ACCREDITED
Certificate #4703.03

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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-24RB

Report Type:	Testing and Report According to IES LM-79-2019
Type of Luminaire:	LED luminaire
Report Date:	2024-08-27

Test & Report By:

Ferrum Li

Engineer: Ferrum Li

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:		
Model Number	ALR-24RB	
Remark	N/A	
Representative (Tested) Model	ALR-24RB(mode:2700K) ALR-24RB(mode:3000K) ALR-24RB(mode:3500K) ALR-24RB(mode:4000K) ALR-24RB(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	
Integral Controls Availability	Yes	
Dimming	Continuous	
Sample Number	STD240728NB-E1	
Date of Receipt	2024-08-14	
Luminaire Aperture (for downlights)	--	in.
Luminaire Length	--	mm
Luminaire Width	--	mm
Number of Units (modular products)	N/A	s

1.2 Rated Values:	
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	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-79-2019 Optical and Electrical Measurements of Solid-State Lighting Products 2. ANSI C78.377-2015 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
Reference Work Instruction	QD25

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° C ± 1.2° 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 25º C ± 1.2º 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 25º C ± 1.2º 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.

2.2 Electrical, Photometric and Chromaticity Measurements

Test date	2024-08-16	Test Ambient:	25±1° C
Test Orientation	As intended	Stabilization Time (min)	60
Model Number	ALR-24RB(mode:2700K)	Total Operating Time (min)	75

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD240728 NB-E1	120.0	60	0.2098	23.16	0.9198	41.82

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

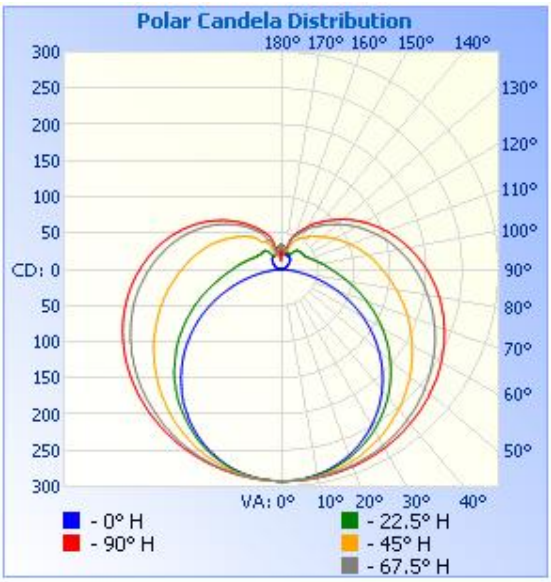
Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	1711.5
Luminous Efficacy (lm/W)	73.90
Beam Angle (°)	169.1
Center Beam Candle Power (cd)	292

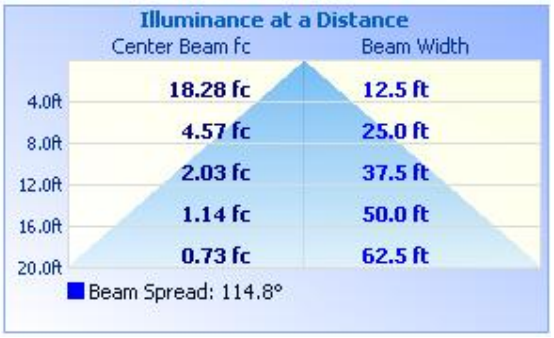
Zonal Lumen Tabulation

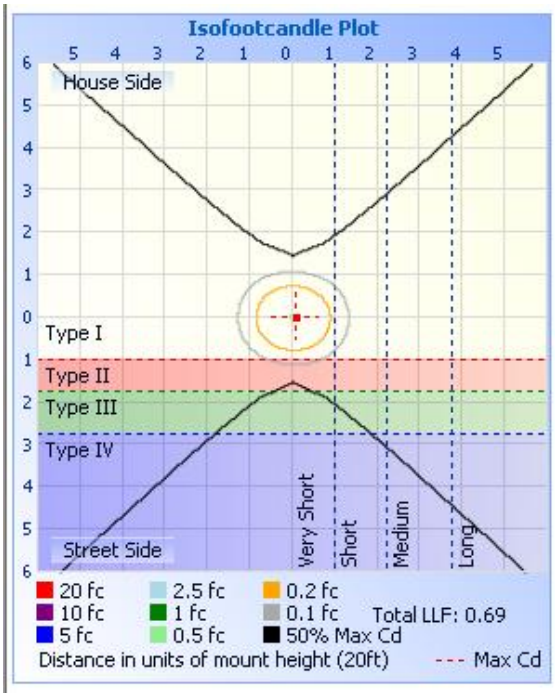
Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	234.8	13.7%
0-40	395.4	23.1%
0-60	763.6	44.6%
60-90	481.2	28.1%
70-100	420.8	24.6%
90-120	299.6	17.5%
0-90	1,244.8	72.7%
90-180	466.4	27.3%
0-180	1,711.2	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	27.8	1.6%	90-100	119.3	7%
10-20	80.7	4.7%	100-110	99.8	5.8%
20-30	126.3	7.4%	110-120	80.5	4.7%
30-40	160.6	9.4%	120-130	62.1	3.6%
40-50	181.1	10.6%	130-140	45.6	2.7%
50-60	187.1	10.9%	140-150	30.5	1.8%
60-70	179.7	10.5%	150-160	17.9	1%
70-80	162.0	9.5%	160-170	8.0	0.5%
80-90	139.5	8.2%	170-180	2.7	0.2%

Photometric Data







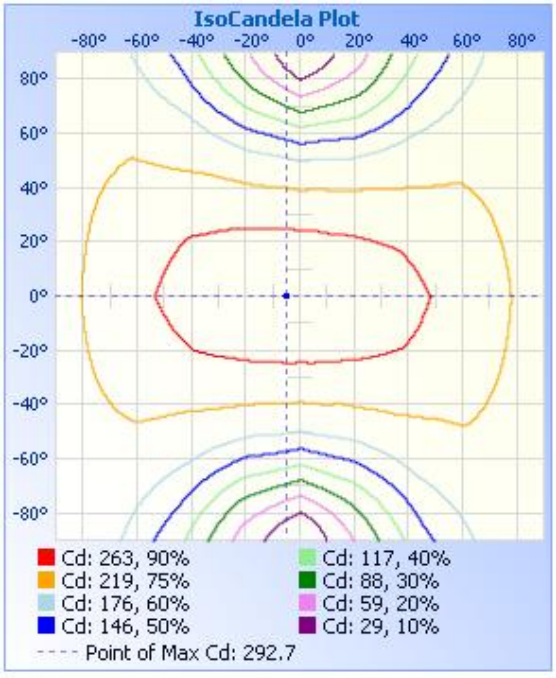


Table--1 UNIT: cd

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	292	292	292	292	292	292	292	292	292	292	292	292	292	292	292	292			
5	292	292	291	291	292	292	292	292	293	292	292	291	291	291	292	292			
10	290	290	289	287	287	288	290	291	292	291	290	288	287	287	289	290			
15	288	287	284	282	282	284	287	290	291	290	286	282	281	282	285	288			
20	286	284	279	274	273	276	282	288	289	287	281	274	272	274	280	285			
25	283	280	271	264	262	267	277	285	287	283	274	265	261	264	273	281			
30	280	275	263	252	249	256	270	281	285	279	266	253	248	252	265	276			
35	276	269	253	238	234	243	262	277	282	273	256	239	232	239	256	271			
40	271	263	243	223	217	229	252	271	277	268	245	224	214	224	247	265			
45	266	256	231	206	198	213	242	265	273	261	234	207	195	209	236	259			
50	261	248	219	187	176	196	232	258	267	254	223	188	174	191	225	253			
55	255	240	207	168	153	179	221	251	262	246	210	169	151	174	214	245			
60	248	232	194	148	129	161	209	243	255	237	197	149	127	155	203	238			
65	241	223	181	128	104	142	197	234	248	229	184	129	101	137	192	230			
70	233	214	169	109	78.3	125	185	225	239	219	172	109	75.0	120	180	221			
75	224	205	156	90.3	52.8	108	173	216	231	210	159	90.2	49.2	103	169	212			
80	215	195	145	74.2	29.3	92.7	161	205	221	199	147	73.8	26.2	88.8	159	203			
85	206	185	134	61.0	10.4	79.5	150	195	211	189	135	59.6	7.88	77.3	147	192			
90	195	175	124	51.2	1.09	69.1	139	185	201	178	124	49.1	0.49	67.6	137	182			
95	185	165	115	44.5	0.40	61.2	130	174	189	167	114	42.0	0.50	60.3	128	172			
100	174	154	106	38.9	0.40	54.1	120	163	178	157	105	36.2	1.29	53.7	119	162			
105	163	144	98.0	34.8	2.16	47.9	111	152	166	146	96.6	31.9	3.87	48.4	110	151			
110	152	134	90.1	32.1	6.42	43.6	101	141	154	135	88.6	28.4	7.43	43.4	102	141			
115	140	124	83.0	30.4	8.11	39.6	93.0	129	142	125	81.3	27.9	9.21	39.6	93.1	129			
120	128	114	76.4	30.2	9.30	37.5	85.0	118	131	114	74.2	28.0	10.3	37.7	85.0	118			
125	117	104	70.1	30.2	11.9	36.5	77.2	107	119	103	67.4	28.3	12.6	35.8	77.4	107			
130	105	94.0	64.4	30.5	14.6	35.8	70.4	96.7	107	93.3	61.7	28.3	15.2	35.1	70.4	97.1			
135	94.4	84.4	57.9	30.9	17.2	35.3	64.6	86.6	95.9	83.8	58.0	28.2	17.3	34.9	63.6	86.7			
140	84.1	75.6	53.0	30.3	19.2	34.5	58.7	77.8	85.4	75.5	53.0	25.7	19.2	33.7	57.7	77.7			
145	74.0	67.4	49.1	26.5	20.3	29.2	53.5	70.1	76.2	68.4	50.3	24.9	20.6	28.1	45.5	67.9			
150	65.3	58.1	45.4	22.7	20.8	23.1	48.9	60.6	65.3	60.4	48.0	24.9	21.1	21.6	43.5	59.0			
155	57.2	48.8	41.3	22.0	20.7	24.0	44.0	53.2	56.9	54.2	45.3	25.3	21.1	21.0	35.2	45.8			
160	49.4	44.5	26.7	21.0	20.7	25.3	31.5	46.4	48.8	47.5	38.8	26.7	21.2	20.9	20.9	40.1			
165	34.0	29.6	20.0	20.9	20.5	24.8	26.7	30.6	34.5	34.2	27.5	27.2	22.9	21.5	23.1	19.5			
170	29.3	17.9	23.6	27.1	27.7	27.6	26.6	27.6	29.4	29.4	26.9	28.2	28.0	28.3	27.2	23.1			
175	24.2	21.7	30.6	31.6	31.8	31.3	30.4	26.8	23.4	23.6	28.4	31.9	32.8	32.8	32.0	30.9			
180	8.43	32.7	32.5	35.0	35.1	34.7	33.7	32.4	18.4	19.0	31.9	32.8	34.4	34.8	34.5	33.1			

2.3 Electrical, Photometric and Chromaticity Measurements

Test date	2024-08-16	Test Ambient:	25±1° C
Test Orientation	As intended	Stabilization Time (min)	60
Model Number	ALR-24RB(mode:2700K)	Total Operating Time (min)	61

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD240728 NB-E1	120.0	60	0.2117	23.33	0.9182	41.77

Chromaticity Measurement - Sphere-Spectroradiometer Method(Self-absorption:1.1529) (4π geometry):

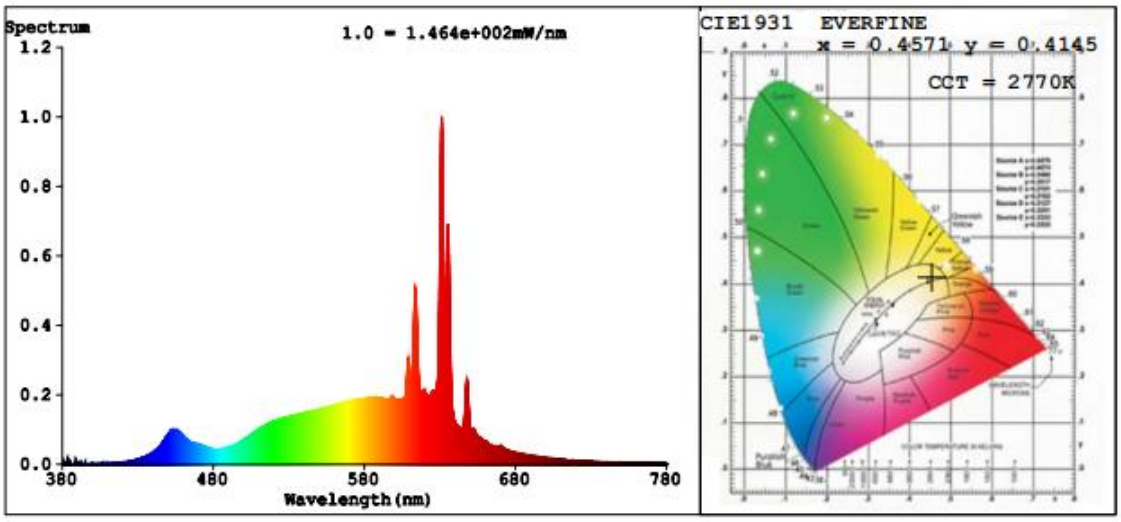
Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	2770
Duv	0.0017
Chromaticity (x, y)	x=0.4571 y=0.4145
Chromaticity (u', v')	u'=0.2590 v'=0.5284

Parameter	Result
Color Rendering Index (CRI)	94.5
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)	1728
Luminous Efficacy (lm/W)	74.07

Spectral Power Distribution & Chromaticity Diagram



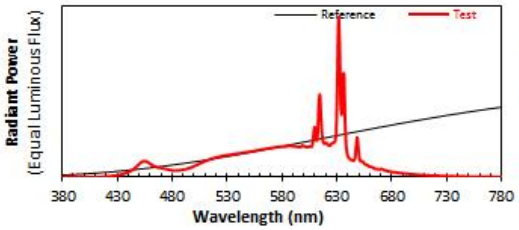
Special Color Rendering Indices

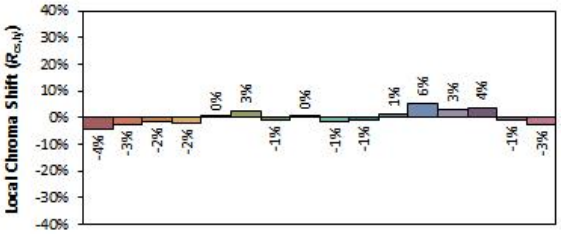
R1 =96	R2 =96	R3 =93	R4 =97	R5 =95	R6 =96	R7 =95	
R8 =88	R9 =69	R10=87	R11=97	R12=79	R13=96	R14=94	R15=92

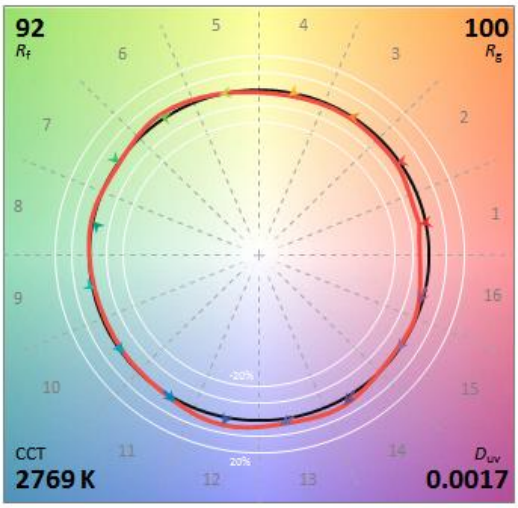
TM30

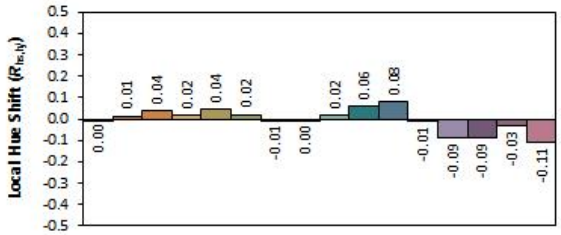
ANSI/IES TM-30-18 Color Rendition Report

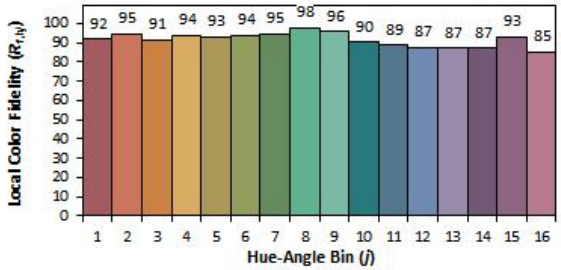
Source:	L128-xx90RC35xxxxx	**Manufacturer:**	RAB Lighting INC.
Date:	2024-08-16	**Model:**	ALR-24RB(mode:2700K)

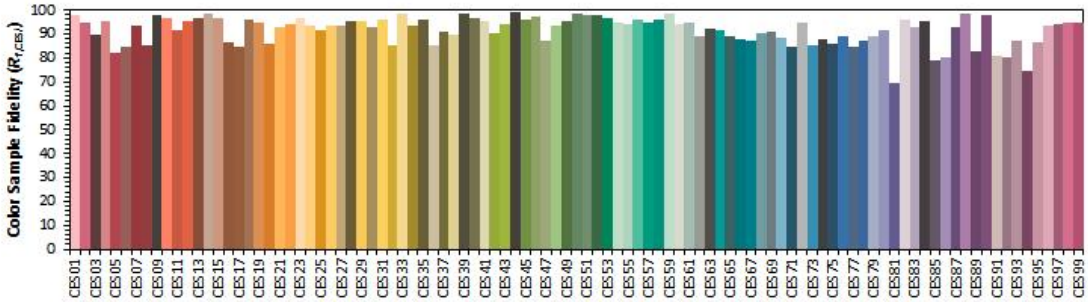












Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x	0.4571
y	0.4144
u'	0.2590
v'	0.5284

CIE 13.3-1995 (CRI)

R_a	95
R_9	70

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	2024-08-16	Test Ambient:	25±1° C
Test Orientation	As intended	Stabilization Time (min)	60
Model Number	ALR-24RB(mode:3000K)	Total Operating Time (min)	61

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD240728 NB-E1	120.0	60	0.2110	23.27	0.9192	41.62

Chromaticity Measurement - Sphere-Spectroradiometer Method(Self-absorption:1.1526) (4π geometry):

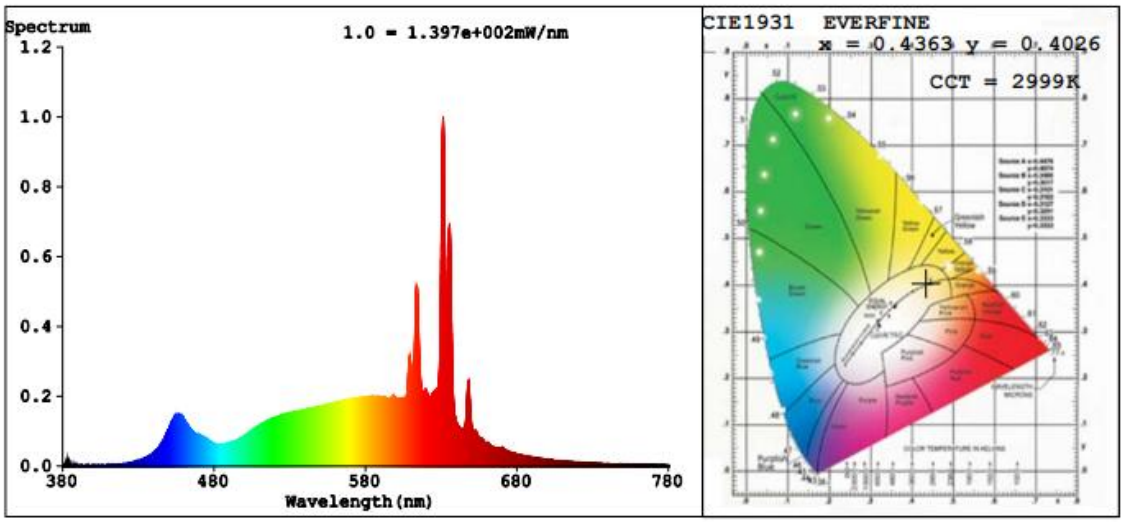
Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	2999
Duv	-0.0005
Chromaticity (x, y)	x=0.4363 y=0.4026
Chromaticity (u', v')	u'=0.2508 v'=0.5207

Parameter	Result
Color Rendering Index (CRI)	96.2
R9	78
Rg	101
Rf	92
Rcs,h1(%)	-4

Photometric Measurement –Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	1766
Luminous Efficacy (lm/W)	75.89

Spectral Power Distribution & Chromaticity Diagram



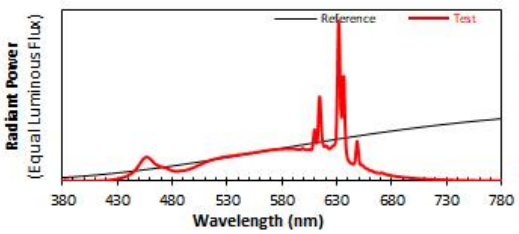
Special Color Rendering Indices

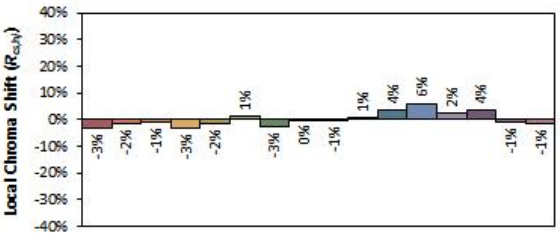
R1 =99	R2 =98	R3 =95	R4 =98	R5 =97	R6 =96	R7 =95	
R8 =91	R9 =78	R10=93	R11=98	R12=80	R13=99	R14=95	R15=96

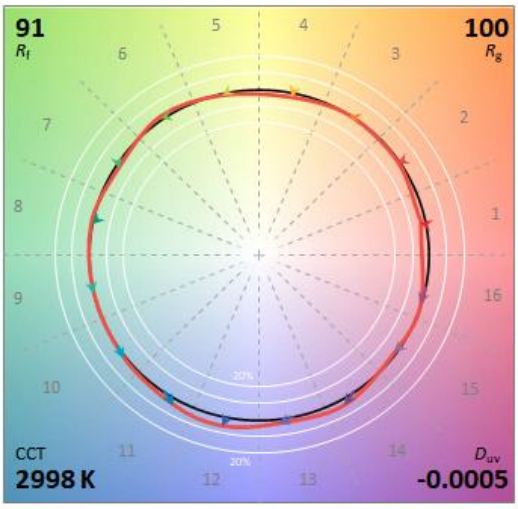
TM30

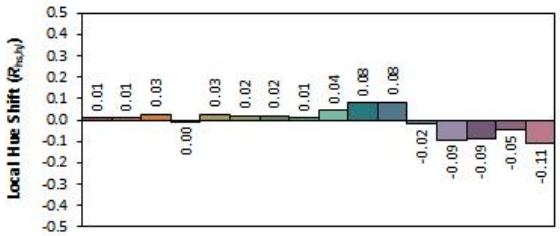
ANSI/IES TM-30-18 Color Rendition Report

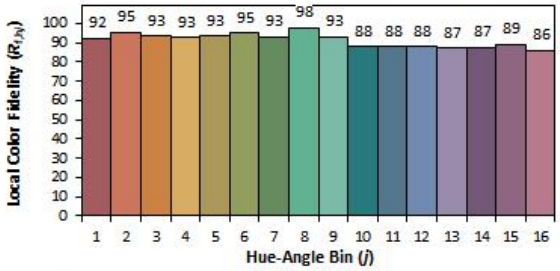
Source:	L128-xx90RC35xxxxx	**Manufacturer:**	RAB Lighting INC.
Date:	2024-08-16	**Model:**	ALR-24RB(mode:3000K)

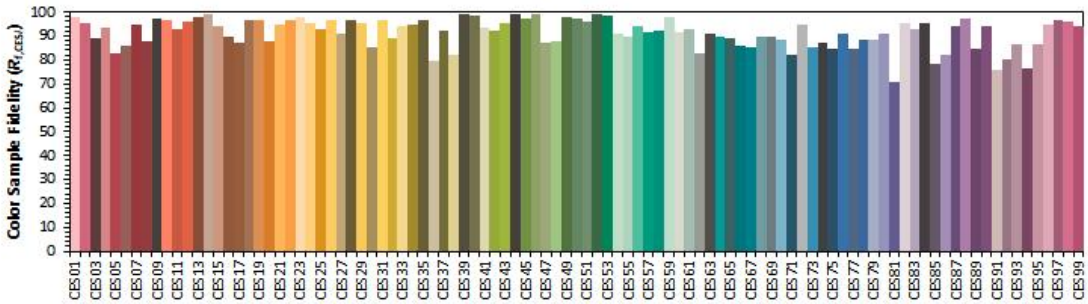












Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x	**0.4363**
y	**0.4025**
u'	**0.2508**
v'	**0.5207**

CIE 13.3-1995 (CRI)

R_a	96
R_9	78

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	2024-08-16	Test Ambient:	25±1° C
Test Orientation	As intended	Stabilization Time (min)	60
Model Number	ALR-24RB(mode:3500K)	Total Operating Time (min)	61

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD240728 NB-E1	120.0	60	0.2071	22.89	0.9211	41.79

Chromaticity Measurement - Sphere-Spectroradiometer Method(Self-absorption:1.1527) (4π geometry):

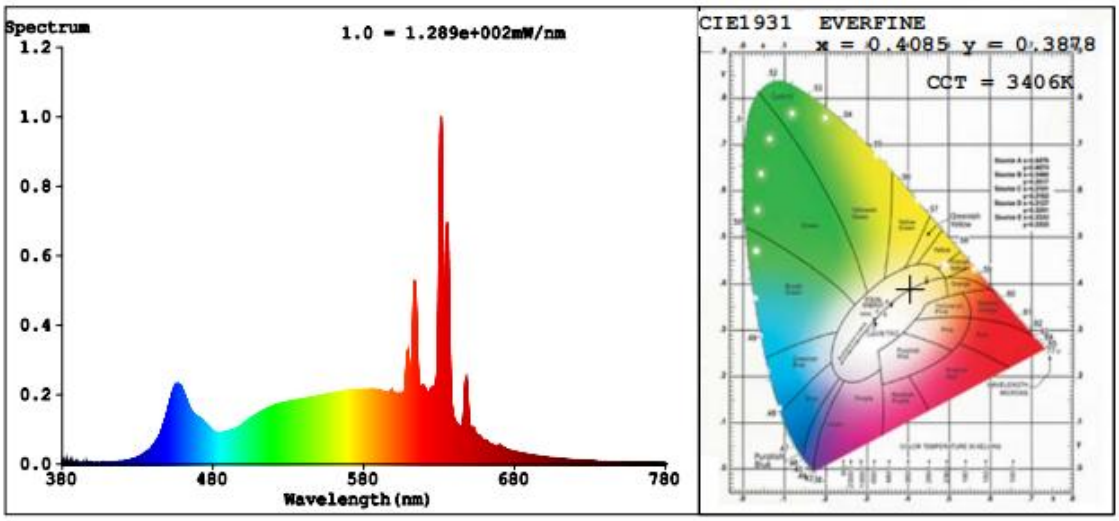
Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3406
Duv	-0.002
Chromaticity (x, y)	x=0.4085 y=0.3878
Chromaticity (u', v')	u'=0.2390v'=0.5105

Parameter	Result
Color Rendering Index (CRI)	96.7
R9	86
Rg	100
Rf	92
Rcs,h1(%)	-3

Photometric Measurement –Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	1813
Luminous Efficacy (lm/W)	79.20

Spectral Power Distribution & Chromaticity Diagram



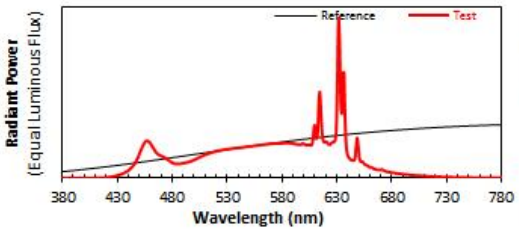
Special Color Rendering Indices

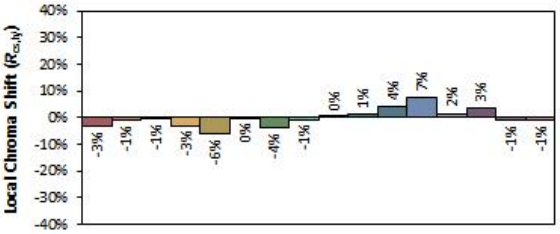
R1 =98	R2 =99	R3 =97	R4 =98	R5 =97	R6 =95	R7 =95	
R8 =94	R9 =86	R10=97	R11=98	R12=77	R13=99	R14=97	R15=98

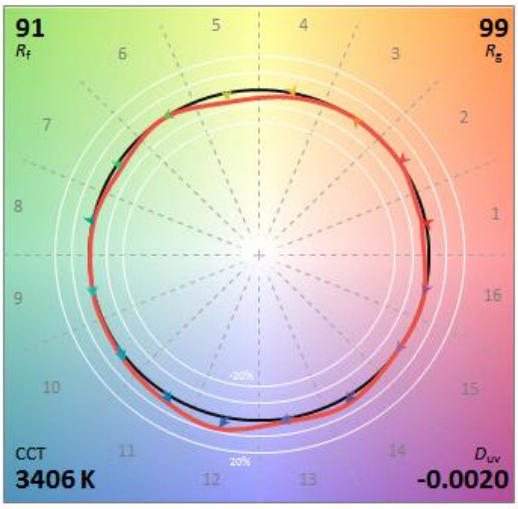
TM30

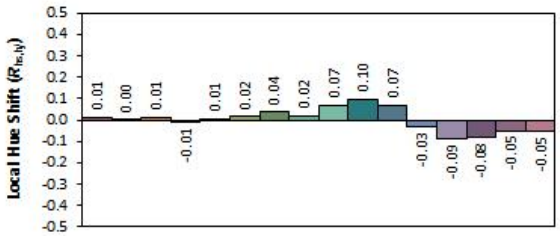
ANSI/IES TM-30-18 Color Rendition Report

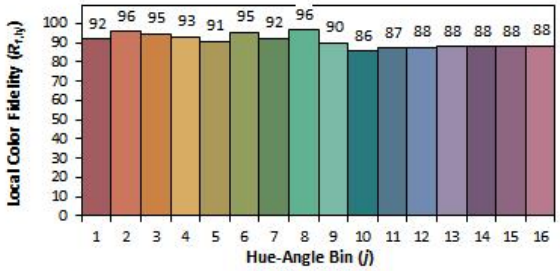
Source:	L128-xx90RC35xxxxx	**Manufacturer:**	RAB Lighting INC.
Date:	2024-08-16	**Model:**	ALR-24RB(mode:3500K)

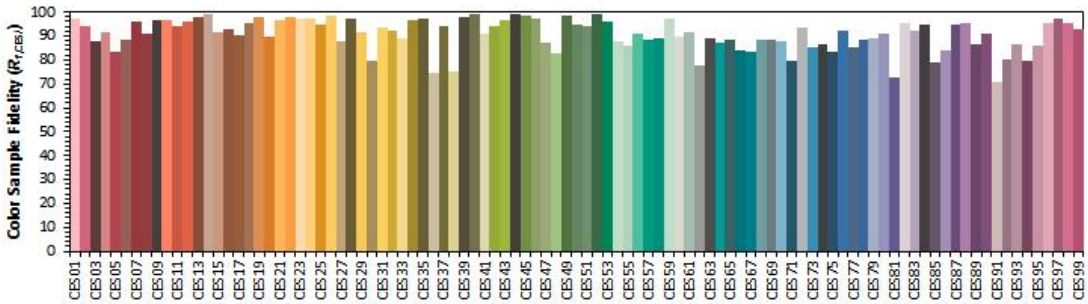












Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x	**0.4085**
y	**0.3876**
u'	**0.2390**
v'	**0.5104**

CIE 13.3-1995 (CRI)

R_a	97
R_9	87

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	2024-08-16	Test Ambient:	25±1° C
Test Orientation	As intended	Stabilization Time (min)	60
Model Number	ALR-24RB(mode:4000K)	Total Operating Time (min)	61

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD240728 NB-E1	120.0	60	0.2059	22.81	0.9230	41.71

Chromaticity Measurement - Sphere-Spectroradiometer Method(Self-absorption:1.1527) (4π geometry):

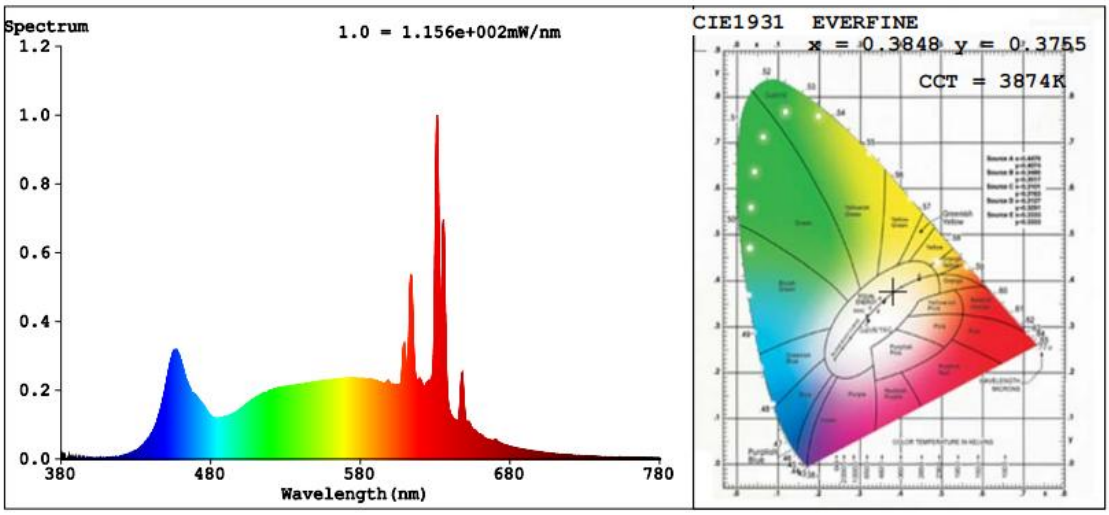
Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3874
Duv	-0.0018
Chromaticity (x, y)	x=0.3848 y=0.3755
Chromaticity (u', v')	u'=0.2285 v'=0.5017

Parameter	Result
Color Rendering Index (CRI)	96.4
R9	90
Rg	100
Rf	91
Rcs,h1(%)	-3

Photometric Measurement –Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	1826
Luminous Efficacy (lm/W)	80.05

Spectral Power Distribution & Chromaticity Diagram



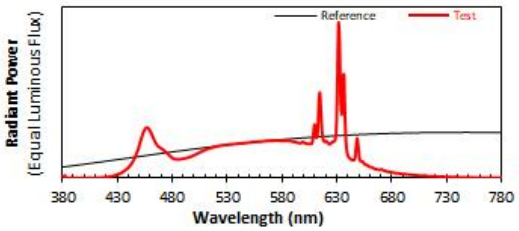
Special Color Rendering Indices

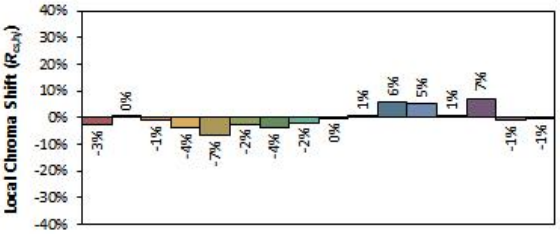
R1 =98	R2 =99	R3 =97	R4 =97	R5 =96	R6 =95	R7 =95	
R8 =94	R9 =90	R10=98	R11=99	R12=74	R13=98	R14=97	R15=97

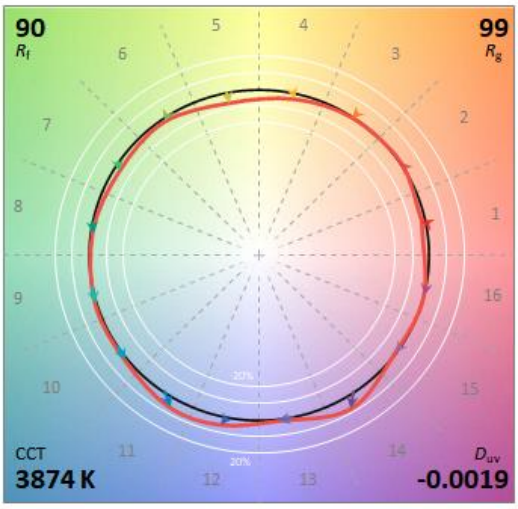
TM30

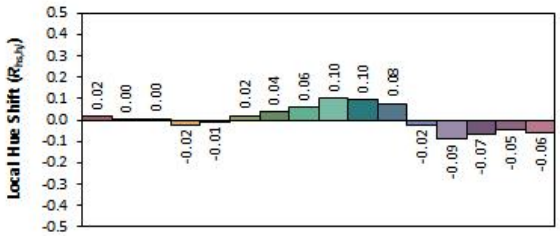
ANSI/IES TM-30-18 Color Rendition Report

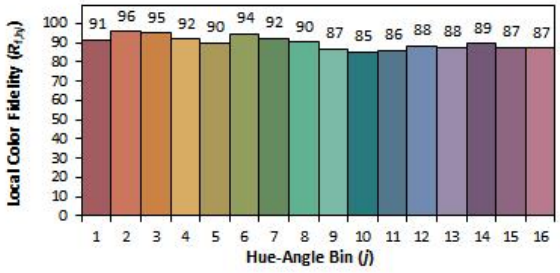
Source:	L128-xx90RC35xxxxx	**Manufacturer:**	RAB Lighting INC.
Date:	2024-08-16	**Model:**	ALR-24RB(mode:4000K)

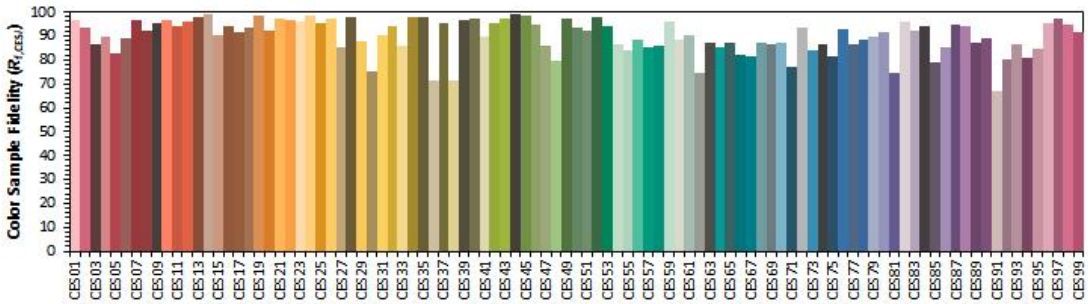












Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x	**0.3847**
y	**0.3754**
u'	**0.2285**
v'	**0.5016**

CIE 13.3-1995 (CRI)	
R_a	96
R_9	91

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

2.7 Electrical, Photometric and Chromaticity Measurements

Test date	2024-08-16	Test Ambient:	25±1° C
Test Orientation	As intended	Stabilization Time (min)	60
Model Number	ALR-24RB(mode:5000K)	Total Operating Time (min)	61

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD240728 NB-E1	120.0	60	0.2088	23.06	0.9202	41.79

Chromaticity Measurement - Sphere-Spectroradiometer Method(Self-absorption:1.1524) (4π geometry):

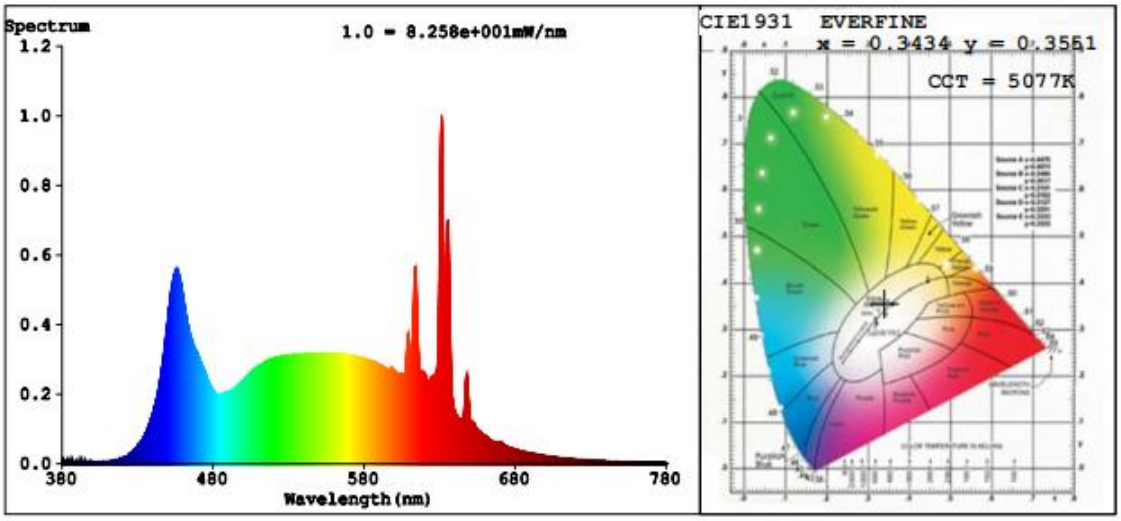
Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	5077
Duv	0.0024
Chromaticity (x, y)	x=0.3434 y=0.3551
Chromaticity (u', v')	u'=0.2089v'=0.4861

Parameter	Result
Color Rendering Index (CRI)	95.1
R9	80
Rg	99
Rf	91
Rcs,h1(%)	-4

Photometric Measurement –Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	1752
Luminous Efficacy (lm/W)	75.99

Spectral Power Distribution & Chromaticity Diagram



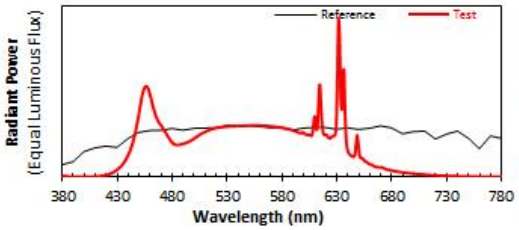
Special Color Rendering Indices

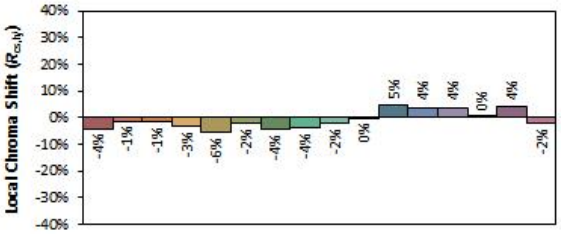
R1 =97	R2 =99	R3 =97	R4 =94	R5 =95	R6 =95	R7 =94	
R8 =91	R9 =80	R10=94	R11=95	R12=72	R13=98	R14=98	R15=95

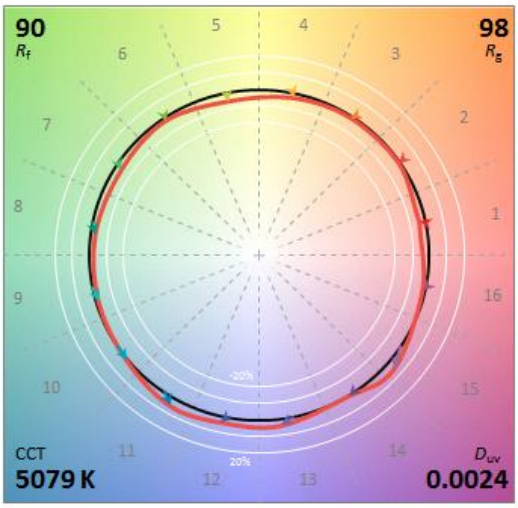
TM30

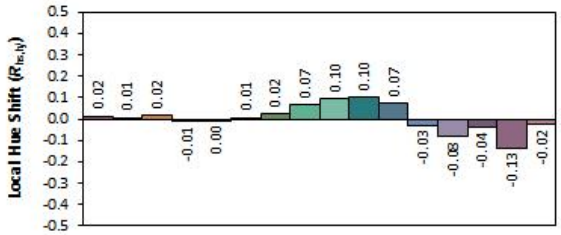
ANSI/IES TM-30-18 Color Rendition Report

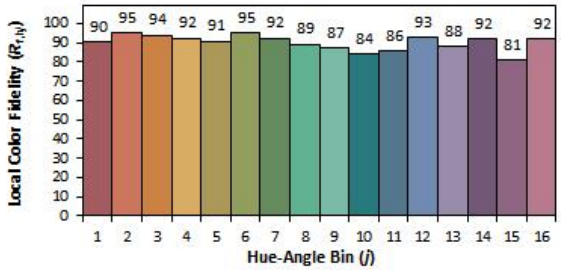
Source:	L128-xx90RC35xxxxx	**Manufacturer:**	RAB Lighting INC.
Date:	2024-08-16	**Model:**	ALR-24RB(mode:5000K)

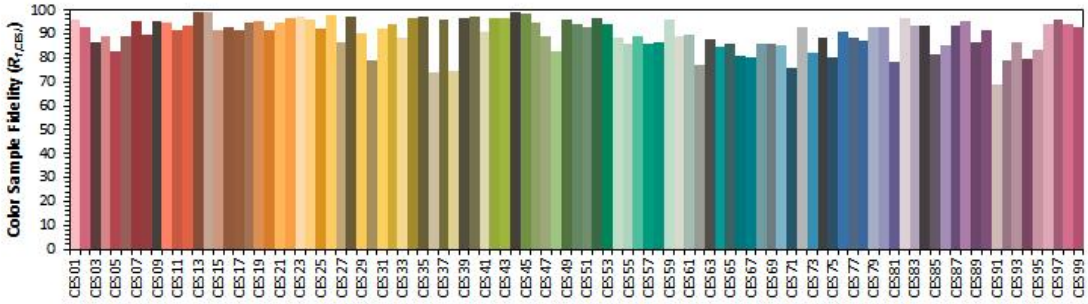












Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x	0.3433
y	0.3549
u'	0.2089
v'	0.4860

CIE 13.3-1995 (CRI)

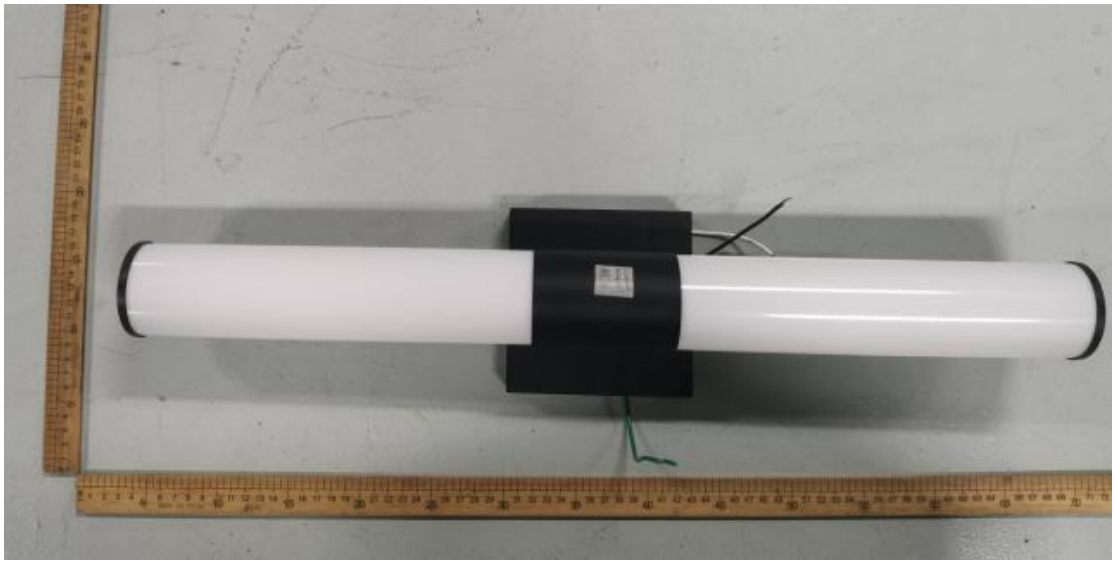
R_a	95
R_9	80

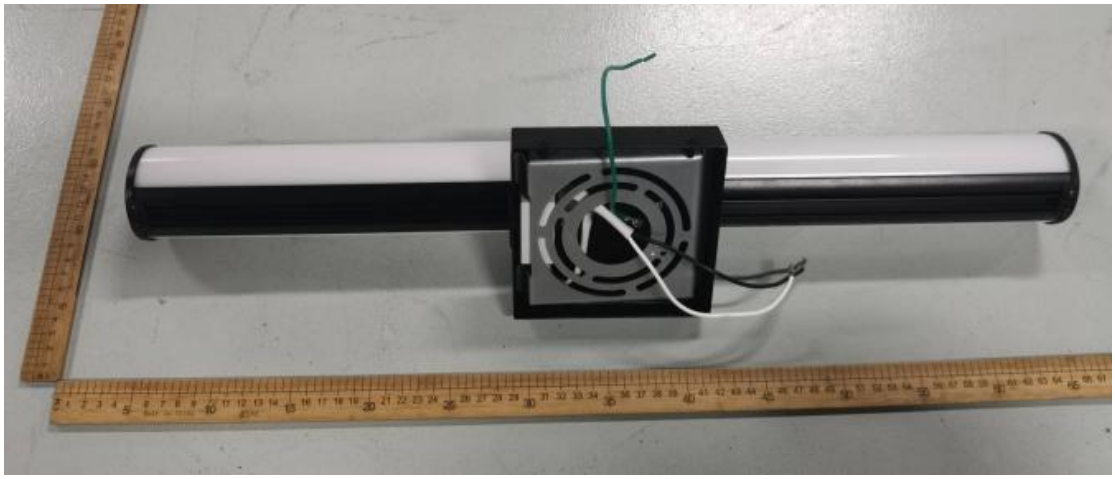
Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.

3. Test Equipment

Equipment ID	Equipment Name	Last Calibration Date	Next Calibration Date
ST-R-S-451	2 meter Integrating Sphere	Verified by D204 standard lamp	
ST-R-S-455	Spectral analysis system HAAS-1200	Verified by D204 standard lamp	
ST-R-S-452	Standard Lamp D204	2023-06-26	2026-06-25
ST-R-S-453	Power Meter for Integrating Sphere	2024-05-29	2025-05-28
ST-R-S-467	Hygrothermograph	2024-06-06	2025-06-05
ST-R-355	Goniophotometer system	Verified by D908S standard lamp	
ST-R-359	Standard Lamp D908S	2022-07-19	2025-07-18
ST-R-357	AC Power Source	2024-01-29	2025-01-28
ST-R-S-422	Power Meter for Goniophotometer	2024-05-29	2025-05-28
ST-R-S-354	hygrothermograph for Goniophotometer	2024-05-29	2025-05-28
Uncertainty: Photometric Measurement (Sphere):2.94%, k=2 Chromaticity Measurement(Sphere):52.28K, k=2 Photometric Measurement(Goniophotometer): 2.94%, k=2			

4. Product Photo





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