	35.0	27.4	34.3	41.9	48.3	53.5	49.8	27.5	0.00
140	28.5	34.2	42.0	49.0	53.2	49.6	43.0	35.3	28.5	34.7	41.9	48.7	54.6	50.5	23.1	0.00
145	30.4	34.7	42.1	49.1	53.2	49.6	43.0	36.1	30.1	35.1	41.7	49.3	55.6	51.1	18.6	0.00
150	32.2	35.5	42.5	48.9	52.4	49.1	43.0	36.6	31.8	35.0	41.3	49.8	56.7	51.8	14.1	0.00
155	33.6	36.3	42.5	48.1	50.8	48.2	42.5	36.7	33.4	35.2	40.4	50.3	57.7	52.5	9.60	0.00
160	34.8	37.3	40.9	46.6	48.8	47.0	41.4	36.7	34.0	35.1	39.4	50.9	58.8	53.2	5.12	0.00
165	35.3	37.3	39.6	45.4	46.2	45.1	40.1	37.1	35.4	35.5	38.5	51.4	59.9	53.9	0.63	0.00
170	31.3	31.3	35.0	38.1	39.2	38.0	33.7	28.6	25.7	26.1	37.6	52.0	60.9	54.5	0.00	0.00
175	24.3	26.3	27.8	25.6	25.2	28.0	25.0	22.1	22.3	2.17	36.6	52.5	62.0	55.2	0.00	0.00
180	40.0	36.0	26.0	21.4	21.0	22.4	26.0	38.1	40.4	0.00	35.7	53.1	63.1	55.9	0.00	0.00



2.2 Electrical, Photometric and Chromaticity Measurements

Test date	2024-11-22	Test Ambient:	25 ± 1 ° C
Test Orientation	As intended	Stabilization Time (min)	60
Model Number	ENCT-BN(mode:2700K)	Total Operating Time(min)	61

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD241047 NB-A1	120.0	60.01	0.1845	20.09	0.9075	46.25

Chromaticity Measurement - Sphere-Spectroradiometer

Method(Self-absorption:1.0262)(4π geometry):

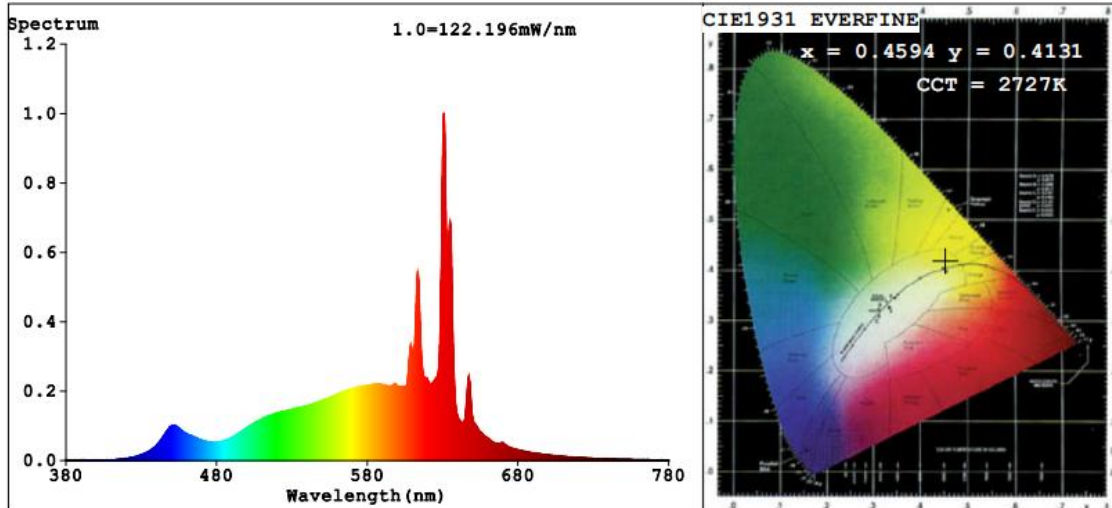
Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	2727
Duv	0.0010
Chromaticity (x, y)	x=0.4594 y=0.4131
Chromaticity (u', v')	u'=0.2610 v'=0.5282
Color Rendering Index (CRI)	95.2
R9	67
Rg	100
Rf	92
Rcs,h1	-5

Photometric Measurement –Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	1768
Luminous Efficacy (lm/W)	88.00



Spectral Power Distribution & Chromaticity Diagram



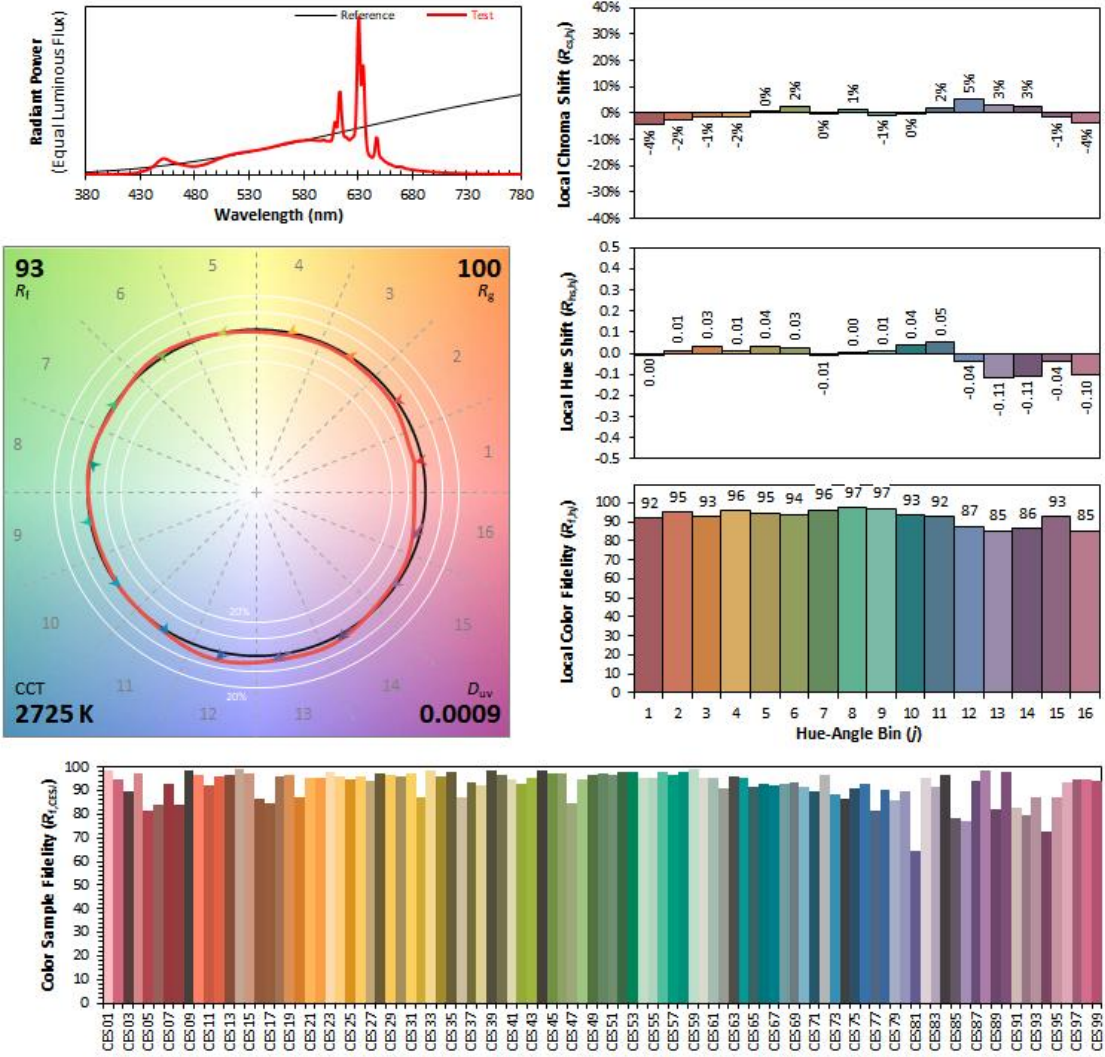
R1 =97	R2 =97	R3 =96	R4 =98	R5 =96	R6 =97	R7 =93		
R8 =86	R9 =67	R10=92	R11=98	R12=87	R13=97	R14=96	R15=92	



TM30

ANSI/IES TM-30-18 Color Rendition Report

Source: L128-xx90RC35xxxxx Manufacturer: RAB Lighting INC.
 Date: 2024-11-22 Model: ENCT-BN (mode:2700K)



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

x	0.4594	CIE 13.3-1995 (CRI) R_a 95 R_g 68
y	0.4130	
u'	0.2611	
v'	0.5282	

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



2.3 Electrical, Photometric and Chromaticity Measurements

Test date	2024-11-22	Test Ambient:	25 ± 1 ° C
Test Orientation	As intended	Stabilization Time (min)	60
Model Number	ENCT-BN(mode:3000K)	Total Operating Time(min)	61

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD241047 NB-A1	120.0	60.01	0.1837	20.04	0.9092	46.11

Chromaticity Measurement - Sphere-Spectroradiometer

Method(Self-absorption:1.0264)(4π geometry):

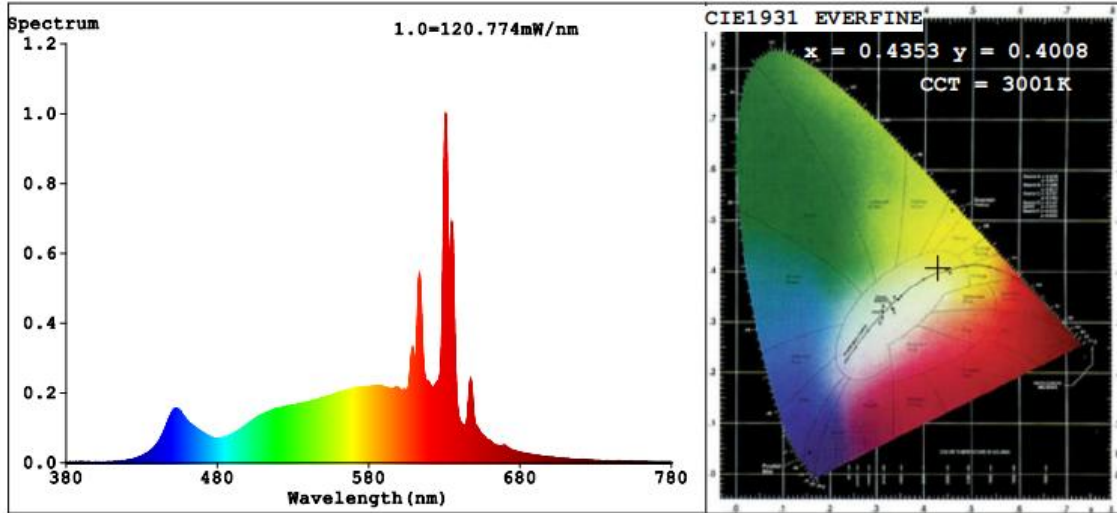
Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3001
Duv	-0.0011
Chromaticity (x, y)	x=0.4353 y=0.4008
Chromaticity (u', v')	u'=0.2509 v'=0.5199
Color Rendering Index (CRI)	96.9
R9	80
Rg	101
Rf	93
Rcs,h1	-4

Photometric Measurement –Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	1829
Luminous Efficacy (lm/W)	91.27



Spectral Power Distribution & Chromaticity Diagram



R1 =99	R2 =99	R3 =96	R4 =99	R5 =99	R6 =96	R7 =95		
R8 =92	R9 =80	R10=96	R11=96	R12=85	R13=100	R14=96	R15=97	

TM30

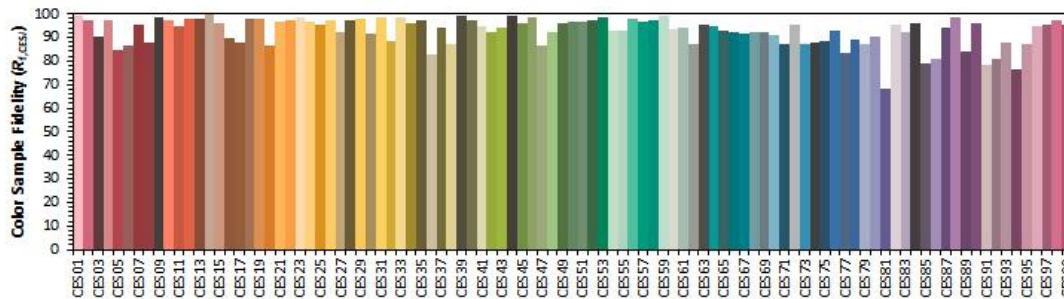
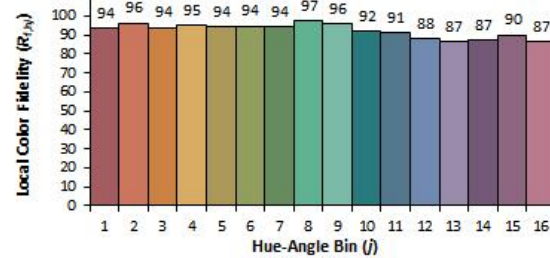
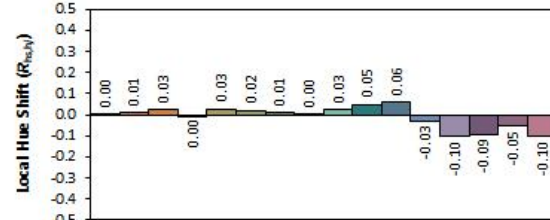
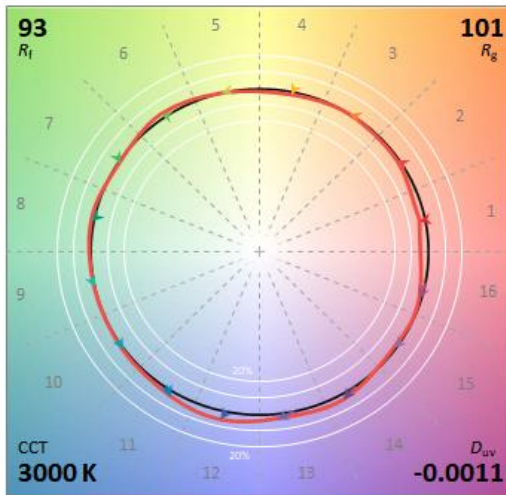
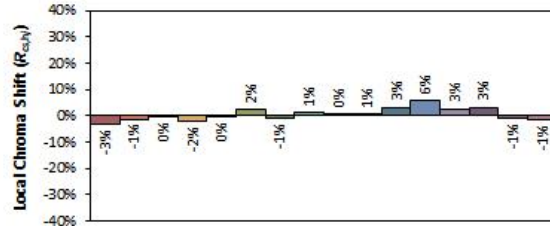
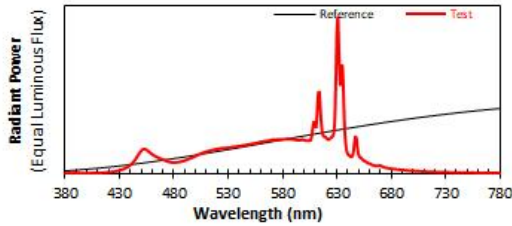
ANSI/IES TM-30-18 Color Rendition Report

Source: L128-xx90RC35xxxxx

Manufacturer: RAB Lighting INC.

Date: 2024-11-22

Model: ENCT-BN (mode:3000K)



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

x 0.4353
y 0.4007
u' 0.2510
v' 0.5198

CIE 13.3-1995 (CRI)

R_a 97
R_g 80

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



2.4 Electrical, Photometric and Chromaticity Measurements

Test date	2024-11-22	Test Ambient:	25 ± 1 ° C
Test Orientation	As intended	Stabilization Time (min)	60
Model Number	ENCT-BN(mode:3500K)	Total Operating Time(min)	61

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD241047 NB-A1	120.0	60.01	0.1831	20.01	0.9107	46.87

Chromaticity Measurement - Sphere-Spectroradiometer

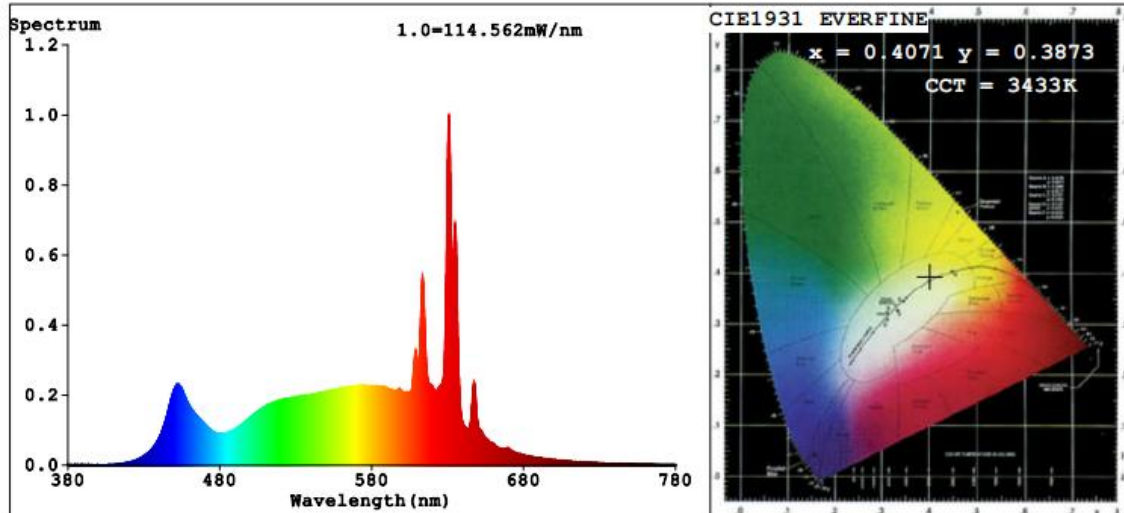
Method(Self-absorption:1.0260)(4π geometry):

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3433
Duv	-0.0019
Chromaticity (x, y)	x=0.4071 y=0.3873
Chromaticity (u', v')	u'=0.2383 v'=0.5101
Color Rendering Index (CRI)	97.3
R9	91
Rg	102
Rf	93
Rcs,h1	-2

Photometric Measurement –Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	1878
Luminous Efficacy (lm/W)	93.85

Spectral Power Distribution & Chromaticity Diagram



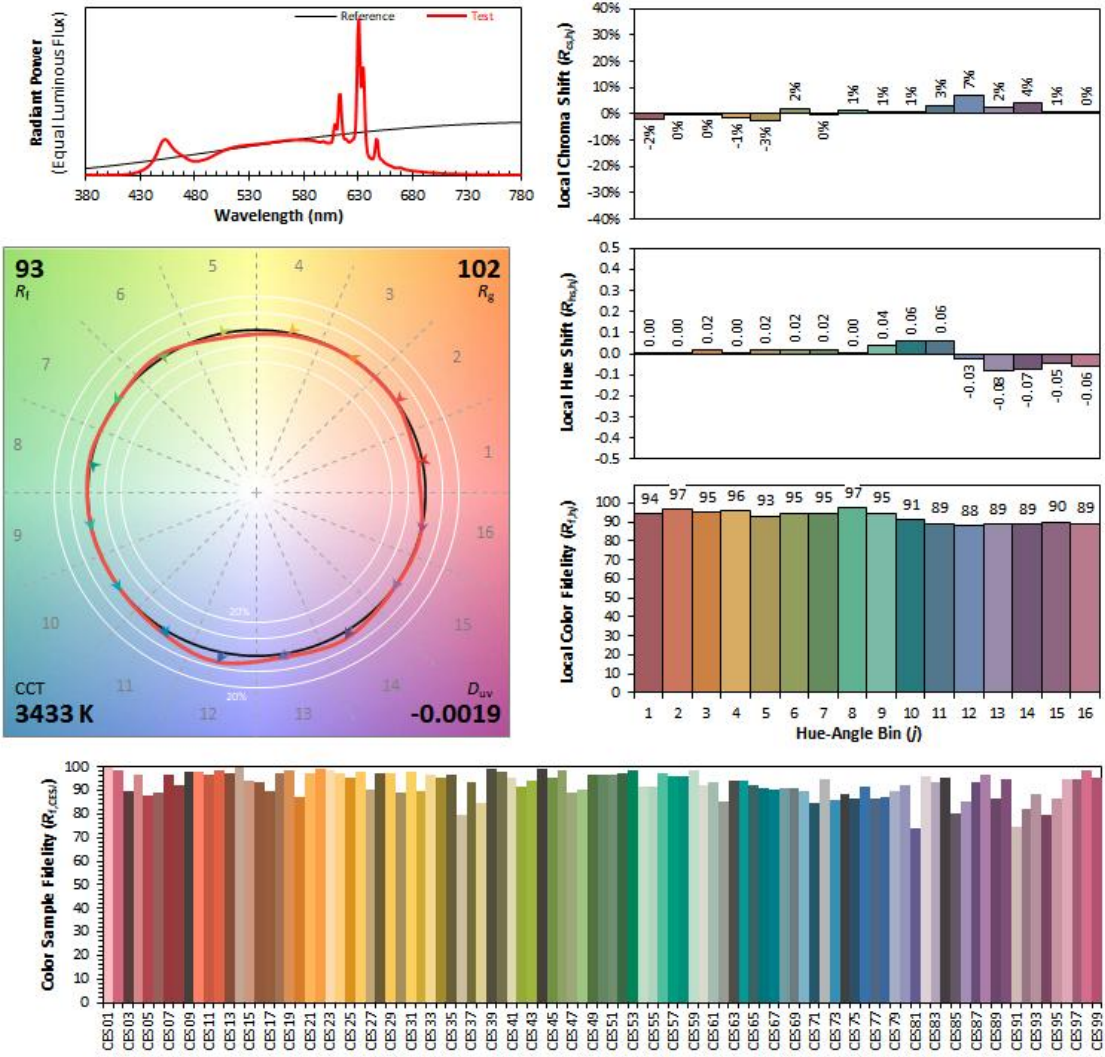
R1 =98	R2 =99	R3 =95	R4 =98	R5 =99	R6 =96	R7 =97	
R8 =97	R9 =91	R10=97	R11=95	R12=81	R13=98	R14=96	R15=99



TM30

ANSI/IES TM-30-18 Color Rendition Report

Source: L128-xx90RC35xxxxx Manufacturer: RAB Lighting INC.
 Date: 2024-11-22 Model: ENCT-BN (mode:3500K)



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

x	0.4070	CIE 13.3-1995 (CRI)	
y	0.3872		
u'	0.2383		
v'	0.5100		
		R_a	97
		R_g	91

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



2.5 Electrical, Photometric and Chromaticity Measurements

Test date	2024-11-22	Test Ambient:	25 ± 1 ° C
Test Orientation	As intended	Stabilization Time (min)	60
Model Number	ENCT-BN(mode:4000K)	Total Operating Time(min)	61

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD241047 NB-A1	120.0	60.01	0.1825	19.97	0.9121	46.83

Chromaticity Measurement - Sphere-Spectroradiometer

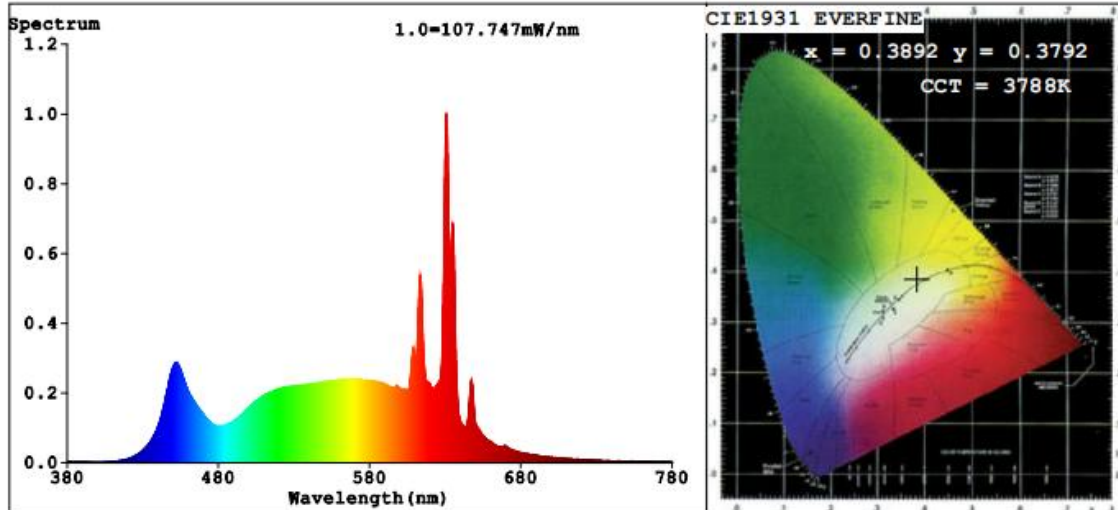
Method(Self-absorption:1.0265)(4π geometry):

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3788
Duv	-0.0013
Chromaticity (x, y)	x=0.3892 y=0.3792
Chromaticity (u', v')	u'=0.2299 v'=0.5040
Color Rendering Index (CRI)	97.6
R9	95
Rg	102
Rf	93
Rcs,h1	-2

Photometric Measurement –Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	1882
Luminous Efficacy (lm/W)	94.24

Spectral Power Distribution & Chromaticity Diagram



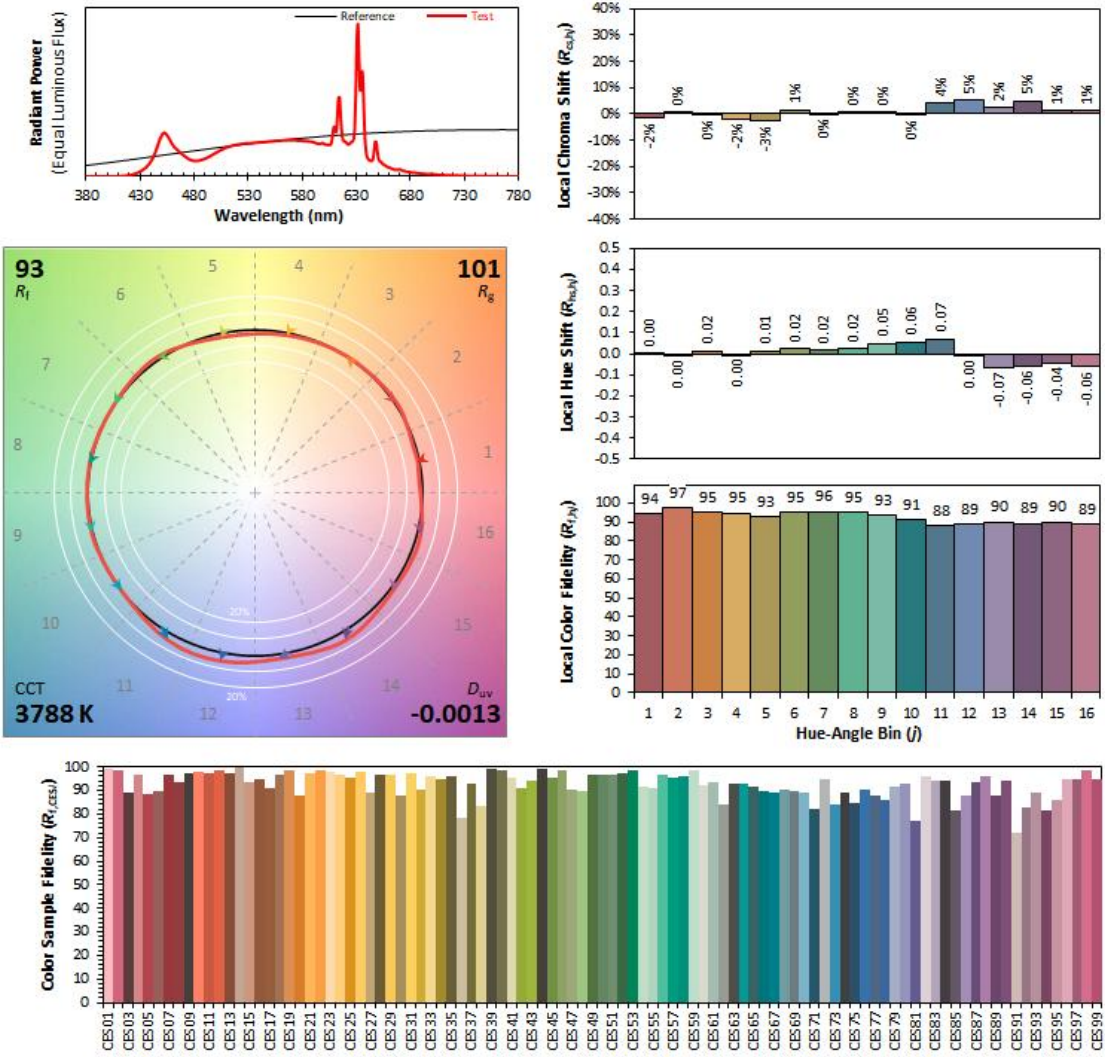
R1 =98	R2 =99	R3 =94	R4 =97	R5 =99	R6 =96	R7 =99		
R8 =99	R9 =95	R10=95	R11=95	R12=78	R13=99	R14=95	R15=98	



TM30

ANSI/IES TM-30-18 Color Rendition Report

Source: L128-xx90RC35xxxxx Manufacturer: RAB Lighting INC.
 Date: 2024-11-22 Model: ENCT-BN (mode:4000K)



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

x	0.3892	CIE 13.3-1995 (CRI)
y	0.3791	
u'	0.2299	
v'	0.5039	
		R_a 98
		R_g 95

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



2.6 Electrical, Photometric and Chromaticity Measurements

Test date	2024-11-22	Test Ambient:	25 ± 1 ° C
Test Orientation	As intended	Stabilization Time (min)	60
Model Number	ENCT-BN(mode:5000K)	Total Operating Time(min)	61

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD241047 NB-A1	120.0	60.01	0.1843	20.05	0.9068	46.31

Chromaticity Measurement - Sphere-Spectroradiometer

Method(Self-absorption:1.0264)(4π geometry):

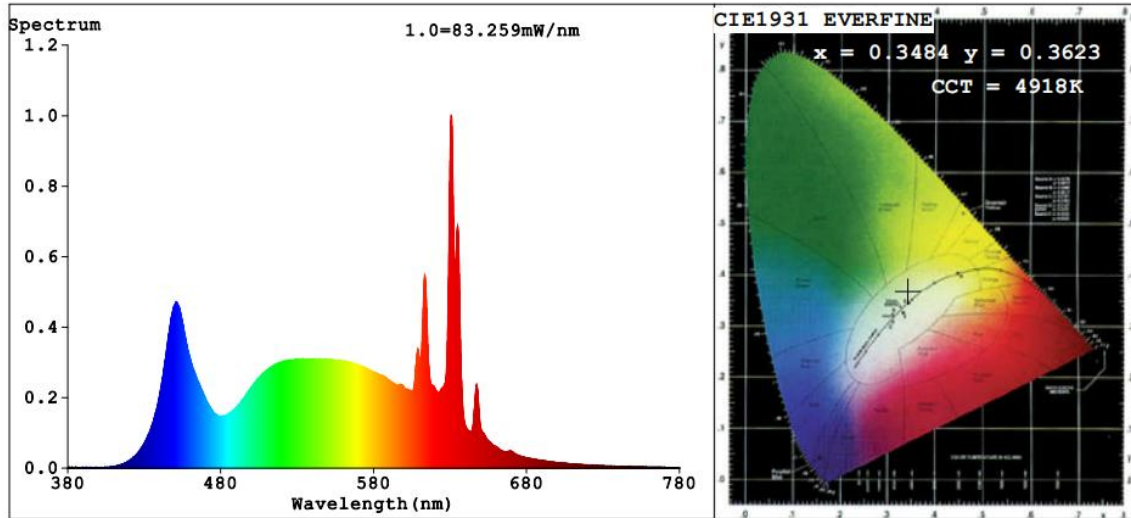
Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	4918
Duv	0.0040
Chromaticity (x, y)	x=0.3484 y=0.3623
Chromaticity (u', v')	u'=0.2095 v'=0.4903
Color Rendering Index (CRI)	95.2
R9	89
Rg	101
Rf	93
Rcs,h1	-3

Photometric Measurement –Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	1802
Luminous Efficacy (lm/W)	89.88



Spectral Power Distribution & Chromaticity Diagram



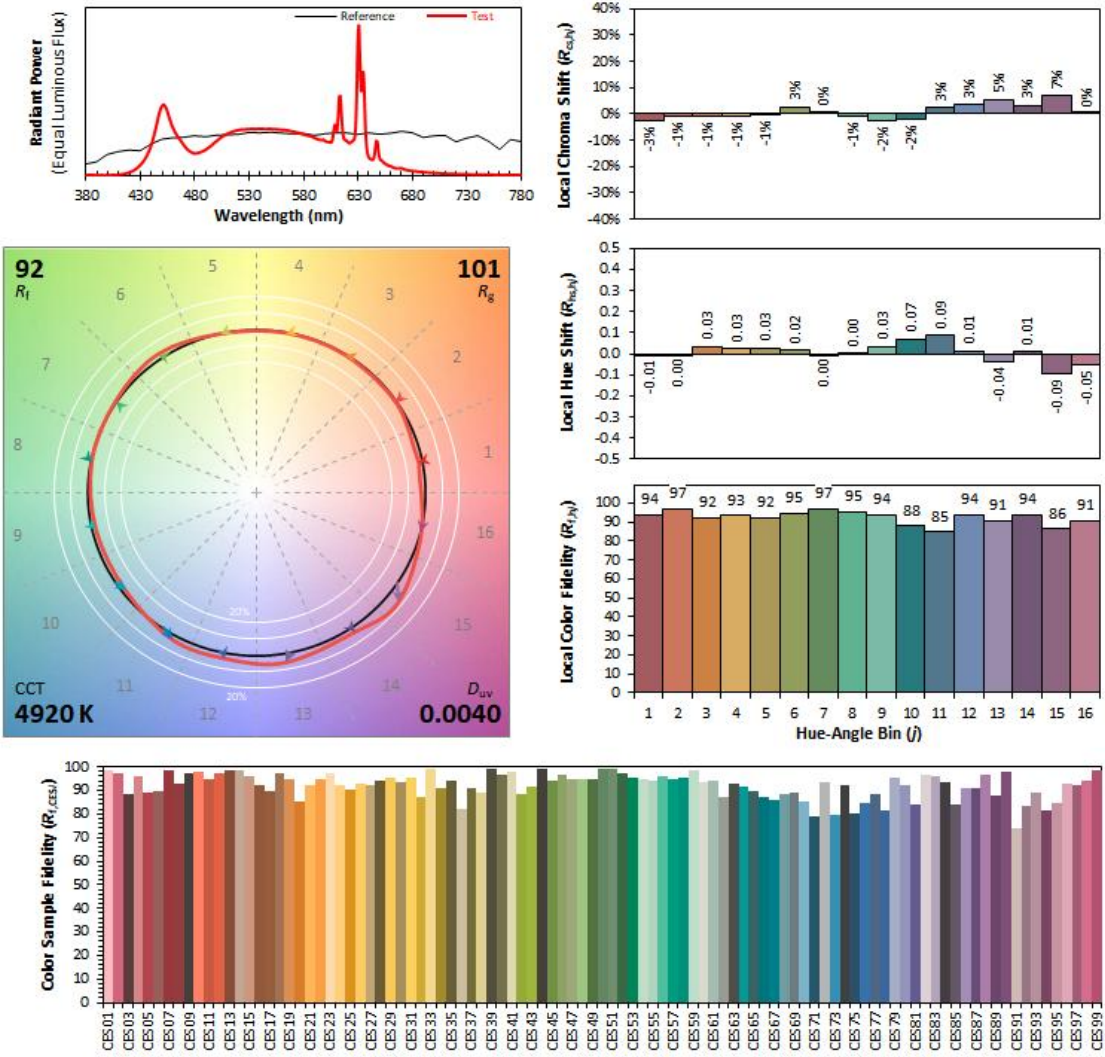
R1 =97	R2 =95	R3 =91	R4 =96	R5 =95	R6 =92	R7 =99		
R8 =98	R9 =89	R10=85	R11=94	R12=68	R13=96	R14=94	R15=95	



TM30

ANSI/IES TM-30-18 Color Rendition Report

Source: L128-xx90RC35xxxxx Manufacturer: RAB Lighting INC.
 Date: 2024-11-22 Model: ENCT-BN (mode:5000K)



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

x	0.3483	CIE 13.3-1995 (CRI)
y	0.3622	
u'	0.2095	
v'	0.4902	

R_a	95
R_g	89

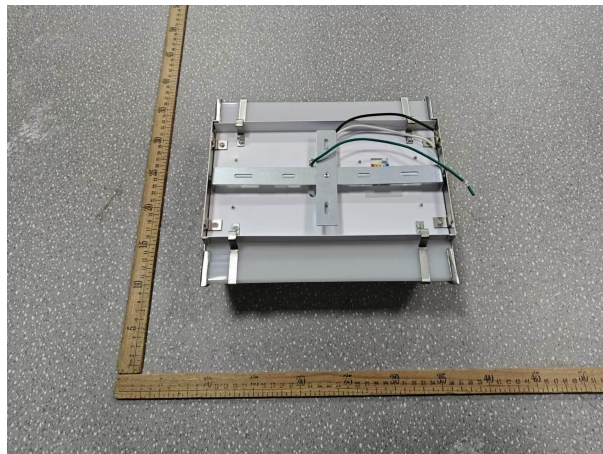
Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.



3. Test Equipment

Equipment ID	Equipment Name	Last Calibration Date	Next Calibration Date
ST-R-702	2 meter Integrating Sphere	Verified by D204 standard lamp	
ST-R-701	Spectral analysis system HAAS-1200	Verified by D204 standard lamp	
ST-R-703	Standard Lamp D204	2023-12-26	2024-12-25
ST-R-704	Power Meter for Integrating Sphere	2023-12-26	2024-12-25
ST-R-707	Temperature Probe for Integrating Sphere	2023-12-26	2024-12-25
ST-R-714	Goniophotometer system	Verified by D908S standard lamp	
ST-R-710	Standard Lamp D908S	2023-12-26	2024-12-25
ST-R-711	Power Meter for Goniophotometer	2023-12-26	2024-12-25
ST-R-709	Hygrothermograph for Goniophotometer	2023-12-26	2024-12-25
Uncertainty(K=2): Photometric Measurement (Sphere):3.40% Chromaticity Measurement(Sphere):44.8K Photometric Measurement(Goniophotometer):3.64%			

4. Product Photo



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