Ningbo TengLi Testing Co., Ltd

2nd floor, Block B, Ningbo Testing and Certification Base, No. 66
Qingyi Road, Ningbo National Hi-Tech Zone, Ningbo, Zhejiang
Tel: 86574-8783 6802
Fax: 86574-8783 5902

ACCREDITED
Certificate#4703.02

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-48SBN

Report Type:	Testing and Report According to IES LM-79-2019
Type of Luminaire:	LED luminaire
Report Date:	2024-11-27
Prepared By:	Ningbo TengLi Testing Co., Ltd 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.

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1.1 Product Information:		
Model Number	ALR-48SBN	
Remark	N/A	
Representative (Tested) Model	ALR-48SBN(mode:2700K) ALR-48SBN(mode:3000K) ALR-48SBN(mode:3500K) ALR-48SBN(mode:4000K) ALR-48SBN(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-L1	
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	38W
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 C78.377-2008 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° 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.

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2.1 Electrical, Photometric and Chromaticity Measurements

Test date	2024-11-22	Test Ambient:	25±1 º C
Test Orientation	As intended	Stabilization Time (min)	60
Model Number	ALR-48SBN(mode:2700K)	Total Operating Time(min)	75

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD241047 NB-L1	120.0	60.01	0.3505	38.40	0.9129	42.52

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

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	2856.9
Luminous Efficacy (lm/W)	74.40
Beam Angle (°)	181.6
Center Beam Candle Power (cd)	435

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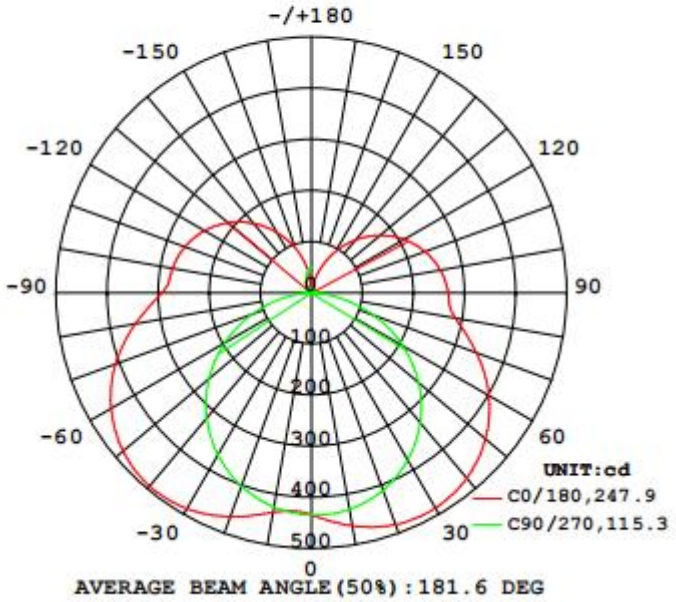
Zonal Lumen Tabulation

LUMINOUS INTENSITY DISTRIBUTION DIAGRAM



AVERAGE BEAM ANGLE(50%):181.6 DEG

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	372.3	13%
0-40	643.7	22.5%
0-60	1,287.1	45.1%
60-90	781.4	27.4%
70-100	656.5	23%
90-120	500.5	17.5%
0-90	2,068.5	72.4%
90-180	788.1	27.6%
0-180	2,856.6	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	41.7	1.5%	90-100	185.0	6.5%
10-20	125.4	4.4%	100-110	169.8	5.9%
20-30	205.2	7.2%	110-120	145.7	5.1%
30-40	271.4	9.5%	120-130	115.1	4%
40-50	314.8	11.0%	130-140	82.3	2.9%
50-60	328.5	11.5%	140-150	51.8	1.8%
60-70	309.8	10.8%	150-160	26.9	0.9%
70-80	262.6	9.2%	160-170	9.9	0.3%
80-90	209.0	7.3%	170-180	1.8	0.1%

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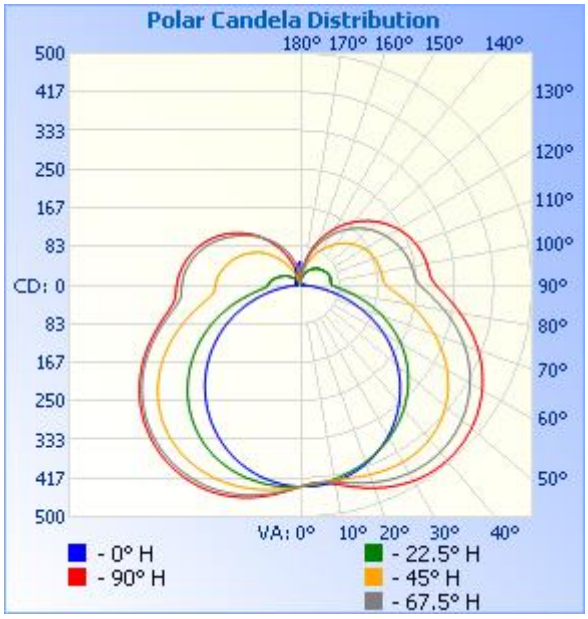
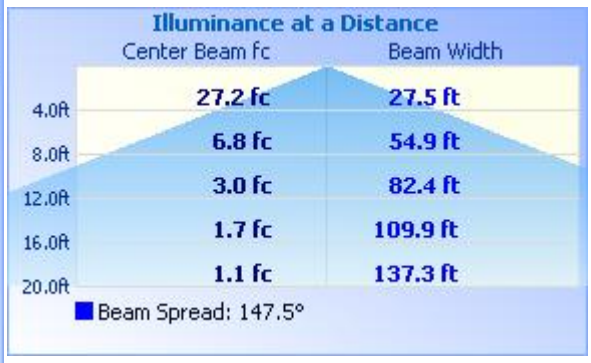
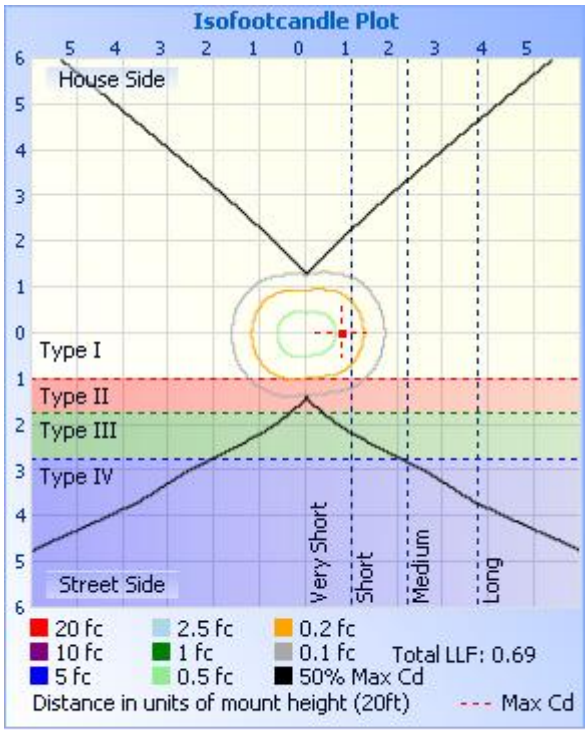
Photometric Data







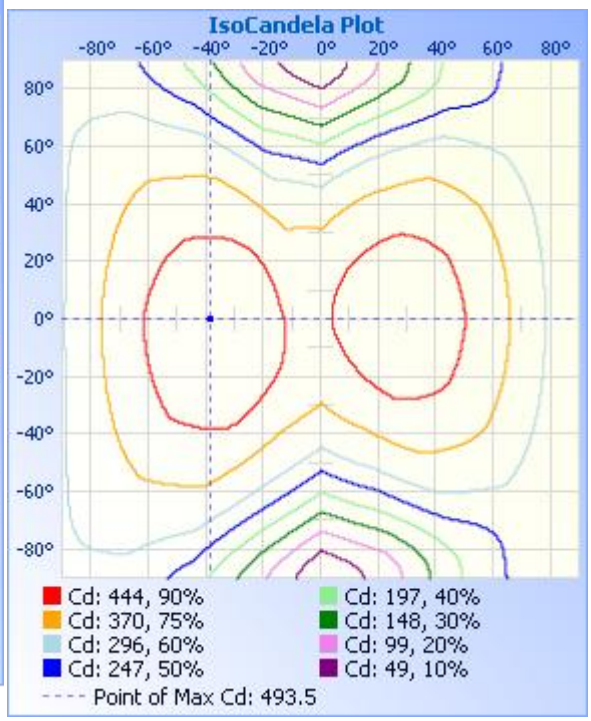


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Table--1 UNIT: cd

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	435	435	435	435	435	435	435	435	435	435	435	435	435	435	435	435			
5	448	447	443	438	434	430	428	427	428	428	429	430	432	436	442	446			
10	463	460	452	441	430	424	427	431	436	435	430	424	425	435	448	458			
15	474	471	458	441	422	417	430	442	451	448	437	420	415	432	453	469			
20	482	477	462	438	411	407	435	453	466	462	446	415	402	426	456	475			
25	486	480	462	433	396	395	439	462	478	474	453	408	386	418	455	479			
30	486	479	459	424	377	381	441	468	487	483	458	400	366	405	452	478			
35	481	474	452	410	356	366	439	471	493	487	459	388	344	389	446	474			
40	473	466	442	394	331	348	433	470	493	487	456	375	319	368	435	466			
45	461	453	428	373	304	327	423	464	490	483	448	358	292	344	420	454			
50	445	436	411	348	274	304	408	454	482	475	436	338	262	318	401	438			
55	424	416	389	320	241	278	389	440	469	462	420	315	230	288	376	418			
60	401	392	364	289	206	249	365	422	453	445	399	290	196	255	348	394			
65	374	364	334	255	169	218	338	401	433	424	375	262	161	219	316	366			
70	344	334	302	219	129	185	307	376	408	398	346	231	124	183	282	336			
75	313	303	268	182	90.0	150	274	347	381	370	315	198	86.8	145	246	304			
80	286	275	236	147	52.6	116	241	316	350	338	282	165	51.1	109	212	276			
85	271	260	215	121	21.9	86.5	209	285	319	307	251	135	21.4	80.8	189	259			
90	268	255	211	112	8.10	68.1	185	258	293	280	225	114	6.89	70.8	184	256			
95	263	251	207	109	5.74	65.7	178	247	280	268	217	111	6.41	67.2	180	253			
100	256	244	201	104	4.50	65.6	176	243	276	264	214	110	6.53	62.5	174	246			
105	247	235	193	98.1	4.09	66.2	173	238	271	258	210	108	7.73	56.9	166	238			
110	237	225	183	91.1	3.43	64.8	169	231	264	250	203	106	9.08	50.9	157	227			
115	224	212	171	83.5	2.78	62.6	165	222	254	240	195	102	10.2	44.6	147	214			
120	209	198	159	74.9	2.25	59.9	158	212	243	228	184	97.1	10.9	39.5	135	199			
125	193	183	144	65.3	1.88	56.7	149	201	229	214	171	91.4	11.5	33.6	123	183			
130	175	166	129	57.1	1.75	53.9	139	188	213	199	158	85.4	12.1	27.2	109	167			
135	156	147	112	48.6	1.75	50.6	127	174	196	183	144	79.5	13.0	22.4	92.5	151			
140	136	127	94.7	39.0	1.78	46.7	115	157	177	165	130	74.4	14.4	16.2	75.2	135			
145	114	107	77.9	29.6	2.04	42.3	101	140	158	148	117	70.5	17.3	11.5	58.0	119			
150	92.4	85.8	59.8	20.2	2.39	37.6	87.2	121	137	129	105	67.0	21.7	6.85	40.7	103			
155	69.9	64.4	42.9	11.4	2.87	31.8	72.0	102	115	111	92.2	61.9	26.7	2.18	23.4	86.6			
160	47.4	43.1	25.2	6.44	3.36	26.3	57.2	81.9	93.2	90.9	77.9	56.7	31.6	0.00	6.15	70.6			
165	25.8	23.3	10.7	3.18	4.39	21.4	43.3	59.9	70.4	69.5	61.4	51.4	36.6	0.00	0.00	54.6			
170	8.86	7.36	3.19	2.27	5.44	15.2	29.9	39.6	47.5	47.0	44.9	46.1	41.6	0.00	0.00	38.7			
175	1.95	1.78	2.02	3.51	6.79	11.3	17.0	22.0	24.7	23.6	28.5	40.9	46.6	0.00	0.00	22.7			
180	5.47	7.89	7.84	7.84	8.13	8.00	7.54	7.99	5.50	0.26	12.1	35.6	51.6	0.00	0.00	6.67			

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	ALR-48SBN(mode:2700K)	Total Operating Time(min)	61

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD241047 NB-L1	120.0	60.01	0.3481	38.44	0.9202	42.43

Chromaticity Measurement - Sphere-Spectroradiometer Method(Self-absorption:1.1423)(4π geometry):

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	2728
Duv	0.0008
Chromaticity (x, y)	x=0.4590 y=0.4126
Chromaticity (u', v')	u'=0.2610 v'=0.5280
Color Rendering Index (CRI)	95.7
R9	70
Rg	100
Rf	92
Rcs,h1	-5

Photometric Measurement –Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	2869
Luminous Efficacy (lm/W)	74.64

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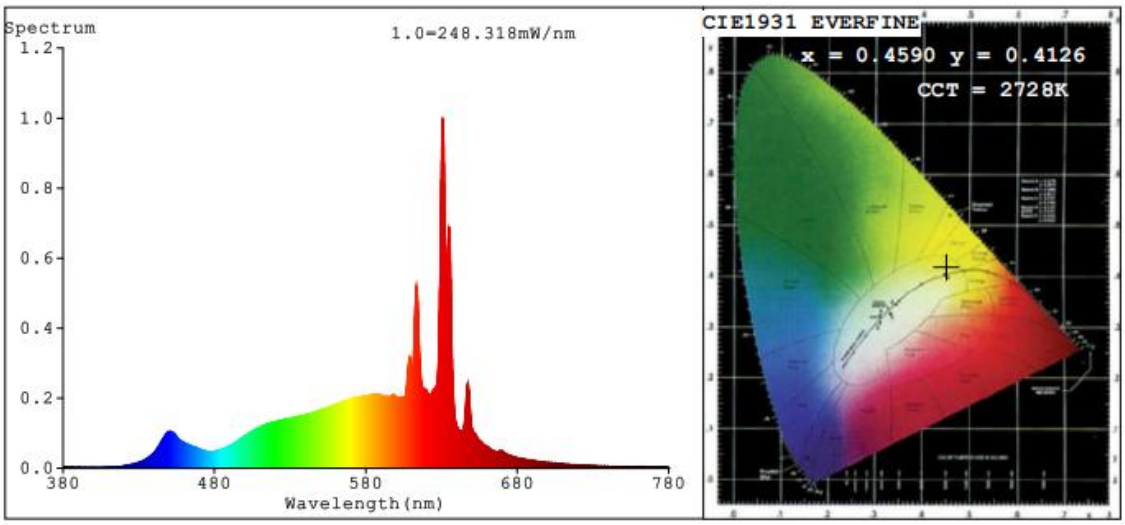
Spectral Power Distribution & Chromaticity Diagram



R1 =98	R2 =98	R3 =96	R4 =98	R5 =97	R6 =97	R7 =94	
R8 =88	R9 =70	R10=92	R11=97	R12=87	R13=97	R14=96	R15=93

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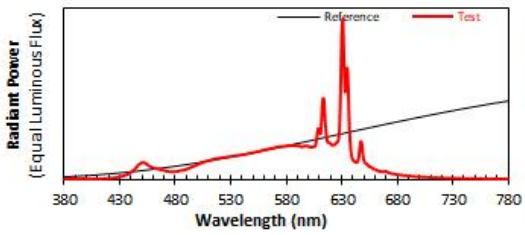
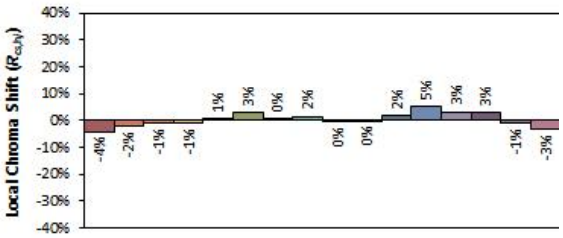
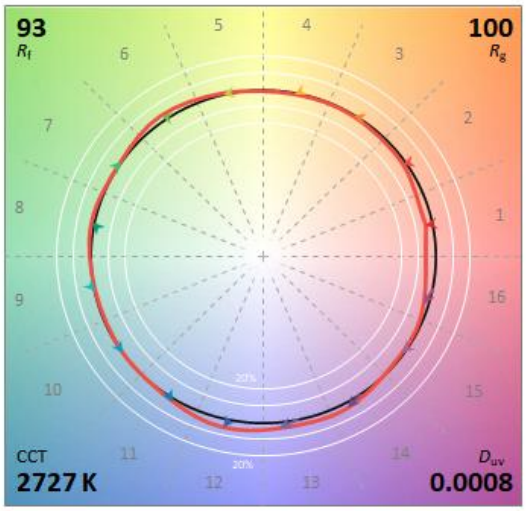
TM30

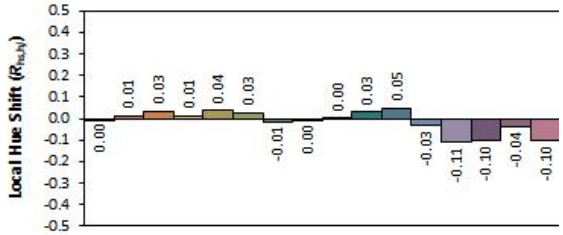
ANSI/IES TM-30-18 Color Rendition Report

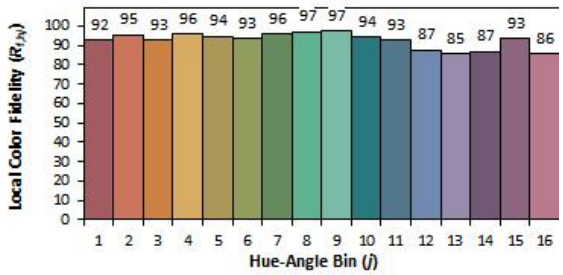
Source:	L128-xx90RC35xxxxx	**Manufacturer:**	RAB Lighting INC.
Date:	2024-11-22	**Model:**	ALR-48SBN(mode:2700K)

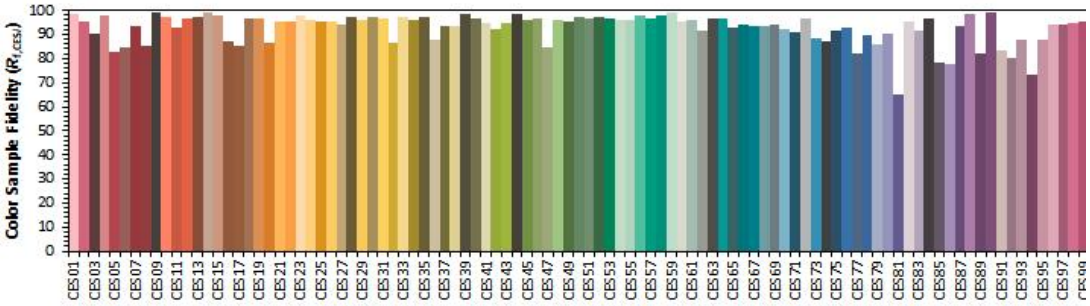












Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x	0.4591
y	0.4125
u'	0.2611
v'	0.5280

CIE 13.3-1995 (CRI)

R_a	96
R_9	71

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

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2.3 Electrical, Photometric and Chromaticity Measurements

Test date	2024-11-22	**Test Ambient:**	25±1 º C
Test Orientation	As intended	**Stabilization Time (min)**	60
Model Number	ALR-48SBN(mode:3000K)	**Total Operating Time(min)**	61

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD241047 NB-L1	120.0	60.01	0.3477	38.40	0.9204	42.41

Chromaticity Measurement - Sphere-Spectroradiometer Method(Self-absorption:1.1422)(4π geometry):

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3003
Duv	-0.0011
Chromaticity (x, y)	x=0.4352 y=0.4009
Chromaticity (u', v')	u'=0.2509 v'=0.5199
Color Rendering Index (CRI)	97.0
R9	82
Rg	102
Rf	93
Rcs,h1	-3

Photometric Measurement –Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	2936
Luminous Efficacy (lm/W)	76.46

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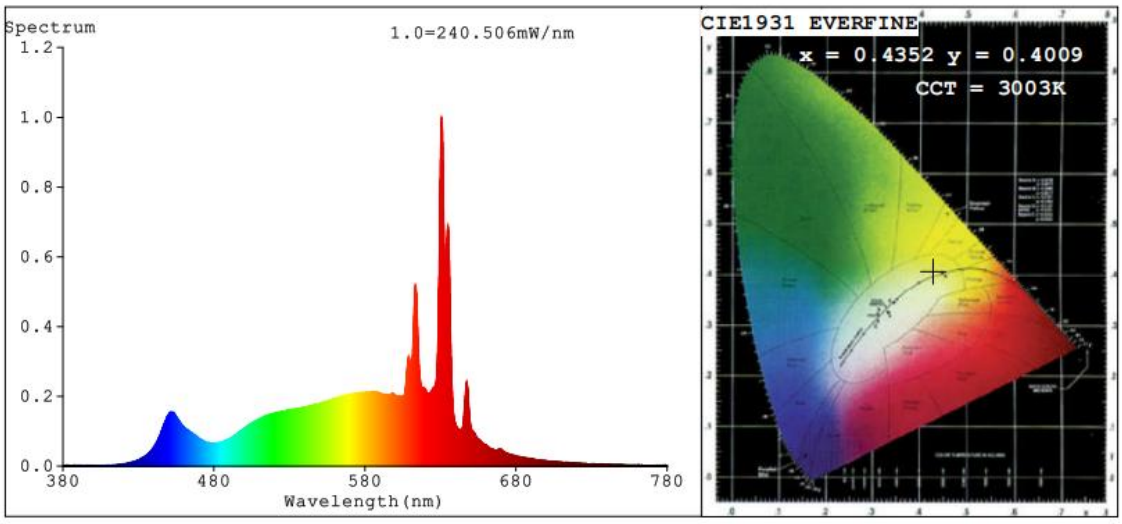
Spectral Power Distribution & Chromaticity Diagram



R1 =99	R2 =99	R3 =96	R4 =98	R5 =99	R6 =96	R7 =95	
R8 =93	R9 =82	R10=96	R11=95	R12=85	R13=100	R14=96	R15=97

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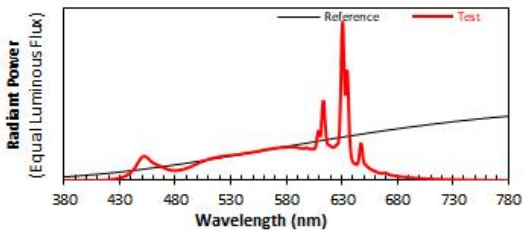
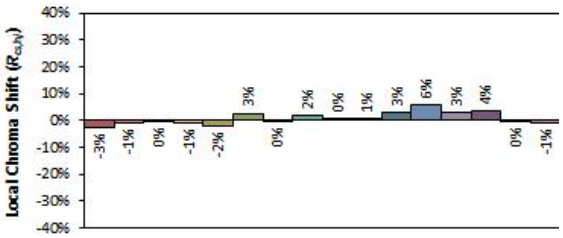
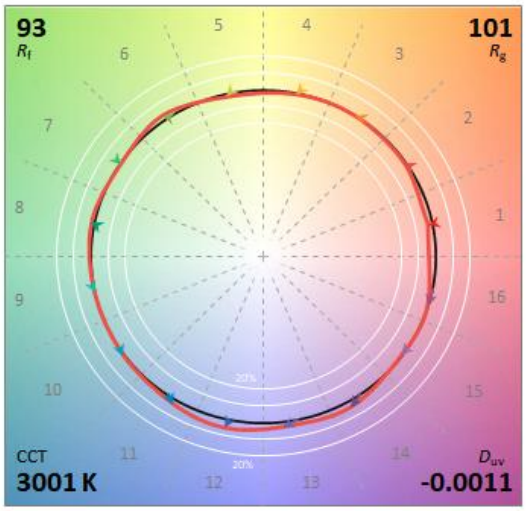
TM30

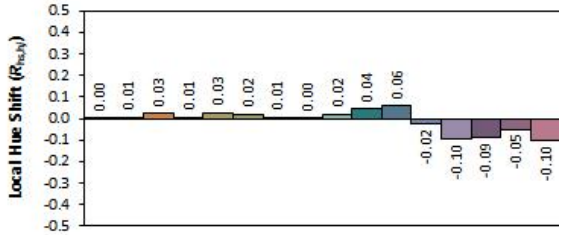
ANSI/IES TM-30-18 Color Rendition Report

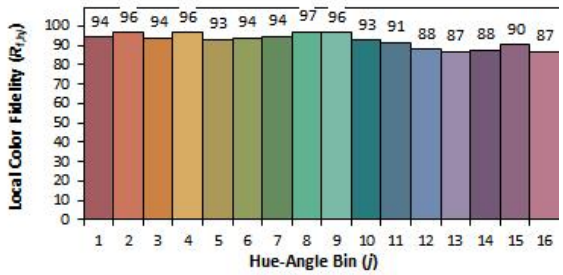
Source:	L128-xx90RC35xxxxx	**Manufacturer:**	RAB Lighting INC.
Date:	2024-11-22	**Model:**	ALR-48SBN(mode:3000K)

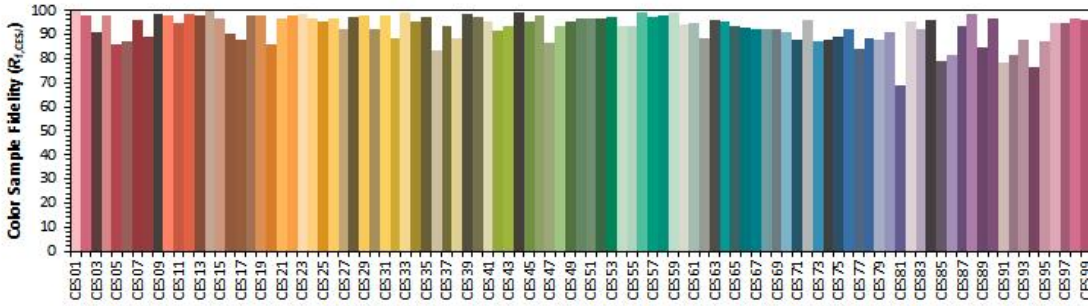












Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x	0.4353
y	0.4008
u'	0.2509
v'	0.5198

CIE 13.3-1995 (CRI)

R_a	97
R_9	82

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	ALR-48SBN(mode:3500K)	Total Operating Time(min)	61

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD241047 NB-L1	120.0	60.01	0.3485	38.45	0.9193	42.30

Chromaticity Measurement - Sphere-Spectroradiometer Method(Self-absorption:1.1426)(4π geometry):

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3436
Duv	-0.0018
Chromaticity (x, y)	x=0.4070 y=0.3875
Chromaticity (u', v')	u'=0.2381 v'=0.5102
Color Rendering Index (CRI)	97.4
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)	3000
Luminous Efficacy (lm/W)	78.02

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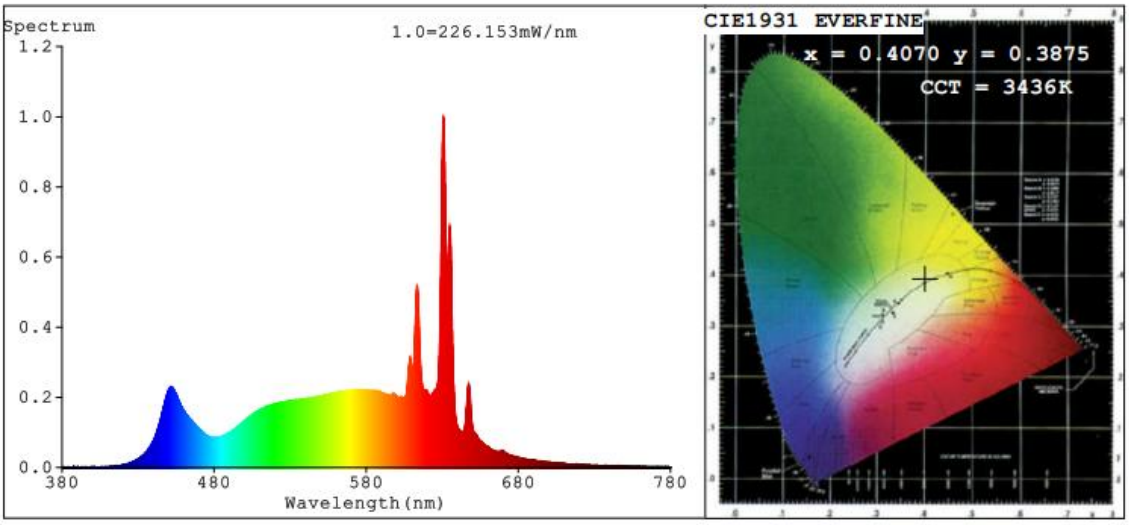
Fax: 86574-8783 5902

Spectral Power Distribution & Chromaticity Diagram



R1 =98	R2 =99	R3 =95	R4 =97	R5 =99	R6 =96	R7 =98	
R8 =98	R9 =92	R10=96	R11=94	R12=81	R13=98	R14=96	R15=99

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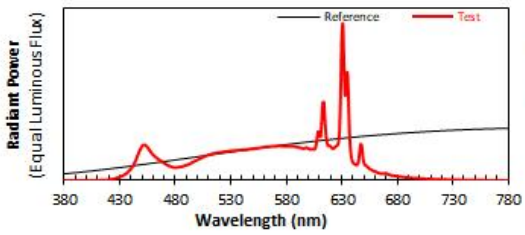
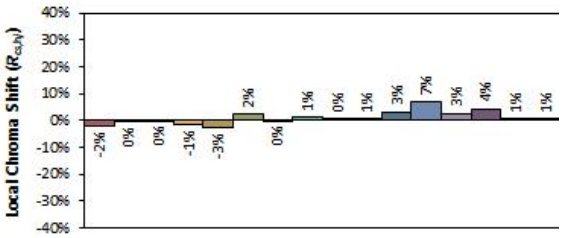
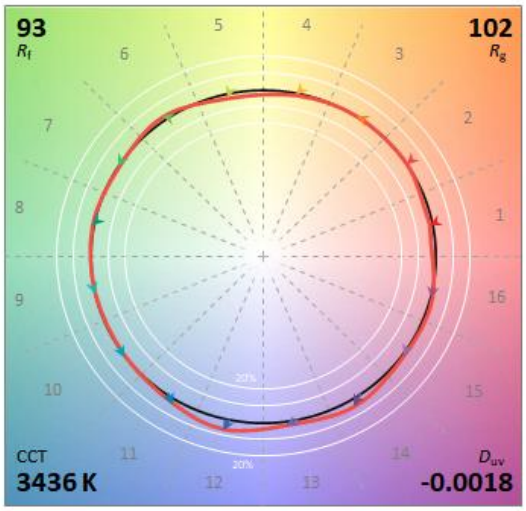
TM30

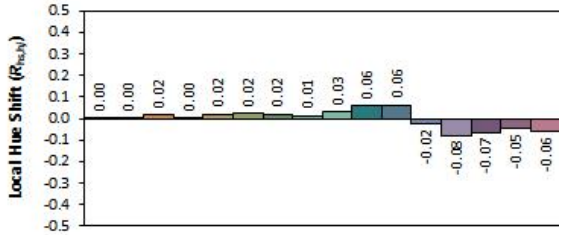
ANSI/IES TM-30-18 Color Rendition Report

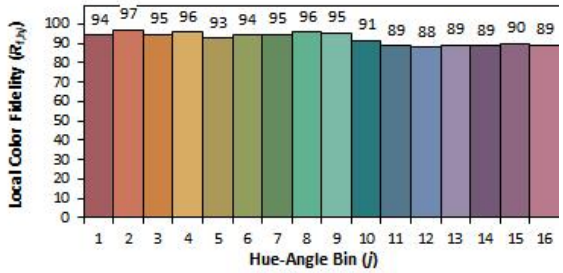
Source:	L128-xx90RC35xxxxx	**Manufacturer:**	RAB Lighting INC.
Date:	2024-11-22	**Model:**	ALR-48SBN(mode:3500K)

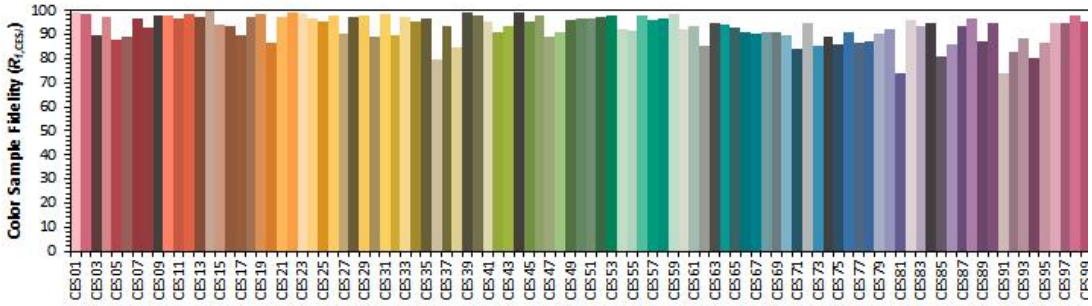












Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x	0.4070
y	0.3874
u'	0.2382
v'	0.5101

CIE 13.3-1995 (CRI)

R_a	97
R_9	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	ALR-48SBN(mode:4000K)	Total Operating Time(min)	61

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD241047 NB-L1	120.0	60.01	0.3461	38.30	0.9221	42.27

Chromaticity Measurement - Sphere-Spectroradiometer Method(Self-absorption:1.1419)(4π geometry):

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3940
Duv	-0.0007
Chromaticity (x, y)	x=0.3826 y=0.3766
Chromaticity (u', v')	u'=0.2266 v'=0.5018
Color Rendering Index (CRI)	97.6
R9	96
Rg	102
Rf	93
Rcs,h1	-2

Photometric Measurement –Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	3423
Luminous Efficacy (lm/W)	89.37

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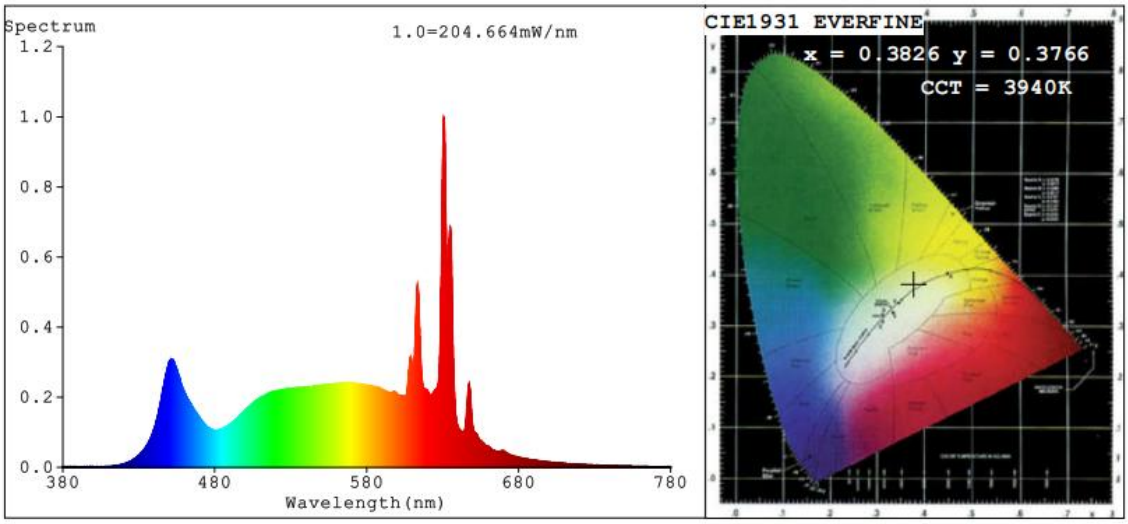
Spectral Power Distribution & Chromaticity Diagram



R1 =98	R2 =99	R3 =93	R4 =98	R5 =99	R6 =96	R7 =99	
R8 =99	R9 =96	R10=94	R11=95	R12=76	R13=99	R14=95	R15=98

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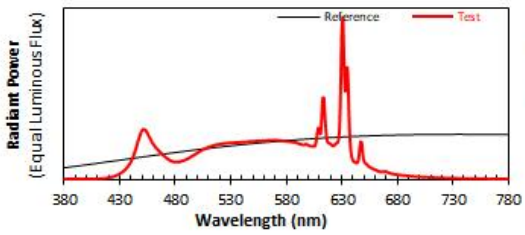
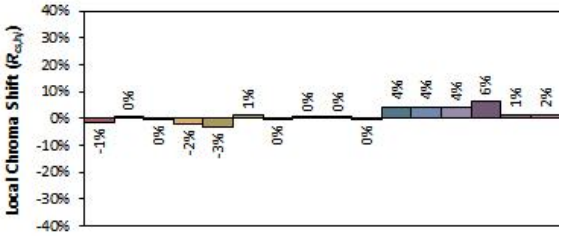
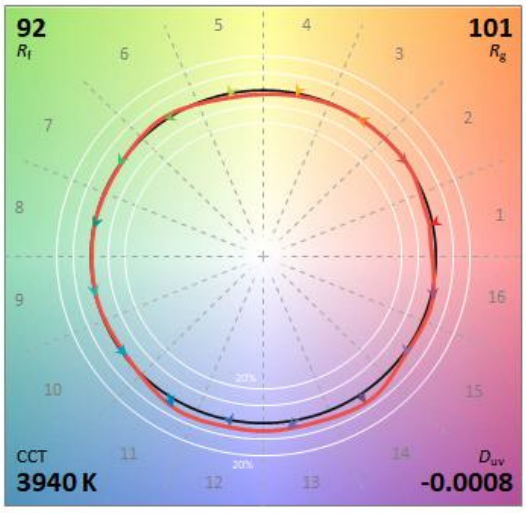
TM30

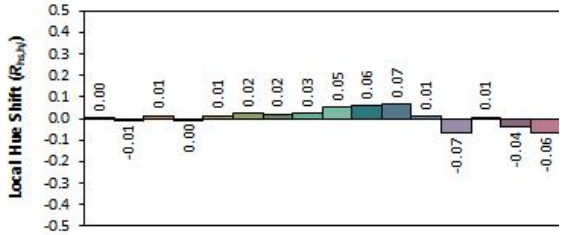
ANSI/IES TM-30-18 Color Rendition Report

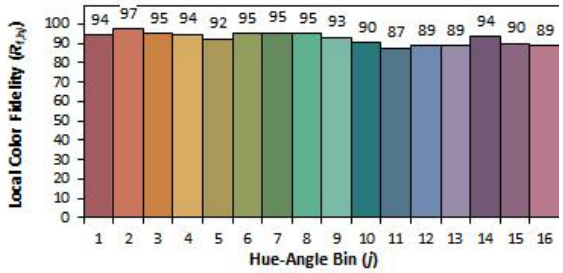
Source:	L128-xx90RC35xxxxx	**Manufacturer:**	RAB Lighting INC.
Date:	2024-11-22	**Model:**	ALR-48SBN(mode:4000K)

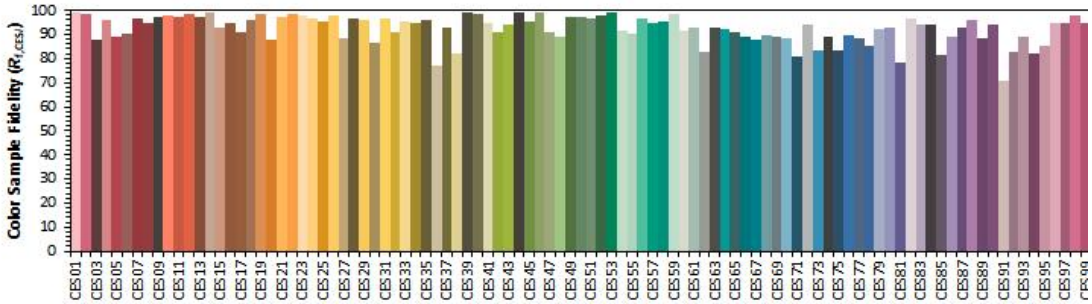












Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x	0.3826
y	0.3764
u'	0.2266
v'	0.5018

CIE 13.3-1995 (CRI)

R_a	98
R_9	97

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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	ALR-48SBN(mode:5000K)	**Total Operating Time(min)**	61

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD241047 NB-L1	120.0	60.01	0.3478	38.39	0.9199	42.29

Chromaticity Measurement - Sphere-Spectroradiometer Method(Self-absorption:1.1424)(4π geometry):

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	5008
Duv	0.0043
Chromaticity (x, y)	x=0.3457 y=0.3609
Chromaticity (u', v')	u'=0.2083 v'=0.4892
Color Rendering Index (CRI)	95.1
R9	88
Rg	101
Rf	93
Rcs,h1	-3

Photometric Measurement –Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	2902
Luminous Efficacy (lm/W)	75.59

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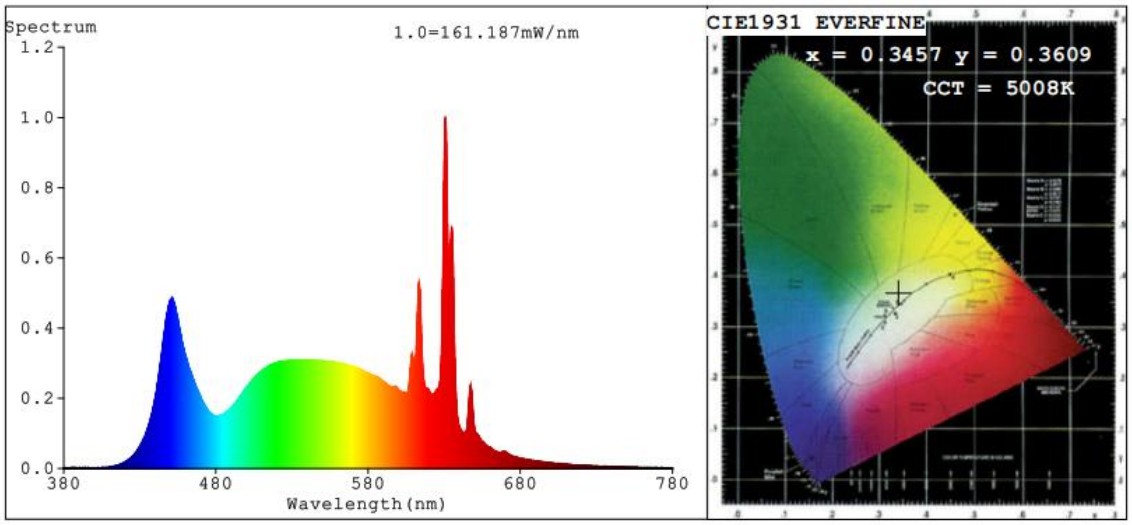
Spectral Power Distribution & Chromaticity Diagram



R1 =97	R2 =95	R3 =91	R4 =96	R5 =96	R6 =93	R7 =97	
R8 =97	R9 =88	R10=86	R11=94	R12=73	R13=96	R14=94	R15=96

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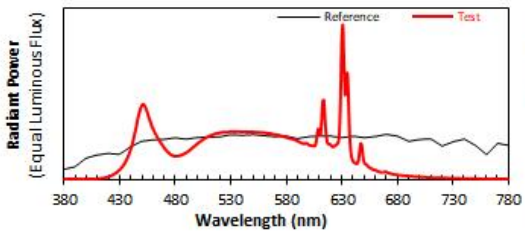
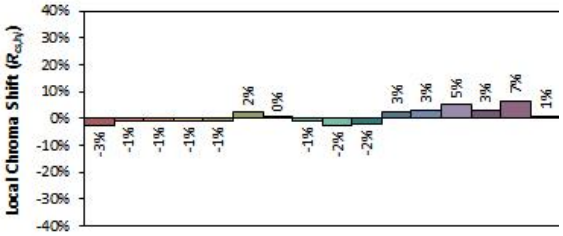
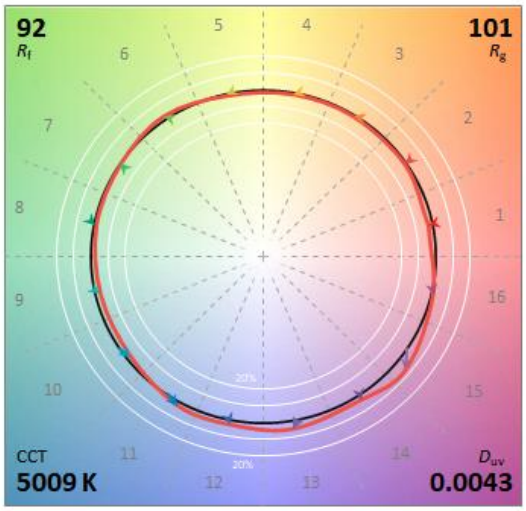
TM30

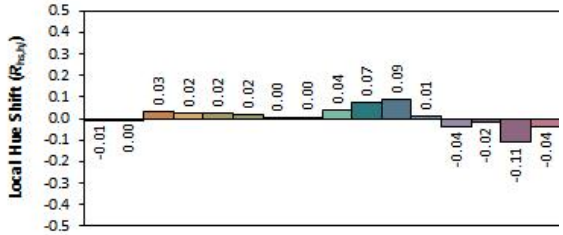
ANSI/IES TM-30-18 Color Rendition Report

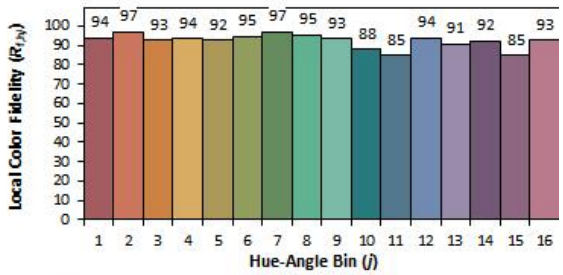
Source:	L128-xx90RC35xxxxx	**Manufacturer:**	RAB Lighting INC.
Date:	2024-11-22	**Model:**	ALR-48SBN(mode:5000K)

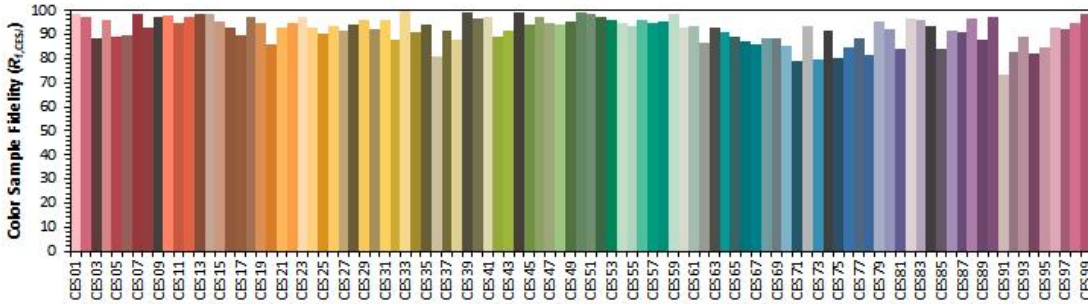












Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x	0.3457
y	0.3607
u'	0.2083
v'	0.4891

CIE 13.3-1995 (CRI)

R_a	95
R_9	89

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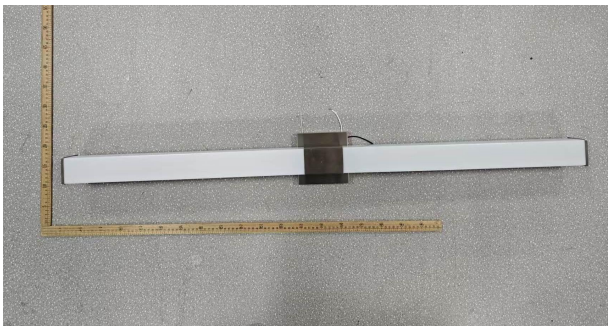
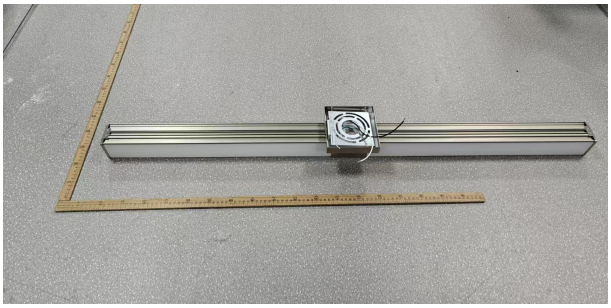
3. Test Equipment

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 *******