



## LM-79-19 Test Report

For

**RAB Lighting INC.**

**(Brand Name:RAB)**

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

**Model name(s):  
ALR-24RBN**

**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.



<b>1.1 Product Information:</b>	
Model Number	ALR-24RBN
Remark	N/A
Representative (Tested) Model	ALR-24RBN(mode:2700K) ALR-24RBN(mode:3000K) ALR-24RBN(mode:3500K) ALR-24RBN(mode:4000K) ALR-24RBN(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-E1
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

<b>1.2 Rated Values:</b>	
Rated Voltage / Frequency	120Vac, 60Hz
Nominal Power	24W
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"> <li>1. Total Luminous Flux</li> <li>2. Luminous Distribution Intensity</li> <li>3. Luminous Efficacy</li> <li>4. Correlated Color Temperature</li> <li>5. Color Rendering Index</li> <li>6. Chromaticity Coordinate</li> <li>7. Electrical Parameters</li> </ol>
Reference Standard	<ol style="list-style-type: none"> <li>1. IES LM-79-2019 Optical and Electrical Measurements of Solid-State Lighting Products</li> <li>2. ANSI C78.377-2008 Specifications for the Chromaticity of Solid State Lighting Products</li> <li>3. CIE 13.3-1995 Method of Measuring and Specifying Colour Rendering Properties of Light Sources</li> <li>4. CIE 15-2004 Technical Report Colorimetry</li> <li>5. IESNA LM-16-93 Practical Guide to Colorimetry of Light Source</li> <li>6. IESNA TM-16-05 Technical Memorandum on Light Emitting Diode (LED) Sources and Systems</li> </ol>

### 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  $1^{\circ}$  vertical intervals and  $22.5^{\circ}$  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**

<b>Test date</b>	2024-11-22	<b>Test Ambient:</b>	25 ± 1 ° C
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	60
<b>Model Number</b>	ALR-24RBN(mode:2700K)	<b>Total Operating Time(min)</b>	75

**Electrical Measurement:**

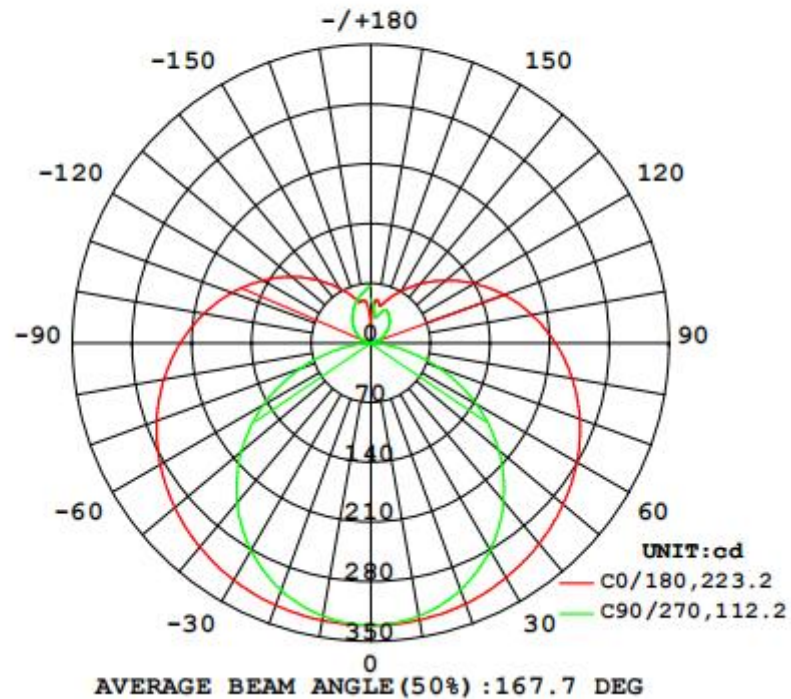
Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD241047 NB-E1	120.0	60.01	0.2235	24.36	0.9082	45.90

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

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	1925.5
Luminous Efficacy (lm/W)	79.05
Beam Angle (°)	167.7
Center Beam Candle Power (cd)	331

**Zonal Lumen Tabulation**

**LUMINOUS INTENSITY DISTRIBUTION DIAGRAM**



Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	265.8	13.8%
0-40	447.3	23.2%
0-60	862.7	44.8%
60-90	540.6	28.1%
70-100	471.8	24.5%
90-120	334.0	17.3%
0-90	1,403.3	72.9%
90-180	522.0	27.1%
0-180	1,925.3	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	31.4	1.6%	90-100	133.5	6.9%
10-20	91.4	4.7%	100-110	111.3	5.8%
20-30	142.9	7.4%	110-120	89.2	4.6%
30-40	181.5	9.4%	120-130	68.6	3.6%
40-50	204.5	10.6%	130-140	49.7	2.6%
50-60	210.9	11.0%	140-150	33.7	1.8%
60-70	202.3	10.5%	150-160	21.3	1.1%
70-80	182.0	9.5%	160-170	11.2	0.6%
80-90	156.3	8.1%	170-180	3.5	0.2%

**Photometric Data**

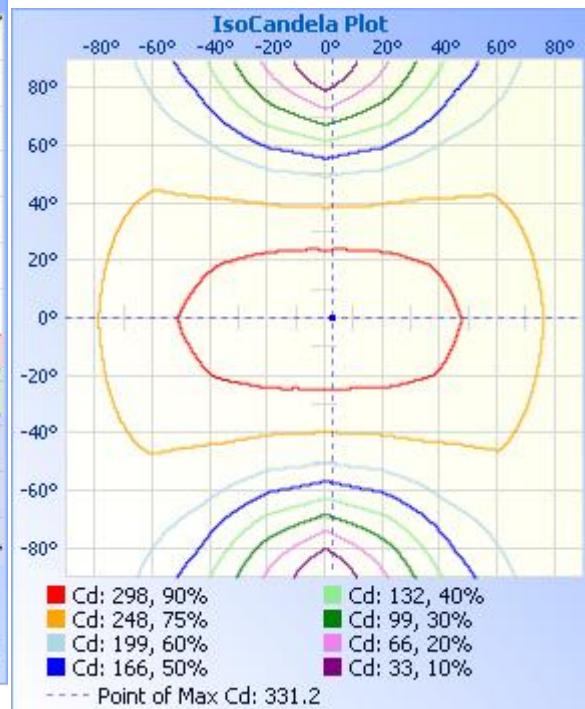
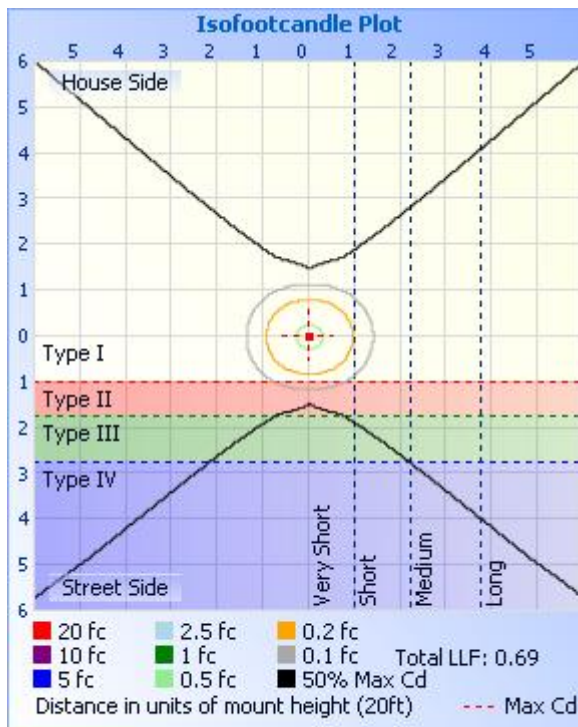
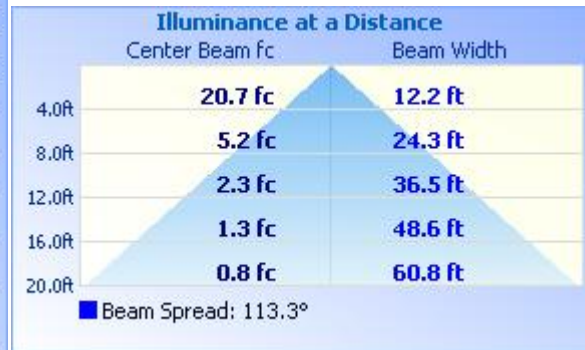
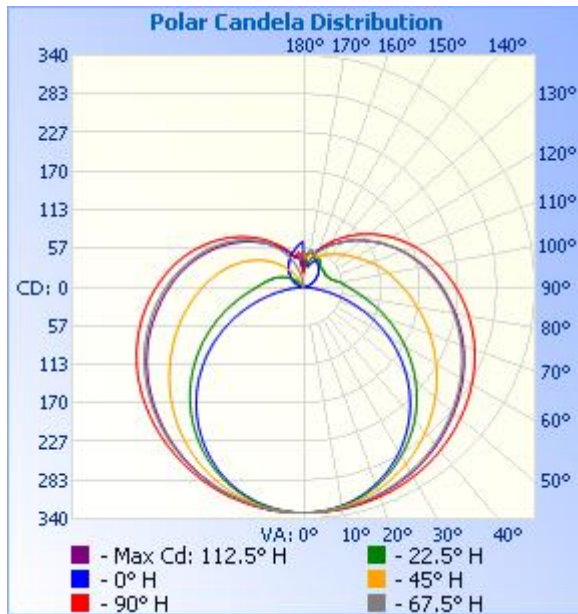




Table--1

UNIT: °C

γ (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	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331			
5	331	331	330	330	330	330	330	331	331	331	330	330	330	330	330	330			
10	330	329	328	326	325	326	327	329	330	330	328	326	325	326	326	329			
15	328	327	323	320	318	320	323	327	329	327	324	320	318	320	324	326			
20	326	323	317	311	308	311	317	323	327	324	318	311	309	311	318	323			
25	322	318	310	300	295	300	309	318	325	320	310	300	296	300	310	319			
30	318	313	301	286	280	286	300	313	321	315	302	287	281	287	304	314			
35	313	307	290	271	263	271	289	307	317	310	292	272	264	272	291	308			
40	307	299	279	254	243	254	278	300	312	303	280	255	244	255	280	301			
45	301	292	266	235	220	235	266	293	307	296	268	236	222	236	268	294			
50	295	283	253	215	196	215	252	284	300	288	255	217	199	216	254	286			
55	287	274	239	194	170	194	239	276	293	279	242	196	173	196	241	277			
60	279	265	225	172	142	172	225	266	285	270	228	174	146	174	227	268			
65	270	255	211	150	114	150	211	257	277	260	215	153	117	153	213	258			
70	261	244	197	129	84.6	129	197	246	268	250	201	132	88.0	132	200	248			
75	251	232	184	110	55.9	109	183	235	257	239	188	113	59.2	113	186	237			
80	240	220	170	93.0	29.4	91.5	170	224	247	227	175	95.3	32.5	95.5	173	225			
85	228	209	157	78.5	9.15	76.8	157	213	235	215	162	80.2	10.7	80.6	160	214			
90	217	197	146	67.3	0.44	65.8	146	201	224	203	149	68.7	0.38	68.8	148	202			
95	204	186	135	59.6	0.83	57.7	135	189	211	191	138	60.1	1.08	60.6	137	190			
100	192	174	125	52.9	2.30	49.9	125	177	199	179	128	51.9	2.48	53.5	125	178			
105	179	162	115	47.1	5.38	42.7	115	166	186	167	117	43.9	5.39	47.2	114	167			
110	166	150	106	42.4	9.11	40.2	106	154	173	155	107	40.7	9.15	41.0	102	155			
115	153	138	97.0	39.5	13.2	37.7	95.8	142	160	142	96.7	37.1	13.2	34.7	90.5	143			
120	140	127	88.5	38.1	17.7	37.1	87.2	130	147	129	88.2	35.7	17.4	28.4	79.0	131			
125	127	115	80.6	38.1	22.2	37.4	81.2	118	134	118	81.4	36.9	21.6	22.2	67.4	119			
130	115	104	73.7	38.4	26.8	37.8	74.3	107	121	107	74.0	38.0	25.8	15.9	55.9	107			
135	102	93.2	67.0	37.8	31.0	37.9	68.0	96.2	108	96.2	67.2	39.2	29.9	9.66	44.3	95.5			
140	91.1	83.7	62.2	36.4	34.4	38.0	63.0	85.5	96.5	85.7	63.1	40.3	34.1	3.40	32.8	83.7			
145	79.8	73.9	57.4	34.1	37.7	41.9	58.3	76.4	84.8	77.2	60.3	41.5	38.3	0.00	21.3	71.9			
150	70.3	65.6	52.6	34.4	40.9	46.6	53.6	68.0	74.7	70.0	57.7	42.7	42.5	0.00	9.73	60.0			
155	61.3	57.8	47.2	42.2	43.5	48.7	49.0	60.0	65.3	63.0	55.0	43.9	46.7	0.00	0.00	48.2			
160	52.8	50.5	38.9	46.6	39.7	47.4	50.9	52.7	56.3	55.3	52.3	45.0	50.9	0.00	0.00	36.4			
165	45.2	45.1	37.9	37.7	34.3	43.4	53.9	53.3	49.9	50.5	49.7	46.2	55.1	0.00	0.00	24.5			
170	50.0	45.1	32.6	32.1	30.6	34.4	48.0	54.6	50.7	49.7	47.0	47.4	59.3	0.00	0.00	12.7			
175	45.9	30.4	36.2	40.3	41.5	40.0	42.5	46.2	44.3	48.9	44.4	48.6	63.5	0.00	0.00	0.88			
180	22.8	38.5	46.9	50.2	51.8	50.3	47.4	40.9	22.8	48.1	41.7	49.8	67.7	0.00	0.00	0.00			



**2.2 Electrical, Photometric and Chromaticity Measurements**

<b>Test date</b>	2024-11-22	<b>Test Ambient:</b>	25 ± 1 ° C
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	60
<b>Model Number</b>	ALR-24RBN(mode:2700K)	<b>Total Operating Time(min)</b>	61

**Electrical Measurement:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD241047 NB-E1	120.0	60.01	0.2213	24.39	0.9186	45.69

**Chromaticity Measurement - Sphere-Spectroradiometer**

**Method(Self-absorption:1.0714)(4π geometry):**

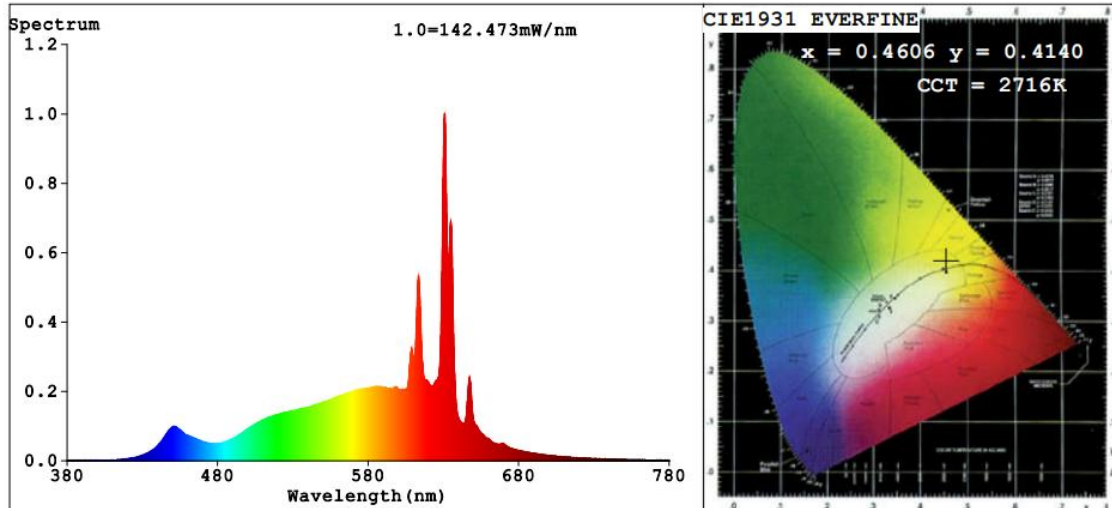
Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	2716
Duv	0.0012
Chromaticity (x, y)	x=0.4606 y=0.4140
Chromaticity (u', v')	u'=0.2615 v'=0.5287
Color Rendering Index (CRI)	95.6
R9	69
Rg	100
Rf	92
Rcs,h1	-5

**Photometric Measurement –Sphere-Spectroradiometer Method:**

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	1945
Luminous Efficacy (lm/W)	79.75



**Spectral Power Distribution & Chromaticity Diagram**



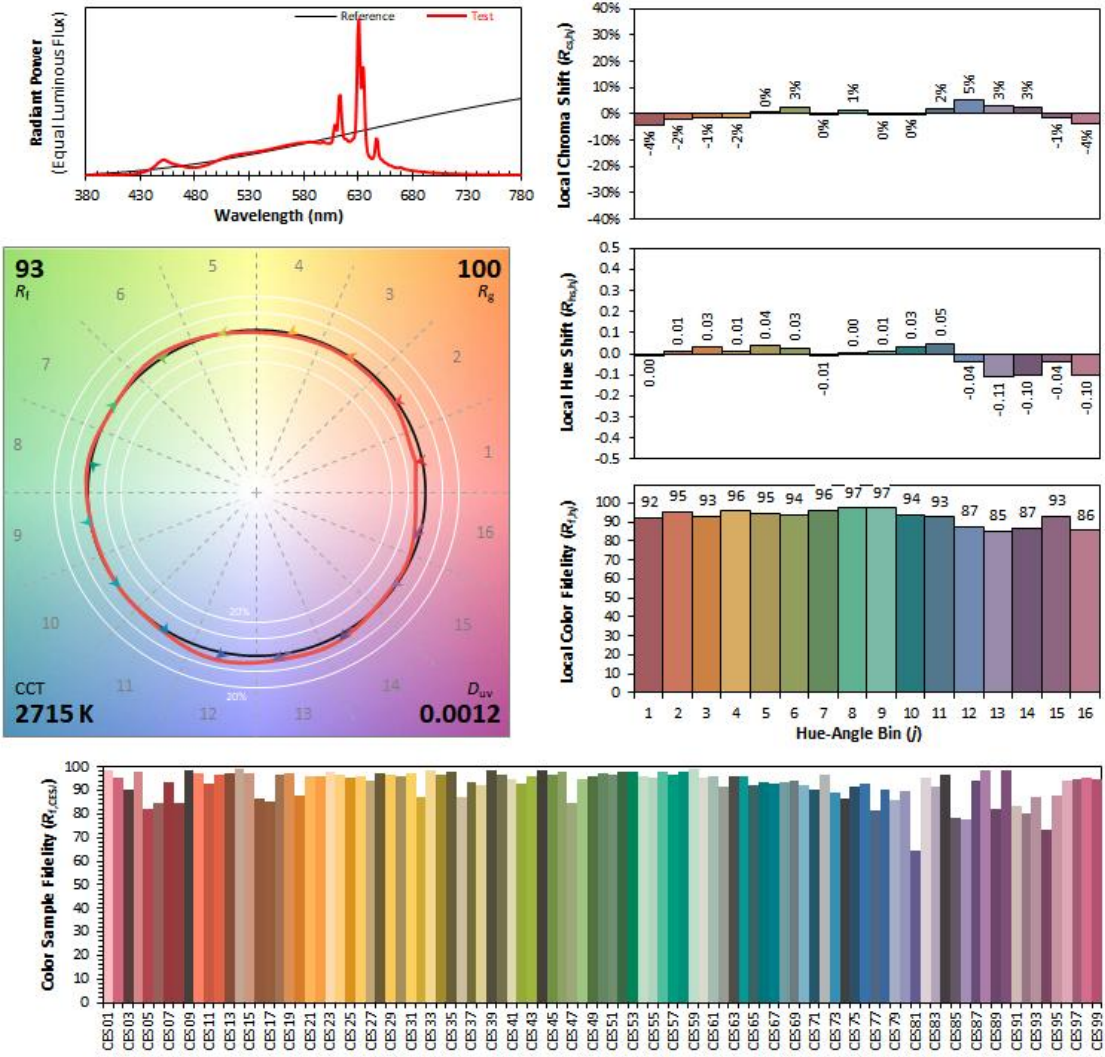
R1 =98	R2 =98	R3 =96	R4 =98	R5 =97	R6 =97	R7 =94		
R8 =88	R9 =69	R10=92	R11=98	R12=87	R13=97	R14=96	R15=93	



**TM30**

**ANSI/IES TM-30-18 Color Rendition Report**

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



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

$x$	0.4606	CIE 13.3-1995 (CRI)
$y$	0.4139	
$u'$	0.2615	
$v'$	0.5287	
		$R_a$ 96
		$R_g$ 70

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**

<b>Test date</b>	2024-11-22	<b>Test Ambient:</b>	25 ± 1 ° C
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	60
<b>Model Number</b>	ALR-24RBN(mode:3000K)	<b>Total Operating Time(min)</b>	61

**Electrical Measurement:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD241047 NB-E1	120.0	60.01	0.2207	24.35	0.9195	45.63

**Chromaticity Measurement - Sphere-Spectroradiometer**

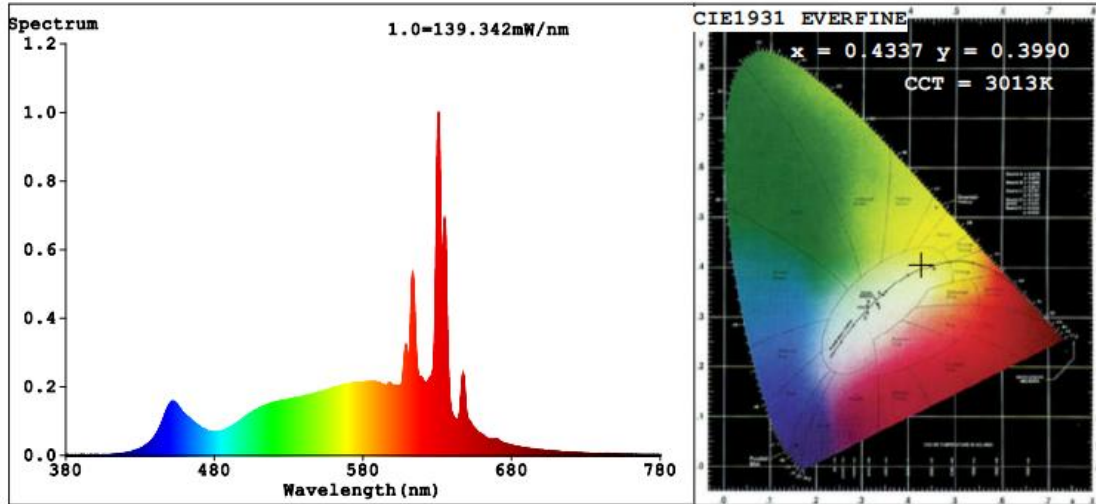
**Method(Self-absorption:1.0712)(4π geometry):**

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3013
Duv	-0.0016
Chromaticity (x, y)	x=0.4337 y=0.3990
Chromaticity (u', v')	u'=0.2507 v'=0.5189
Color Rendering Index (CRI)	97.0
R9	83
Rg	102
Rf	93
Rcs,h1	-3

**Photometric Measurement –Sphere-Spectroradiometer Method:**

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	2005
Luminous Efficacy (lm/W)	82.34

**Spectral Power Distribution & Chromaticity Diagram**



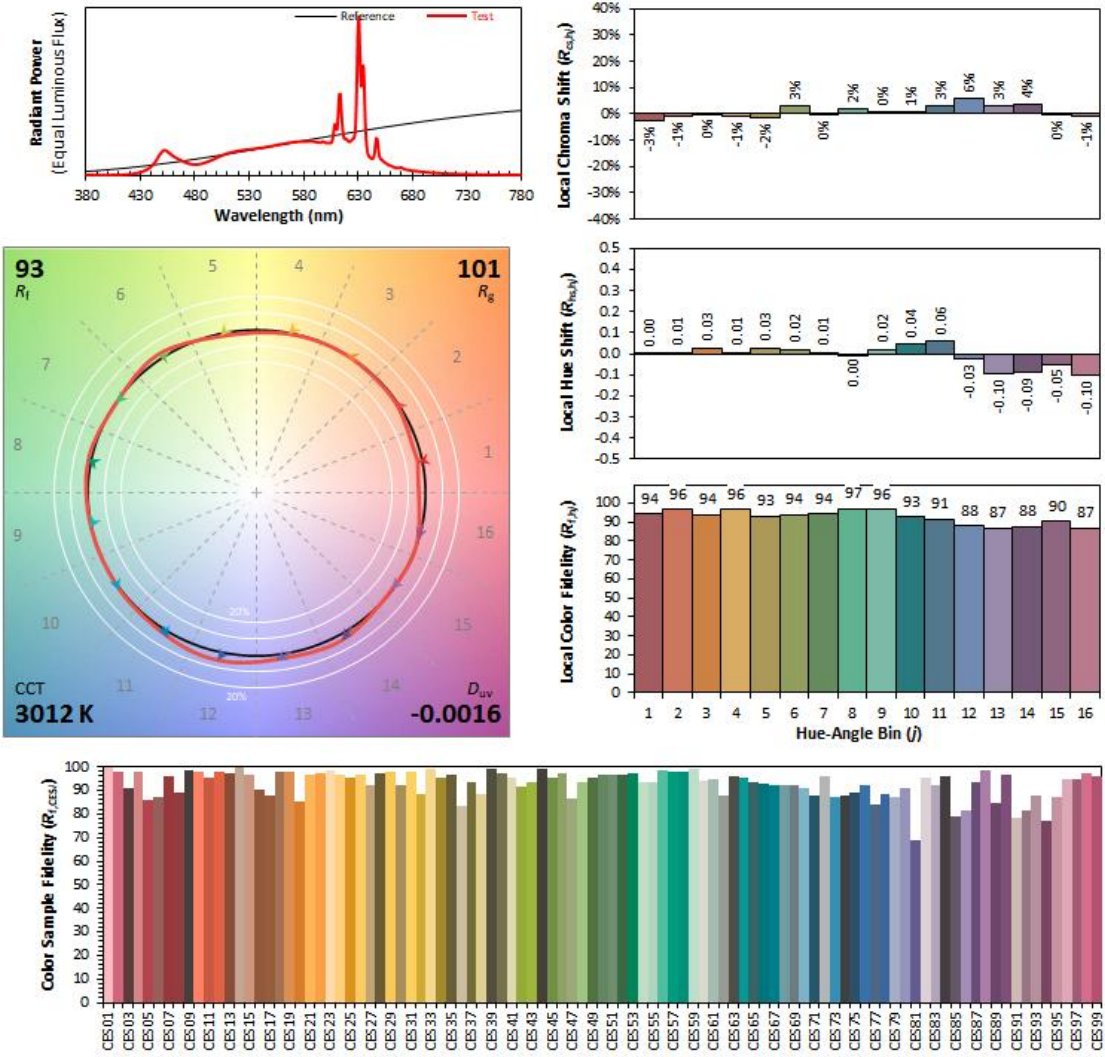
R1 =99	R2 =99	R3 =96	R4 =98	R5 =99	R6 =95	R7 =95		
R8 =93	R9 =83	R10=96	R11=95	R12=85	R13=99	R14=96	R15=98	



**TM30**

**ANSI/IES TM-30-18 Color Rendition Report**

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



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

$x$	0.4337	CIE 13.3-1995 (CRI)	
$y$	0.3989		
$u'$	0.2507		
$v'$	0.5189		
		$R_a$	97
		$R_g$	83

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**

<b>Test date</b>	2024-11-22	<b>Test Ambient:</b>	25 ± 1 ° C
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	60
<b>Model Number</b>	ALR-24RBN(mode:3500K)	<b>Total Operating Time(min)</b>	61

**Electrical Measurement:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD241047 NB-E1	120.0	60.01	0.2194	24.27	0.9219	45.57

**Chromaticity Measurement - Sphere-Spectroradiometer**

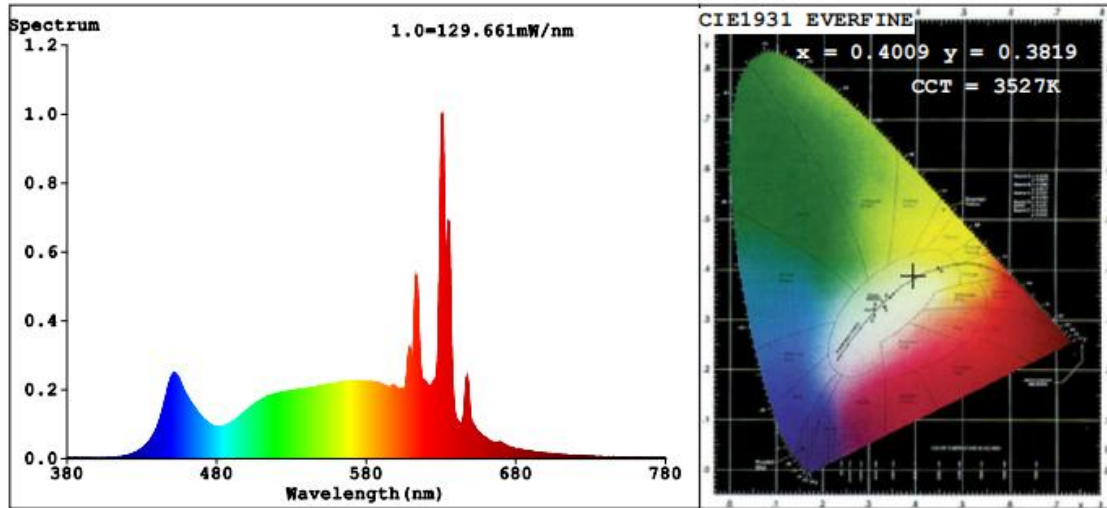
**Method(Self-absorption:1.0715)(4π geometry):**

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3527
Duv	-0.0029
Chromaticity (x, y)	x=0.4009 y=0.3819
Chromaticity (u', v')	u'=0.2365 v'=0.5069
Color Rendering Index (CRI)	97.1
R9	95
Rg	103
Rf	93
Rcs,h1	-2

**Photometric Measurement –Sphere-Spectroradiometer Method:**

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	2049
Luminous Efficacy (lm/W)	84.43

**Spectral Power Distribution & Chromaticity Diagram**



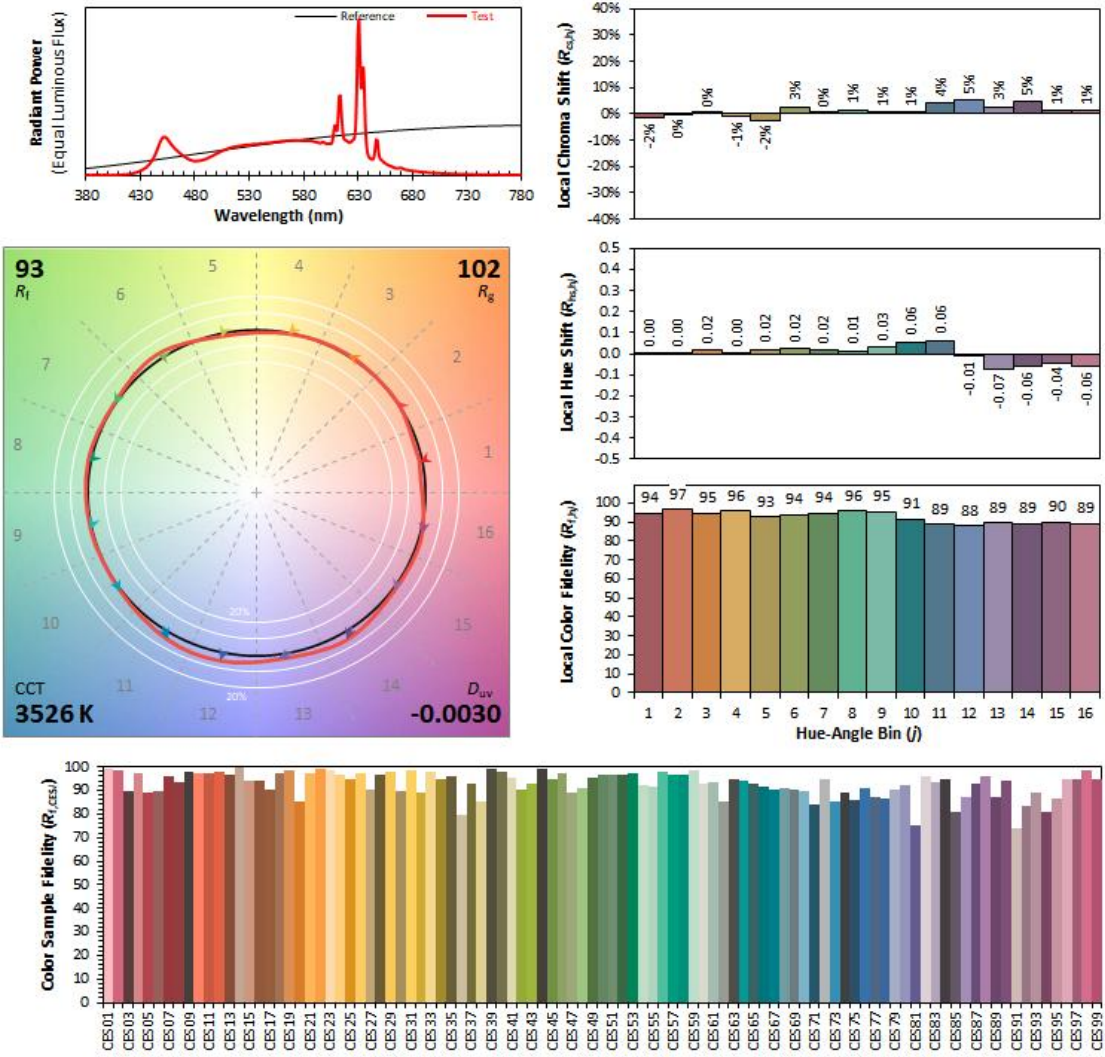
R1 =97	R2 =99	R3 =95	R4 =97	R5 =98	R6 =95	R7 =98	
R8 =99	R9 =95	R10=97	R11=94	R12=81	R13=97	R14=95	R15=98



**TM30**

**ANSI/IES TM-30-18 Color Rendition Report**

Source: L128-xx90RC35xxxxx      Manufacturer: RAB Lighting INC.  
 Date: 2024-11-22      Model: ALR-24RBN (mode: 3500K)



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

$x$	0.4008	CIE 13.3-1995 (CRI) $R_a$ 97 $R_g$ 96
$y$	0.3818	
$u'$	0.2365	
$v'$	0.5068	

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**

<b>Test date</b>	2024-11-22	<b>Test Ambient:</b>	25 ± 1 ° C
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	60
<b>Model Number</b>	ALR-24RBN(mode:4000K)	<b>Total Operating Time(min)</b>	61

**Electrical Measurement:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD241047 NB-E1	120.0	60.01	0.2202	24.31	0.9200	45.58

**Chromaticity Measurement - Sphere-Spectroradiometer**

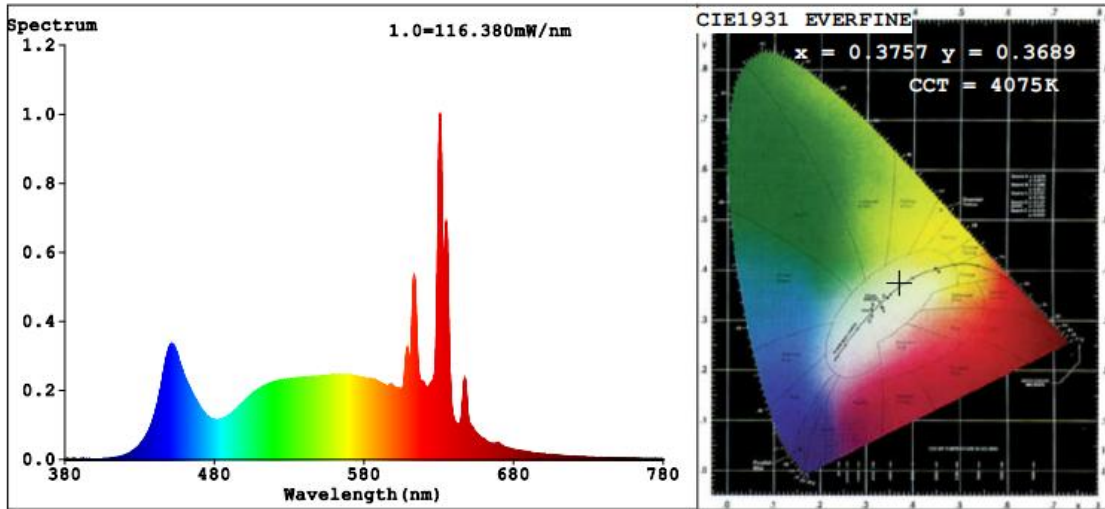
**Method(Self-absorption:1.0717)(4π geometry):**

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	4075
Duv	-0.0023
Chromaticity (x, y)	x=0.3757 y=0.3689
Chromaticity (u', v')	u'=0.2251 v'=0.4974
Color Rendering Index (CRI)	97.1
R9	96
Rg	103
Rf	93
Rcs,h1	-2

**Photometric Measurement –Sphere-Spectroradiometer Method:**

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	2026
Luminous Efficacy (lm/W)	83.34

**Spectral Power Distribution & Chromaticity Diagram**



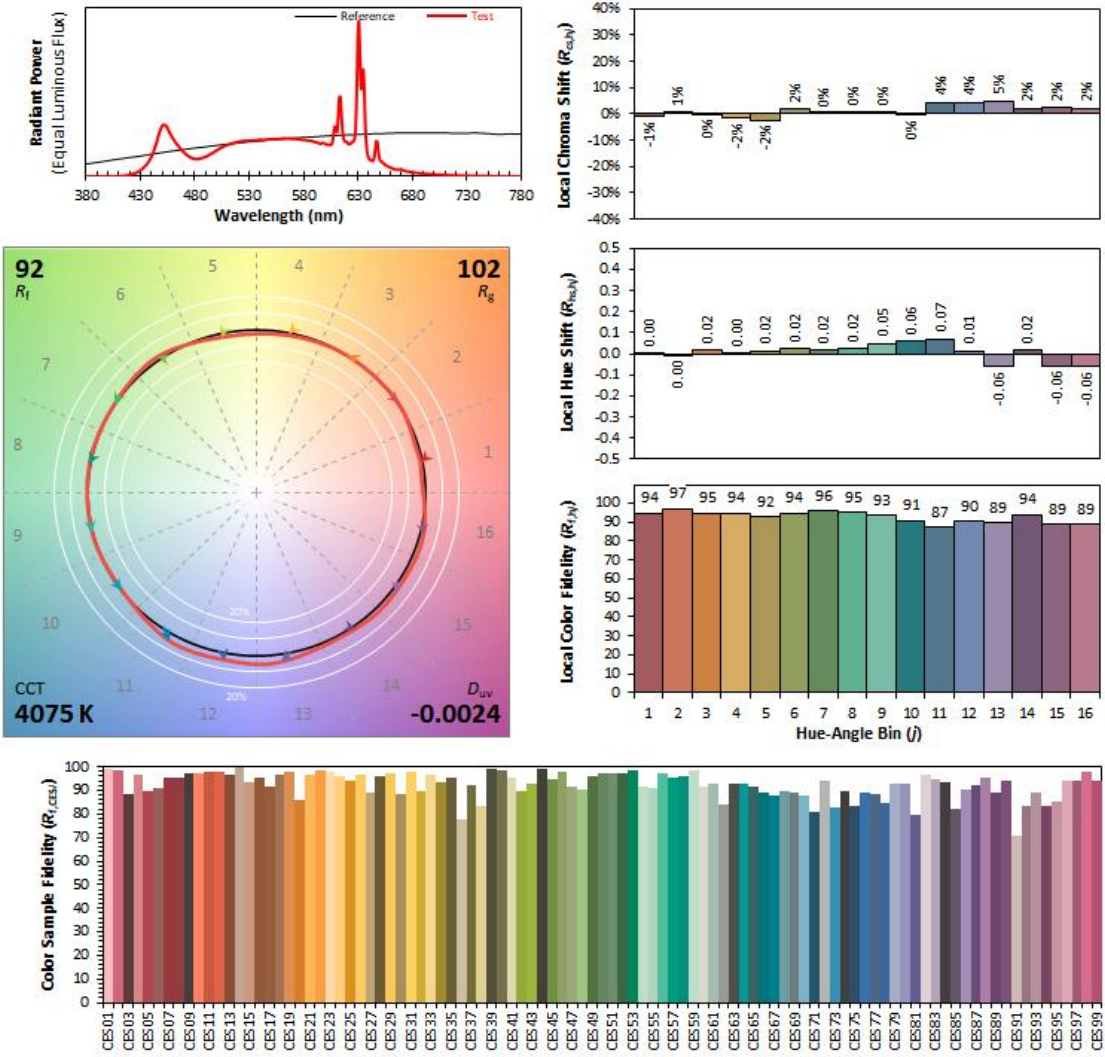
R1 =97	R2 =99	R3 =93	R4 =97	R5 =98	R6 =96	R7 =99	
R8 =98	R9 =96	R10=95	R11=94	R12=77	R13=98	R14=95	R15=96



**TM30**

**ANSI/IES TM-30-18 Color Rendition Report**

Source: L128-xx90RC35xxxxx      Manufacturer: RAB Lighting INC.  
 Date: 2024-11-22      Model: ALR-24RBN (mode: 4000K)



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

$x$	0.3757	CIE 13.3-1995 (CRI)
$y$	0.3688	
$u'$	0.2251	
$v'$	0.4973	
		$R_a$ 97
		$R_g$ 96

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**

<b>Test date</b>	2024-11-22	<b>Test Ambient:</b>	25 ± 1 ° C
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	60
<b>Model Number</b>	ALR-24RBN(mode:5000K)	<b>Total Operating Time(min)</b>	61

**Electrical Measurement:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD241047 NB-E1	120.0	60.01	0.2210	24.34	0.9179	45.72

**Chromaticity Measurement - Sphere-Spectroradiometer**

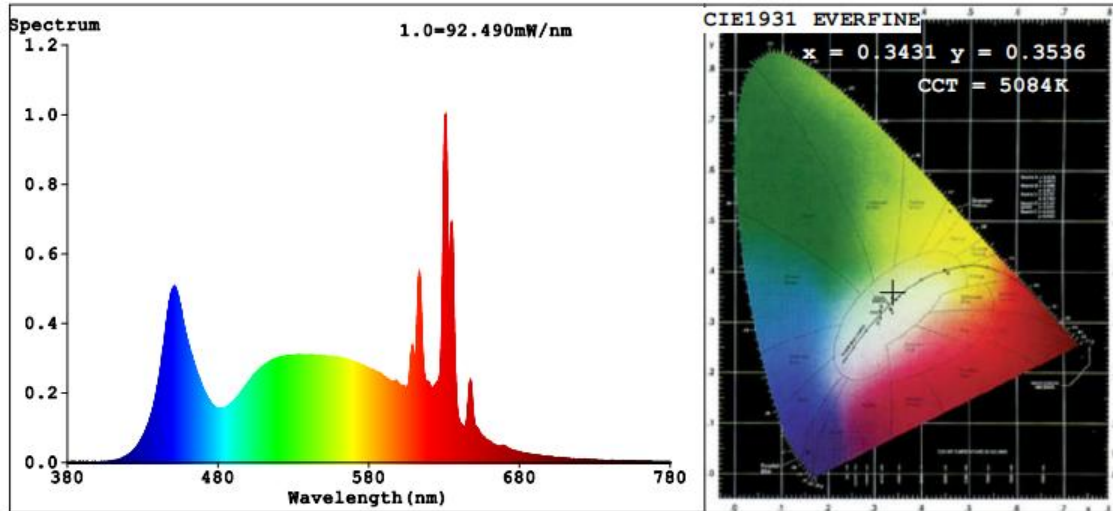
**Method(Self-absorption:1.0713)(4π geometry):**

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	5084
Duv	0.0018
Chromaticity (x, y)	x=0.3431 y=0.3536
Chromaticity (u', v')	u'=0.2093 v'=0.4853
Color Rendering Index (CRI)	96.0
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)	1938
Luminous Efficacy (lm/W)	79.62

**Spectral Power Distribution & Chromaticity Diagram**



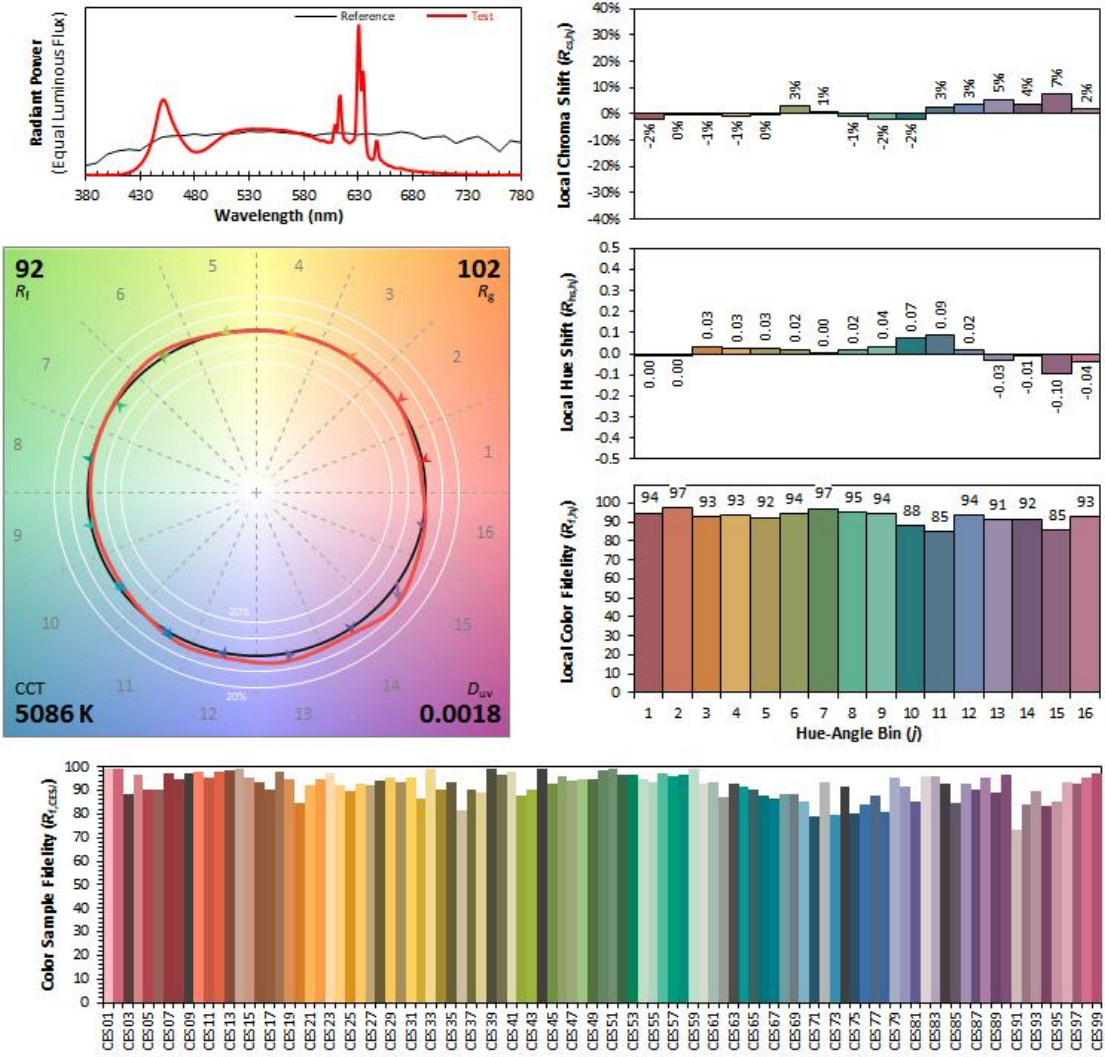
R1 =99	R2 =96	R3 =90	R4 =96	R5 =98	R6 =94	R7 =97		
R8 =99	R9 =95	R10=88	R11=94	R12=75	R13=98	R14=94	R15=99	



**TM30**

**ANSI/IES TM-30-18 Color Rendition Report**

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



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

$x$	<b>0.3430</b>	CIE 13.3-1995 (CRI)  $R_a$ 96 $R_g$ 96
$y$	<b>0.3534</b>	
$u'$	<b>0.2093</b>	
$v'$	<b>0.4852</b>	

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 \*\*\*\*\*