



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-24BN**

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,
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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-24BN	
Remark	N/A	
Representative (Tested) Model	ENCT-24BN(mode:2700K) ENCT-24BN(mode:3000K) ENCT-24BN(mode:3500K) ENCT-24BN(mode:4000K) ENCT-24BN(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-D1	
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	28W
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-24BN(mode:2700K)	Total Operating Time(min)	75

Electrical Measurement:

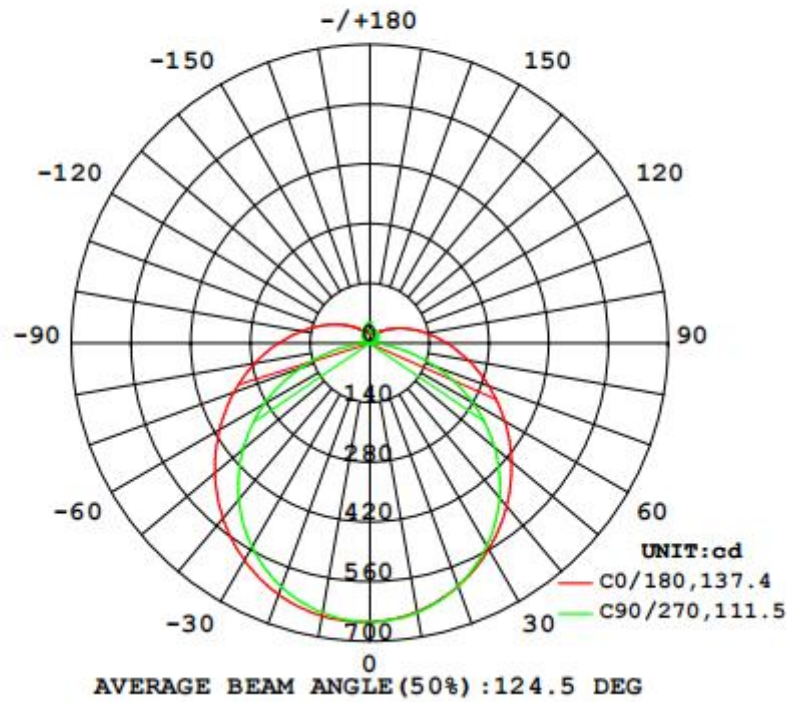
Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD241047 NB-D1	120.0	60.01	0.2549	27.75	0.9073	46.63

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

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	2491.5
Luminous Efficacy (lm/W)	89.78
Beam Angle (°)	124.5
Center Beam Candle Power (cd)	654

Zonal Lumen Tabulation

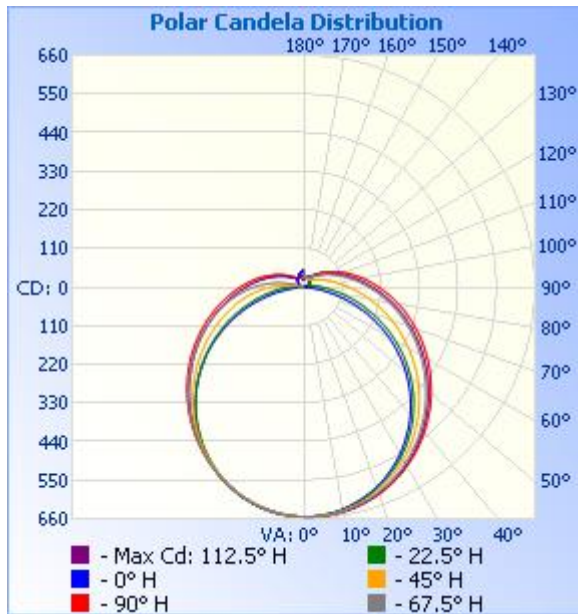
LUMINOUS INTENSITY DISTRIBUTION DIAGRAM



Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	511.5	20.5%
0-40	843.8	33.9%
0-60	1,536.5	61.7%
60-90	665.8	26.7%
70-100	475.0	19.1%
90-120	204.7	8.2%
0-90	2,202.3	88.4%
90-180	289.0	11.6%
0-180	2,491.3	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	61.9	2.5%	90-100	99.5	4%
10-20	177.9	7.1%	100-110	63.1	2.5%
20-30	271.6	10.9%	110-120	42.0	1.7%
30-40	332.3	13.3%	120-130	29.3	1.2%
40-50	354.4	14.2%	130-140	20.8	0.8%
50-60	338.3	13.6%	140-150	15.0	0.6%
60-70	290.4	11.7%	150-160	10.7	0.4%
70-80	222.7	8.9%	160-170	6.5	0.3%
80-90	152.8	6.1%	170-180	2.1	0.1%

Photometric Data



Illuminance at a Distance

Center Beam fc	Beam Width
4.0ft	40.9 fc 11.8 ft 20.5 ft
8.0ft	10.2 fc 23.7 ft 41.1 ft
12.0ft	4.5 fc 35.5 ft 61.6 ft
16.0ft	2.6 fc 47.4 ft 82.1 ft
20.0ft	1.6 fc 59.2 ft 102.7 ft

■ Vert. Spread: 111.9°
■ Horiz. Spread: 137.4°

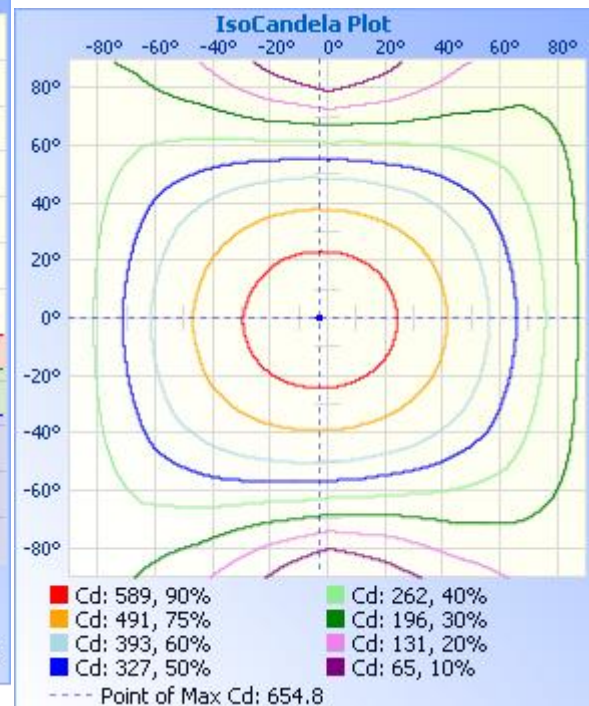
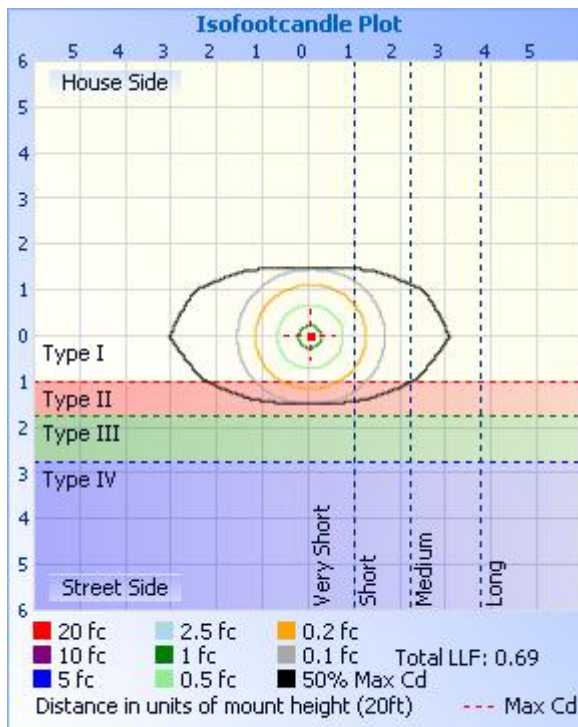




Table--1 UNIT: cd

C (DEG) \ T (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	654	654	654	654	654	654	654	654	654	654	654	654	654	654	654	654			
5	649	649	649	650	651	652	653	653	654	654	653	652	651	650	650	649			
10	640	640	640	641	642	644	646	648	650	649	647	645	643	641	640	640			
15	625	625	625	625	627	630	634	638	641	640	636	631	628	626	625	626			
20	607	606	605	604	606	611	617	623	628	626	620	613	608	605	606	607			
25	584	583	581	579	580	586	595	603	610	608	599	590	583	580	581	584			
30	558	556	552	548	549	557	568	579	589	585	574	562	553	550	553	558			
35	530	526	519	513	514	523	538	552	564	559	545	528	518	515	521	529			
40	499	495	484	474	474	485	503	522	537	530	512	491	479	477	486	497			
45	467	461	446	432	430	443	466	490	506	498	476	451	436	435	447	463			
50	434	426	406	387	382	398	427	456	475	465	438	407	389	389	407	428			
55	400	390	366	339	331	350	386	421	441	430	398	361	339	341	366	392			
60	365	354	325	290	278	301	345	385	408	395	358	313	286	292	324	356			
65	331	318	284	241	222	250	303	349	374	359	318	264	230	242	283	320			
70	298	283	245	193	165	200	263	314	340	324	278	216	174	192	243	284			
75	265	251	208	149	109	153	225	279	307	290	241	171	117	146	205	249			
80	235	219	175	109	58.1	111	189	246	274	257	205	129	64.5	104	168	213			
85	206	191	145	77.2	18.2	76.9	157	215	243	226	173	94.3	21.7	69.6	131	177			
90	181	165	120	54.8	1.22	51.4	130	187	214	196	144	66.9	1.06	43.1	94.1	142			
95	157	143	100.0	39.8	1.17	35.1	106	161	187	170	120	48.2	1.18	16.9	57.2	106			
100	136	122	82.3	29.2	3.31	25.8	87.3	138	163	147	99.5	36.0	3.17	0.00	20.2	70.6			
105	116	103	67.4	23.1	6.15	21.1	72.0	118	141	126	82.6	28.5	5.93	0.00	0.00	35.0			
110	98.2	87.1	55.5	19.5	9.17	18.7	60.0	101	121	107	68.9	24.2	8.87	0.00	0.00	0.00			
115	82.7	73.1	46.3	17.7	12.3	17.8	50.8	85.4	103	91.2	57.9	21.8	11.7	0.00	0.00	0.00			
120	69.3	61.2	39.2	17.2	15.3	17.6	43.6	72.4	87.9	77.4	49.4	20.9	14.6	0.00	0.00	0.00			
125	58.0	51.4	33.7	17.7	18.3	18.3	38.2	61.5	74.5	65.6	42.6	20.9	17.5	0.00	0.00	0.00			
130	48.6	43.3	29.6	19.3	20.9	20.0	34.0	52.5	63.1	55.7	37.5	20.9	20.4	0.00	0.00	0.00			
135	40.9	36.8	26.8	21.3	23.4	22.0	30.9	45.1	53.5	47.7	33.6	20.9	23.2	0.00	0.00	0.00			
140	34.7	31.8	25.7	23.3	25.9	23.8	28.8	39.1	45.5	41.3	30.7	20.9	26.1	0.00	0.00	0.00			
145	30.3	28.8	25.9	24.7	28.1	25.7	28.2	34.4	39.0	36.4	28.0	20.9	29.0	0.00	0.00	0.00			
150	28.7	28.1	26.4	26.2	30.0	27.2	28.2	31.4	34.0	32.8	25.3	20.9	31.8	0.00	0.00	0.00			
155	28.5	28.1	27.5	27.7	31.1	28.5	29.0	30.5	31.4	31.2	22.6	20.9	34.7	0.00	0.00	0.00			
160	28.9	28.5	28.7	27.8	29.7	29.0	29.9	30.3	30.1	30.5	20.0	20.9	37.6	0.00	0.00	0.00			
165	30.1	29.5	28.0	25.8	27.0	30.1	30.6	30.9	29.6	29.8	17.3	20.9	40.5	0.00	0.00	0.00			
170	30.6	26.9	24.1	25.2	25.2	29.2	29.0	30.3	30.2	29.1	14.6	20.9	43.3	0.00	0.00	0.00			
175	23.2	24.7	24.5	26.1	26.6	27.2	28.1	27.7	24.6	28.5	11.9	20.9	46.2	0.00	0.00	0.00			
180	27.0	22.7	27.1	27.6	28.4	27.8	27.6	24.7	26.9	27.8	9.17	20.9	49.1	0.00	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-24BN(mode:2700K)	Total Operating Time(min)	61

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD241047 NB-D1	120.0	60.01	0.2561	27.81	0.9048	46.75

Chromaticity Measurement - Sphere-Spectroradiometer

Method(Self-absorption:1.0709)(4π geometry):

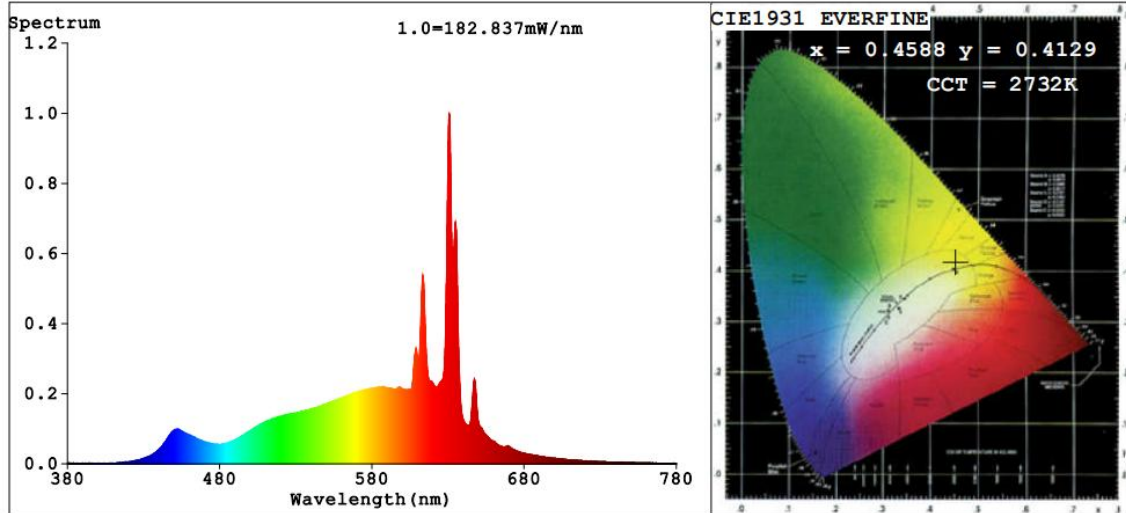
Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	2732
Duv	0.0009
Chromaticity (x, y)	x=0.4588 y=0.4129
Chromaticity (u', v')	u'=0.2608 v'=0.5281
Color Rendering Index (CRI)	95.5
R9	68
Rg	99
Rf	92
Rcs,h1	-5

Photometric Measurement –Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	2501
Luminous Efficacy (lm/W)	89.93



Spectral Power Distribution & Chromaticity Diagram



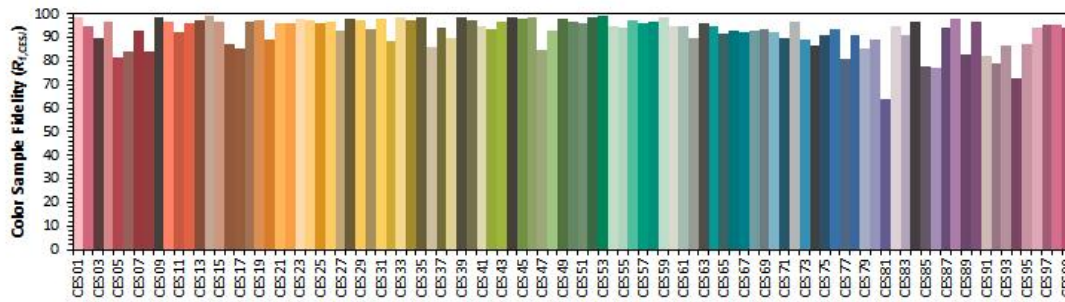
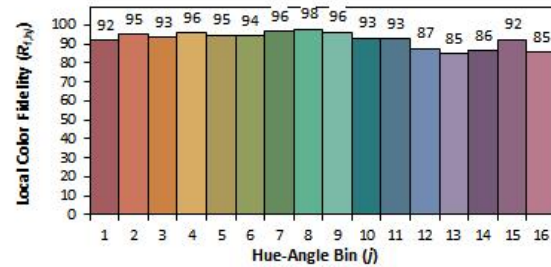
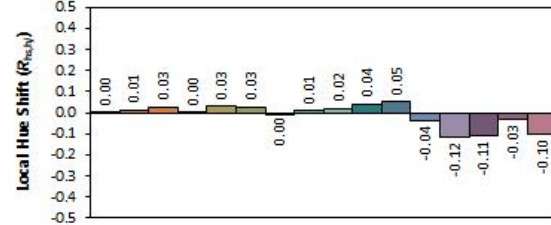
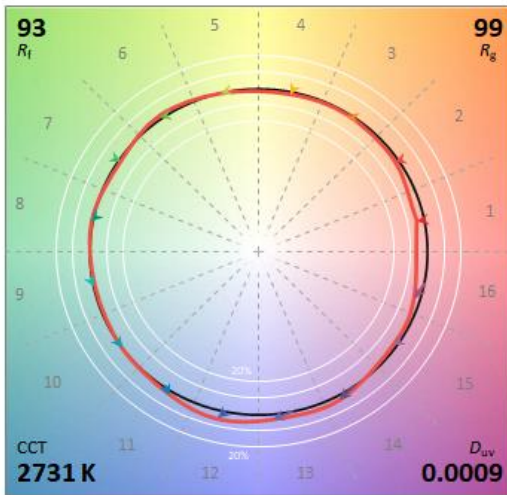
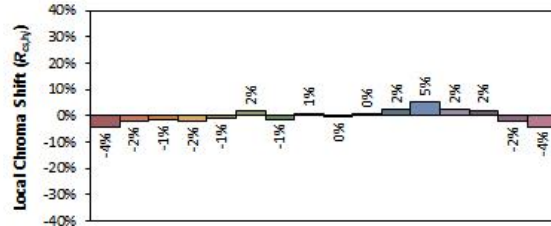
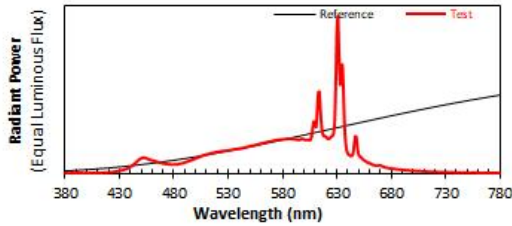
R1 =97	R2 =98	R3 =97	R4 =98	R5 =97	R6 =97	R7 =93		
R8 =87	R9 =68	R10=93	R11=99	R12=87	R13=97	R14=96	R15=93	



TM30

ANSI/IES TM-30-18 Color Rendition Report

Source: L128-xx90RC35xxxxx Manufacturer: RAB Lighting INC.
 Date: 2024-11-22 Model: ENCT-24BN (mode:2700K)



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

x	0.4589	CIE 13.3-1995 (CRI) R_a 96 R_g 69
y	0.4128	
u'	0.2609	
v'	0.5280	

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-24BN(mode:3000K)	Total Operating Time(min)	61

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD241047 NB-D1	120.0	60.01	0.2550	27.74	0.9065	46.69

Chromaticity Measurement - Sphere-Spectroradiometer

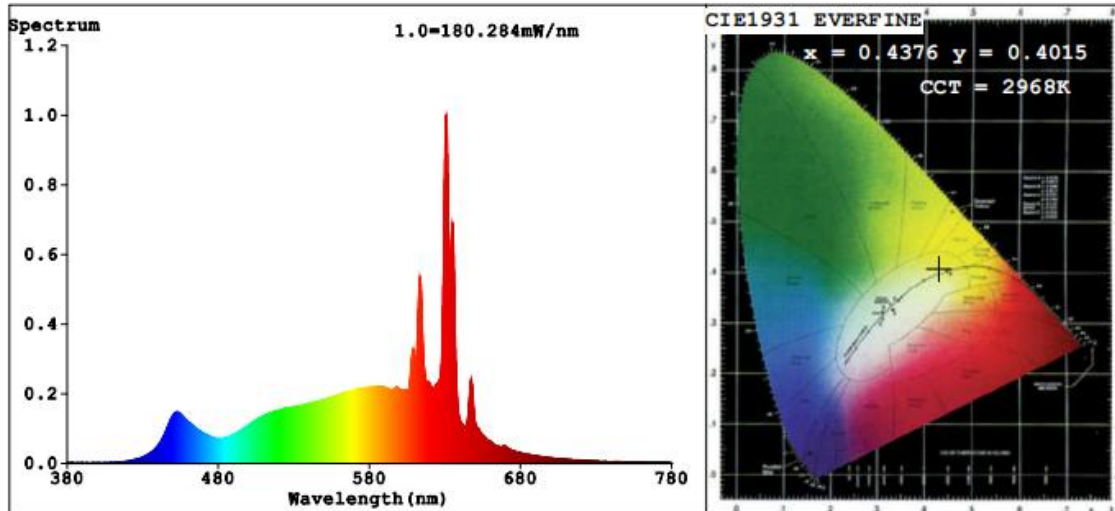
Method(Self-absorption:1.0708)(4π geometry):

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	2968
Duv	-0.0011
Chromaticity (x, y)	x=0.4376 y=0.4015
Chromaticity (u', v')	u'=0.2521 v'=0.5204
Color Rendering Index (CRI)	96.9
R9	79
Rg	101
Rf	93
Rcs,h1	-4

Photometric Measurement –Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	2575
Luminous Efficacy (lm/W)	92.83

Spectral Power Distribution & Chromaticity Diagram



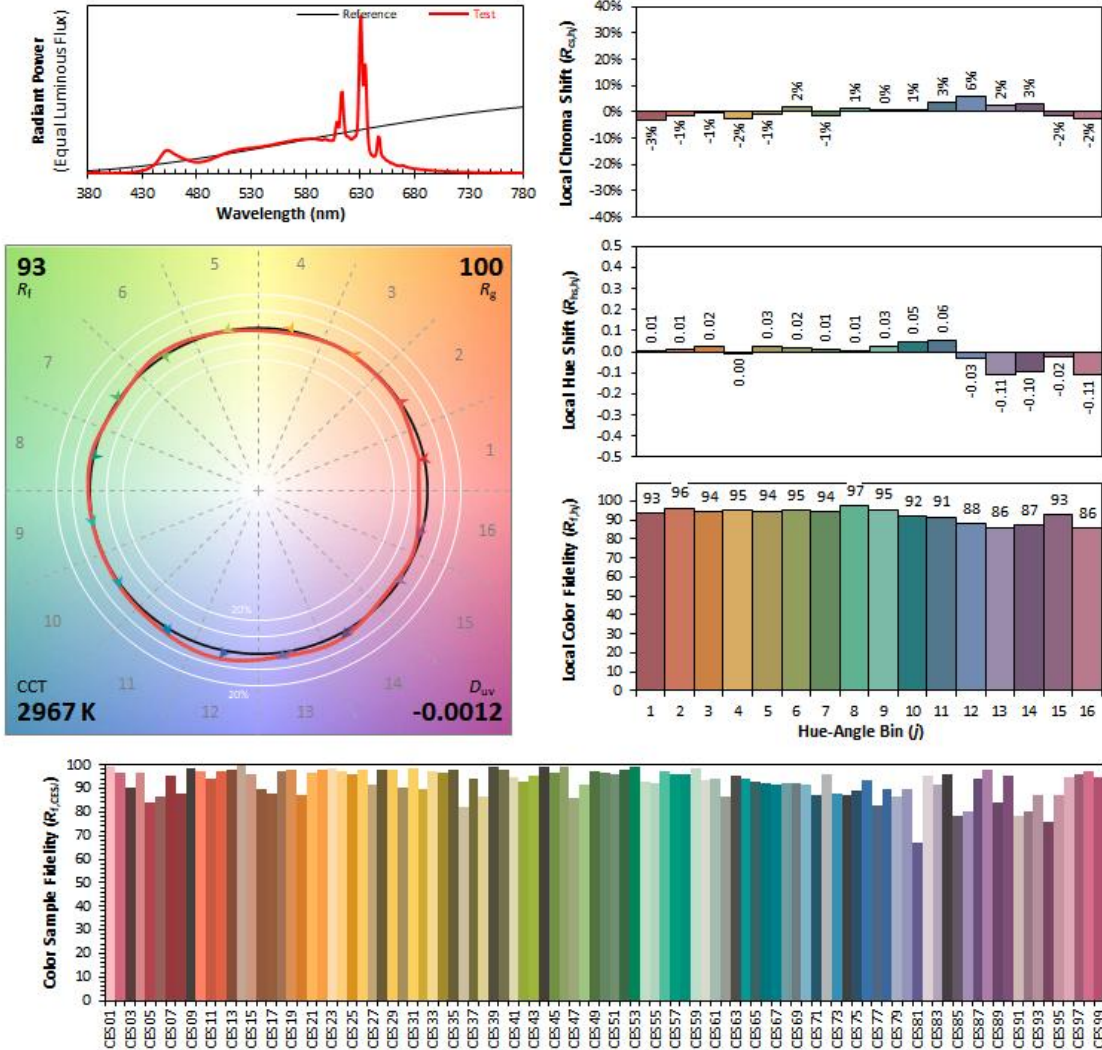
R1 =99	R2 =99	R3 =97	R4 =99	R5 =99	R6 =95	R7 =94	
R8 =91	R9 =79	R10=97	R11=97	R12=85	R13=100	R14=97	R15=97



TM30

ANSI/IES TM-30-18 Color Rendition Report

Source: L128-xx90RC35xxxxx Manufacturer: RAB Lighting INC.
 Date: 2024-11-22 Model: ENCT-24BN (mode:3000K)



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

x	0.4376	CIE 13.3-1995 (CRI) R_a 97 R_g 79
y	0.4014	
u'	0.2522	
v'	0.5204	

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-24BN(mode:3500K)	Total Operating Time(min)	61

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD241047 NB-D1	120.0	60.01	0.2552	27.73	0.9056	46.69

Chromaticity Measurement - Sphere-Spectroradiometer

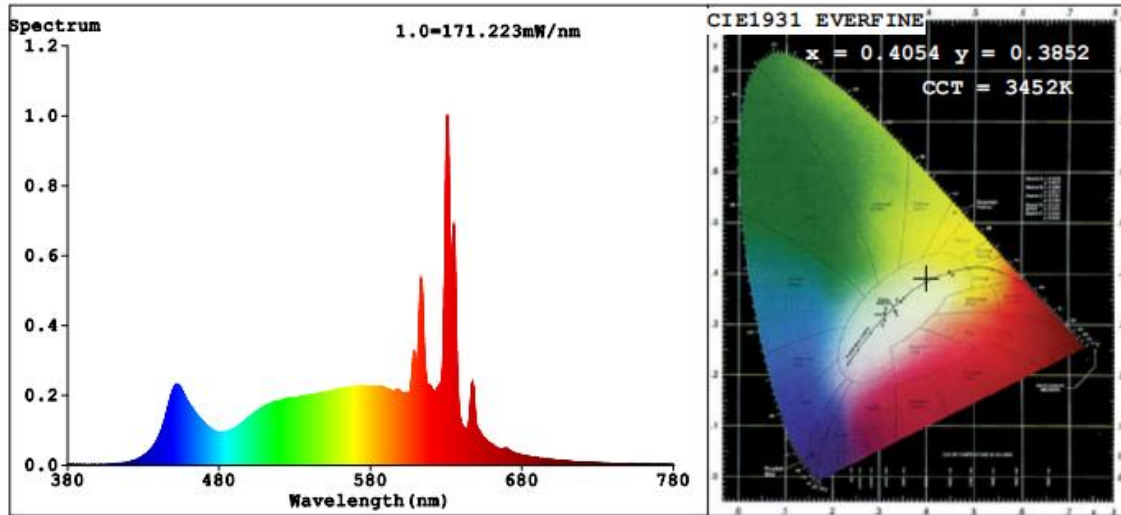
Method(Self-absorption:1.0711)(4π geometry):

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3452
Duv	-0.0024
Chromaticity (x, y)	x=0.4054 y=0.3852
Chromaticity (u', v')	u'=0.2380 v'=0.5090
Color Rendering Index (CRI)	97.1
R9	92
Rg	102
Rf	93
Rcs,h1	-2

Photometric Measurement –Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	2657
Luminous Efficacy (lm/W)	95.82

Spectral Power Distribution & Chromaticity Diagram



R1 =97	R2 =99	R3 =96	R4 =98	R5 =98	R6 =95	R7 =97		
R8 =97	R9 =92	R10=98	R11=95	R12=82	R13=98	R14=96	R15=98	

TM30

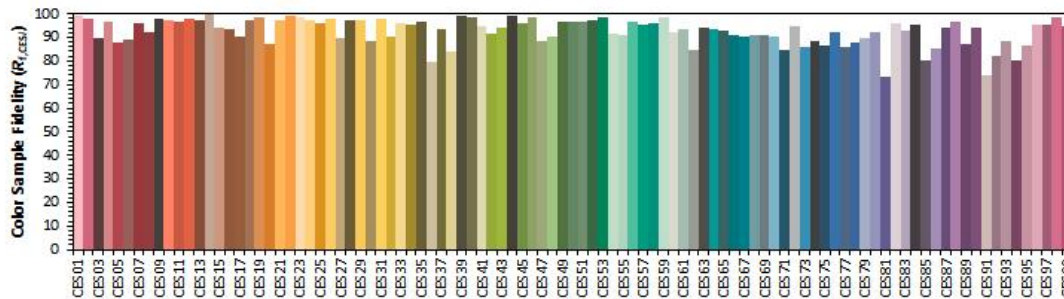
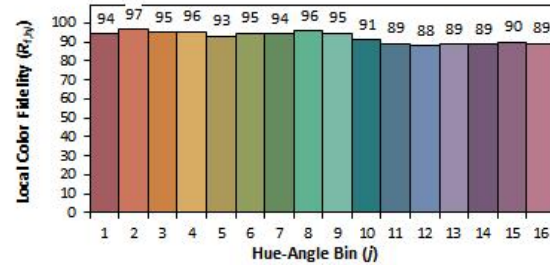
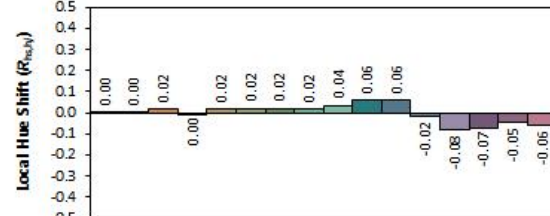
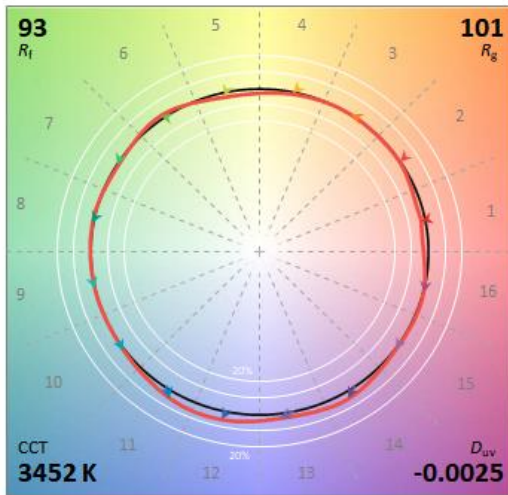
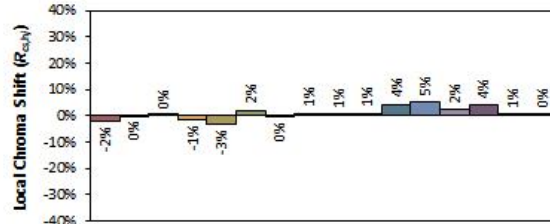
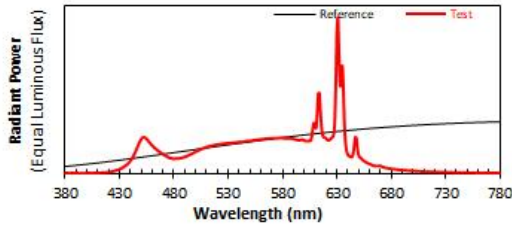
ANSI/IES TM-30-18 Color Rendition Report

Source: L128-xx90RC35xxxxx

Manufacturer: RAB Lighting INC.

Date: 2024-11-22

Model: ENCT-24BN (mode: 3500K)



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

x 0.4054
y 0.3851
u' 0.2381
v' 0.5089

CIE 13.3-1995 (CRI)

Ra 97
Rg 93

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-24BN(mode:4000K)	Total Operating Time(min)	61

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD241047 NB-D1	120.0	60.01	0.2535	27.64	0.9086	46.57

Chromaticity Measurement - Sphere-Spectroradiometer

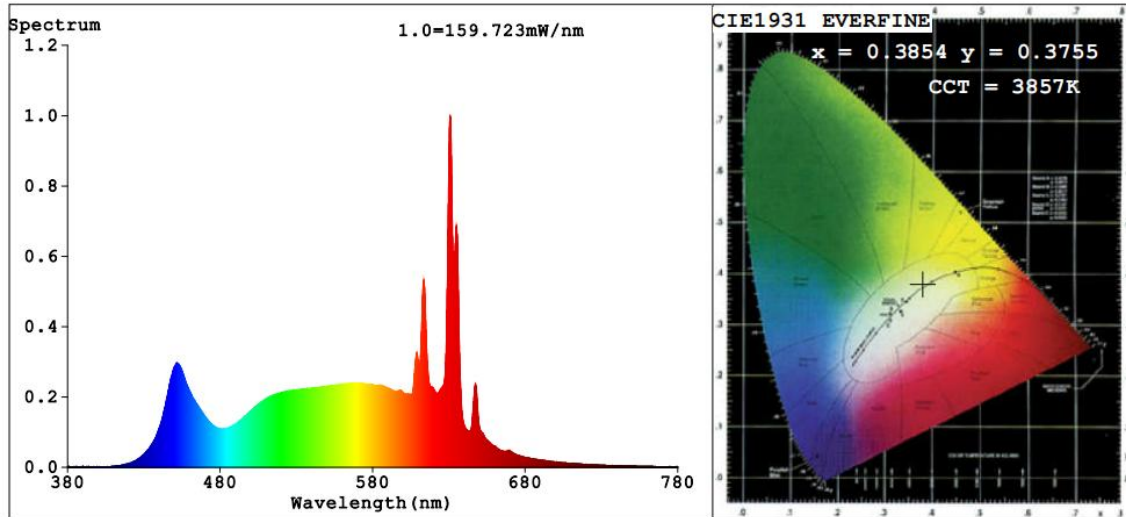
Method(Self-absorption:1.0713)(4π geometry):

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3857
Duv	-0.0020
Chromaticity (x, y)	x=0.3854 y=0.3755
Chromaticity (u', v')	u'=0.2289 v'=0.5017
Color Rendering Index (CRI)	97.4
R9	97
Rg	102
Rf	93
Rcs,h1	-2

Photometric Measurement –Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	2664
Luminous Efficacy (lm/W)	96.38

Spectral Power Distribution & Chromaticity Diagram



R1 =97	R2 =99	R3 =94	R4 =97	R5 =98	R6 =96	R7 =99		
R8 =99	R9 =97	R10=96	R11=94	R12=79	R13=98	R14=95	R15=97	

TM30

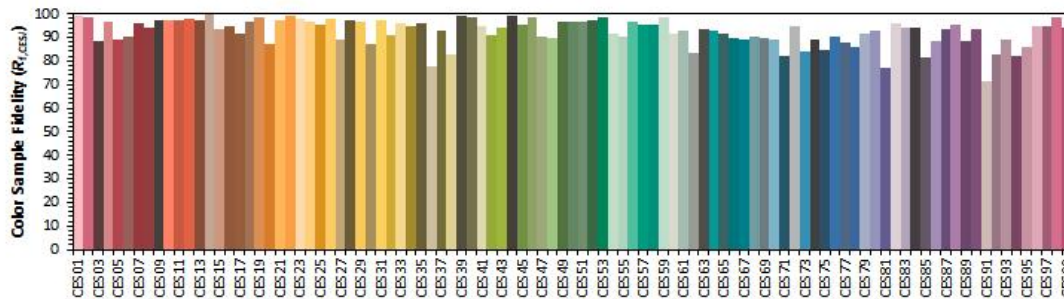
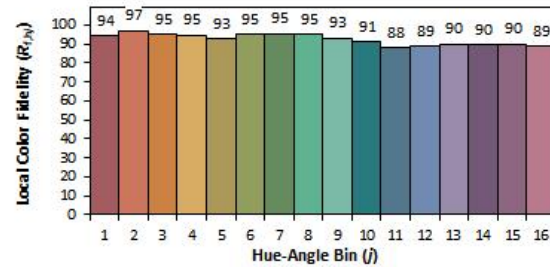
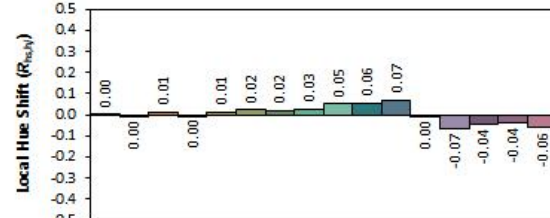
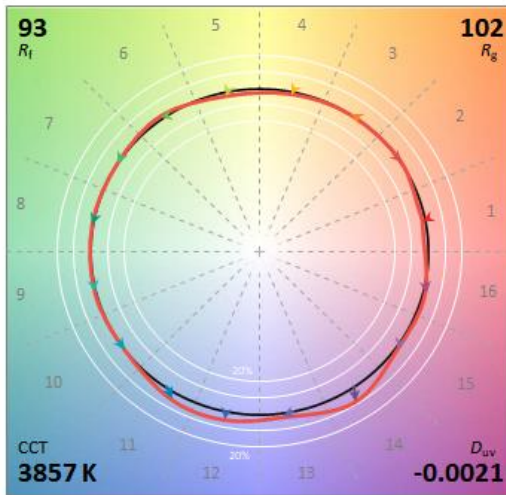
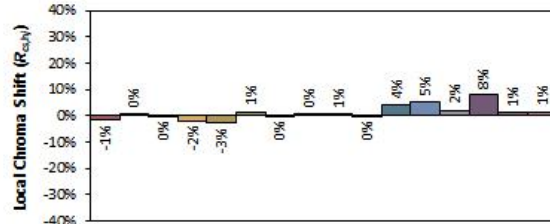
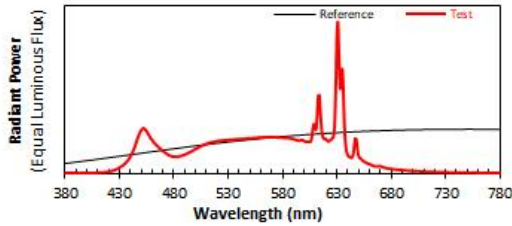
ANSI/IES TM-30-18 Color Rendition Report

Source: L128-xx90RC35xxxxx

Manufacturer: RAB Lighting INC.

Date: 2024-11-22

Model: ENCT-24BN (mode: 4000K)



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

x 0.3854
y 0.3753
u' 0.2289
v' 0.5017

CIE 13.3-1995 (CRI)

R_a 97
R_g 97

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-24BN(mode:5000K)	Total Operating Time(min)	61

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD241047 NB-D1	120.0	60.01	0.2564	27.74	0.9016	46.79

Chromaticity Measurement - Sphere-Spectroradiometer

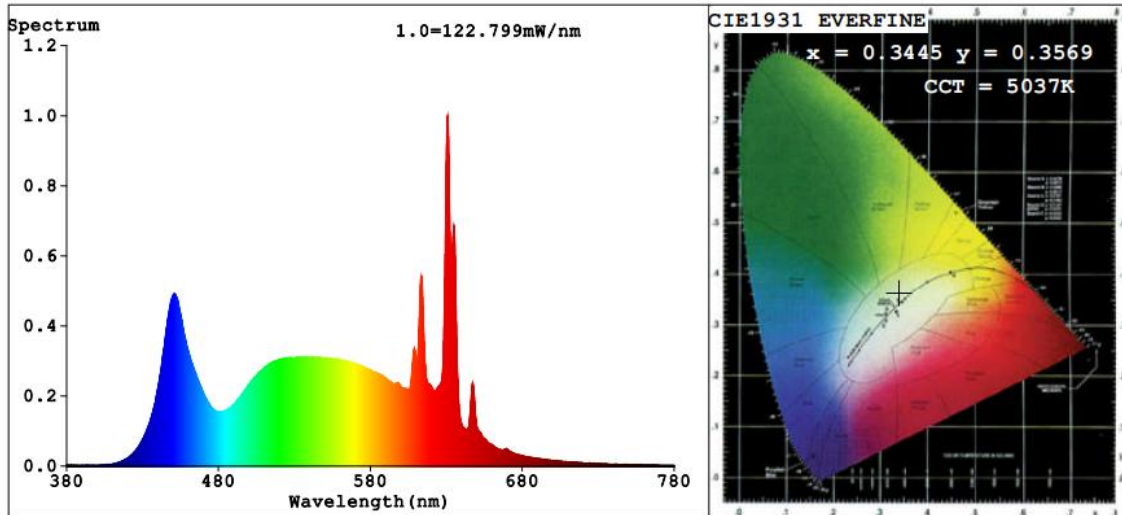
Method(Self-absorption:1.0706)(4π geometry):

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	5037
Duv	0.0029
Chromaticity (x, y)	x=0.3445 y=0.3569
Chromaticity (u', v')	u'=0.2090 v'=0.4871
Color Rendering Index (CRI)	95.6
R9	91
Rg	102
Rf	93
Rcs,h1	-3

Photometric Measurement –Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	2550
Luminous Efficacy (lm/W)	91.93

Spectral Power Distribution & Chromaticity Diagram



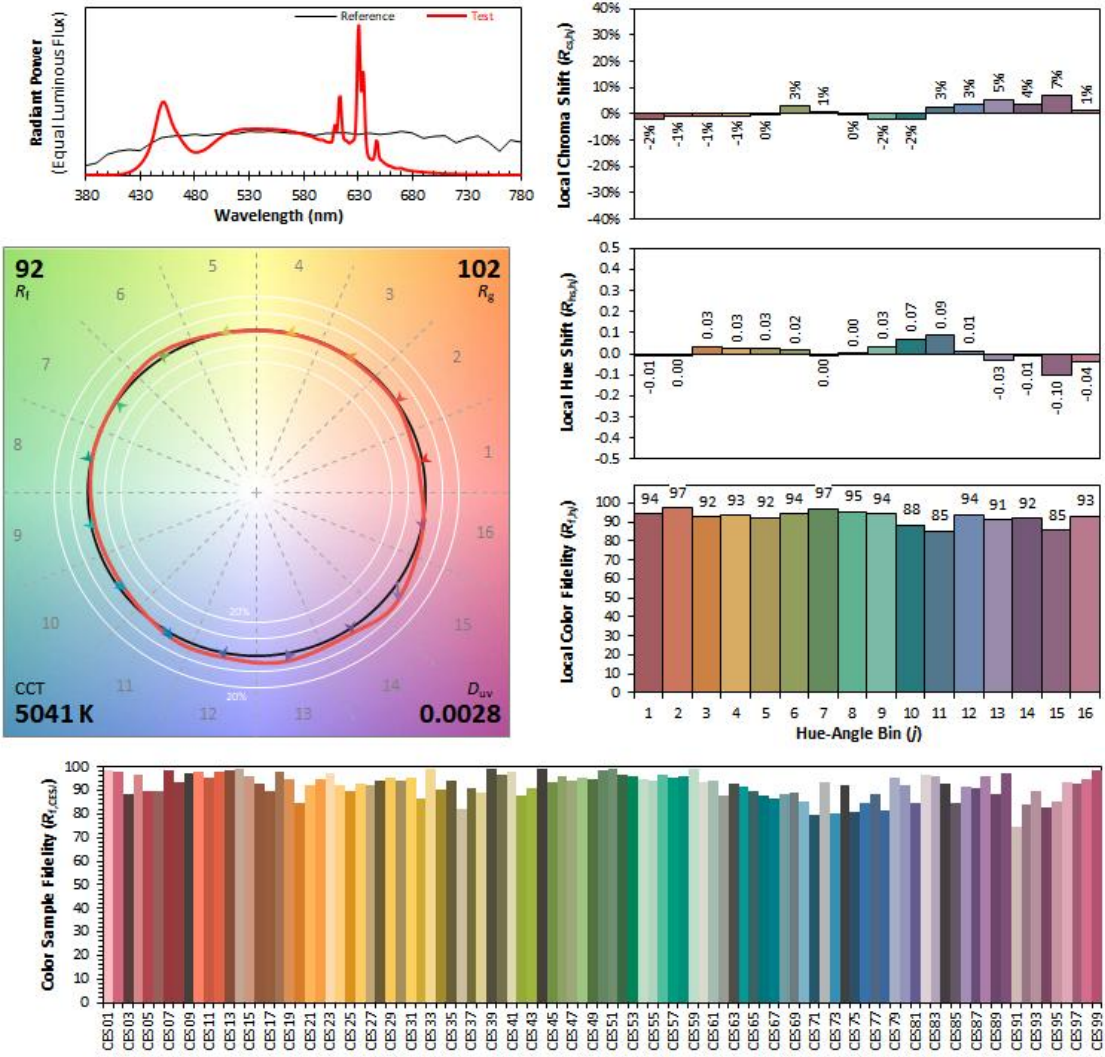
R1 =98	R2 =95	R3 =91	R4 =96	R5 =97	R6 =93	R7 =97		
R8 =98	R9 =91	R10=87	R11=94	R12=75	R13=97	R14=94	R15=98	



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ANSI/IES TM-30-18 Color Rendition Report

Source: L128-xx90RC35xxxxx Manufacturer: RAB Lighting INC.
 Date: 2024-11-22 Model: ENCT-24BN (mode:5000K)



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

x	0.3445	CIE 13.3-1995 (CRI) R_a 96 R_g 92
y	0.3568	
u'	0.2090	
v'	0.4871	

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 *****