



# Photometric Test Report

## Relevant Standards

- IES LM-79-2008
- ANSI C82.77:2014

## Prepared For RAB Lighting Inc.

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## Project Number

DLF2408109

## Report Number

DLF2408109-8a

## Test Date

2024/8/28

## Issue Date

2024/9/1

### Prepared By

Wangzun Zhu

### Approved By

Kevin Jia

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## 1.0 Test Summary

DLC Technical Requirements v5.1

<b>Outdoor - Pole/Arm-Mounted Area and Roadway Luminaires</b>				
<b>Requirement Category</b>	<b>Test Method</b>	<b>Requirements</b>		<b>Test value</b>
Luminaire Output (lm) (Goniophotometer - Section 4.2)	IES LM-79-2008	1000		341
Minimum Luminaire Efficacy (lm/W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Standard 105	Premium 120	38.9
Power (Input Wattage) (W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		8.77
Total Harmonic Distortion (A%) (THD & PF - section 4.3)	ANSI C82.77:2014	20.00%	120V	7.61%
		20.00%	277V	8.34%
Power Factor (THD & PF - section 4.3)	ANSI C82.77:2014	0.9	120V	0.997
		0.9	277V	0.936
Allowable CCTs* (K) (Integrating Sphere - Section 4.1)	IES LM-79-2008	7 step	3045±175	2976
		4 step	3045±100	
Minimum CRI (Integrating Sphere - Section 4.1)	IES LM-79-2008 CIE 13.3-1995	≥70		85
Minimum R9 (Integrating Sphere - Section 4.1)	IES LM-79-2008 CIE 13.3-1995	-		16
Minimum Rf (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	≥70		86
Minimum Rg (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	≥89		97
Minimum IES Rcs,h1 (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	-18% ≤ IES Rcs,h1 ≤ +23%		-11%
Zonal Lumen Requirement (0°-90°) (Goniophotometer - Section 4.2)	IES LM-79-2008	100%		89.09%
Zonal Lumen Requirement (80°-90°) (Goniophotometer - Section 4.2)	IES LM-79-2008	≤10%		2.53%
<b>Input Voltage (V)</b>				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		277
(Goniophotometer - Section 4.2)		Non-Worst Case		120
<b>Input Current (A)</b>				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		0.034
(Goniophotometer - Section 4.2)		Non-Worst Case		0.070
<b>Power (Input Wattage - W)</b>				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		8.77
(Goniophotometer - Section 4.2)		Non-Worst Case		8.36

## 2.0 Test List

Test Item	Test	Test Date	Model Number	Build Level	Sample No.
1	Integrating Sphere Test	2024/8/28	SA-REBR	ES1-02	H1
2	Goniophotometer Test	2024/8/28	SA-REBR	ES1-02	H1
3	THD and PF Test	2024/8/28	SA-REBR	ES1-02	H1

### Remark(If any)

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2、 The results reported herein have been performed in accordance with the laboratory's terms of accreditation. This report shall not be reproduced except in full without the written approval of the Laboratory. The results in this report apply to the test sample(s) mentioned above at the time of the testing period only and are not to be used to indicate applicability to other similar products. This report does not imply that the product(s) has met the criteria for certification.

## 3.0 Production Description

**Luminaire Description:** SA-REBR

**Electrical Specification:** 120V-277V,50/60HZ

### Photos of Luminaire Characteristics



## 4.0 LM-79 Measurement and Test Results

### 4.1 Integrating Sphere Test

Model No.	SA-REBR	Sample ID.	H1
Operate time (Min.)	90	Stabilization time (Min.)	45
Temperature (°C)	25.3	Humidity (%RH)	56.0

#### Test Method

The samples were tested according to the IES LM-79-2008.

Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at  $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$ .

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 voltage of an AC power supply (RMS voltage) or DC power supply (instantaneous voltage) applied to the device under test shall be regulated to within  $\pm 0.2$  percent under load.

The sample was measured using  $4\pi$  geometry and operated at rated voltage and was stabilized before measurement. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780 nm.

#### Test Result

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.08	60	0.071	8.45	0.997
277.01	60	0.034	8.86	0.936

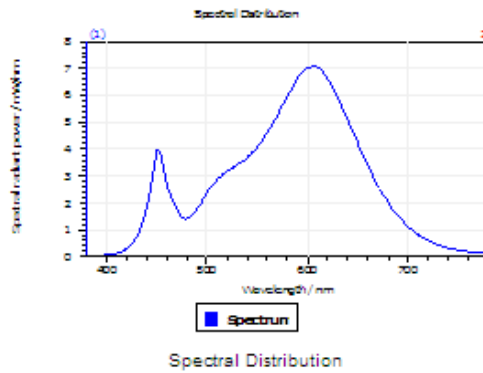
#### Test Result

CCT (K)	CRI	R9	Duv
2976	85	16	-0.0035

Rf	Rg	IES Rcs,h1
86	97	-11%

## 4.1 Integrating Sphere Test

### Results



#### Spectral values

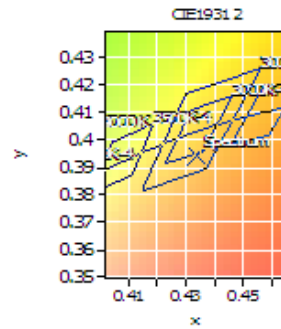
DominantWavelength 584.28 nm  
 Purity 0.485  
 PeakWavelength 605.20 nm  
 Radiant Power 1.06 W  
 Width50%:

#### Color Coordinates

Correlated Color Temperat 2976 K  
 x: 0.4338 u: 0.2526 u': 0.2526  
 y: 0.3943 v: 0.3446 v': 0.5170

CRI01	84.1	CRI09	15.8
CRI02	93.4	CRI10	85.0
CRI03	95.5	CRI11	83.8
CRI04	83.5	CRI12	78.9
CRI05	85.2	CRI13	86.4
CRI06	92.2	CRI14	98.4
CRI07	82.6	CRI15	77.5
CRI08	61.9	CRI16	74.8

ResultsCRI 84.8



## 4.1 Integrating Sphere Test

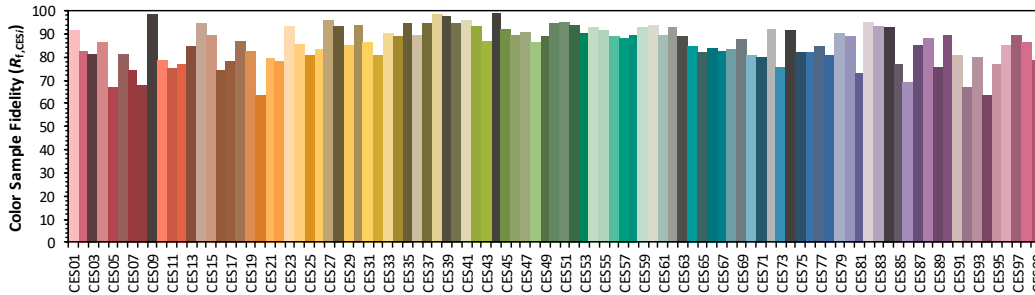
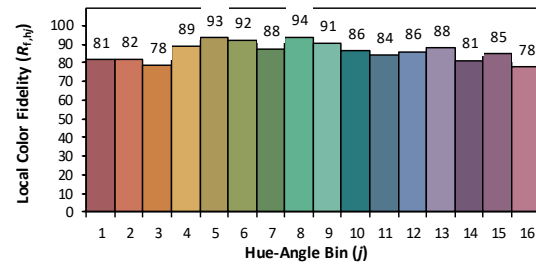
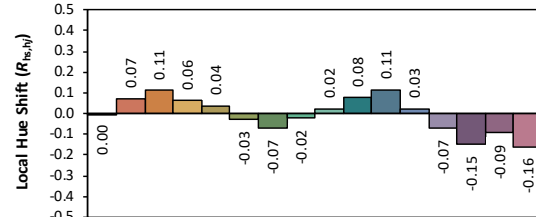
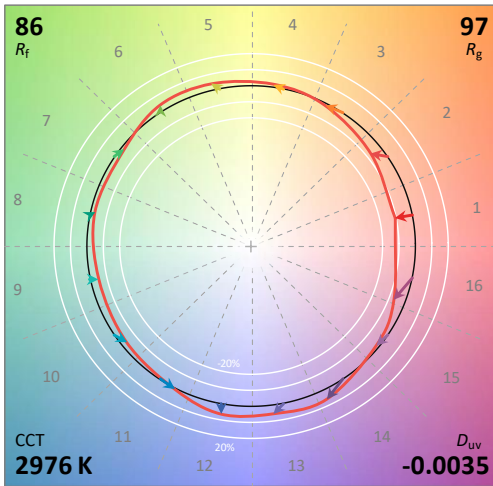
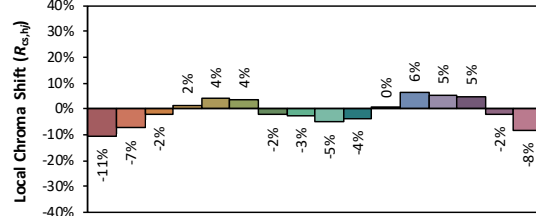
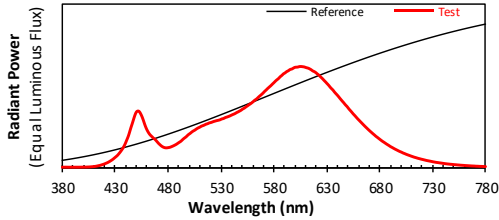
### IES TM-30-18 Color Rendition Report

Source: DLF2408109-8a

Manufacturer: RAB Lighting Inc.

Date: 2024/8/28

Model: SA-REBR



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

$x$  0.4336  
 $y$  0.3943  
 $u'$  0.2526  
 $v'$  0.5170

CIE 13.3-1995 (CRI)	
$R_a$	85
$R_g$	17

#### 4.1 Integrating Sphere Test

Spectral Distribution over Visible Wavelength							
WL (nm)	Radiant (Watts/nm)	WL (nm)	Radiant (Watts/nm)	WL (nm)	Radiant (Watts/nm)	WL (nm)	Radiant (Watts/nm)
380	5.71E-05	485	1.55E-03	590	6.62E-03	695	1.30E-03
385	5.72E-05	490	1.77E-03	595	6.87E-03	700	1.12E-03
390	5.61E-05	495	2.06E-03	600	7.03E-03	705	9.61E-04
395	5.70E-05	500	2.37E-03	605	7.09E-03	710	8.24E-04
400	6.15E-05	505	2.63E-03	610	7.03E-03	715	7.05E-04
405	7.24E-05	510	2.85E-03	615	6.88E-03	720	6.05E-04
410	1.01E-04	515	3.03E-03	620	6.64E-03	725	5.16E-04
415	1.72E-04	520	3.17E-03	625	6.31E-03	730	4.40E-04
420	2.88E-04	525	3.29E-03	630	5.92E-03	735	3.78E-04
425	4.69E-04	530	3.40E-03	635	5.51E-03	740	3.23E-04
430	7.42E-04	535	3.55E-03	640	5.09E-03	745	2.77E-04
435	1.14E-03	540	3.70E-03	645	4.64E-03	750	2.38E-04
440	1.78E-03	545	3.88E-03	650	4.22E-03	755	2.06E-04
445	2.84E-03	550	4.09E-03	655	3.78E-03	760	1.78E-04
450	3.91E-03	555	4.34E-03	660	3.38E-03	765	1.53E-04
455	3.65E-03	560	4.61E-03	665	2.99E-03	770	1.31E-04
460	2.68E-03	565	4.92E-03	670	2.64E-03	775	1.13E-04
465	2.17E-03	570	5.25E-03	675	2.31E-03	780	9.90E-05
470	1.81E-03	575	5.62E-03	680	2.01E-03		
475	1.48E-03	580	5.96E-03	685	1.75E-03		
480	1.42E-03	585	6.30E-03	690	1.51E-03		

## 4.0 LM-79 Measurement and Test Results

### 4.2 Goniophotometer Test

Model No.	SA-REBR	Sample ID.	H1
Operate time (Min.)	90	Stabilization time (Min.)	45
Temperature (°C)	25.3	Humidity (%RH)	54.0

#### Test Method

The samples were tested according to the IES LM-79-2008.

Photometric parameters were measured using a type C goniophotometer and software.

The ambient temperature shall be maintained at  $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$ , measured at a point not more than 1 m from the sample and at the same height as the sample.

The voltage of an AC power supply (RMS voltage) or DC power supply (instantaneous voltage) applied to the device under test shall be regulated to within  $\pm 0.2$  percent under load.

The samples were operated at rated voltage and was stabilized before measurement. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at  $0.5^{\circ}$  vertical intervals and  $10^{\circ}$  horizontal intervals.

#### Test Conditions

Condition	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
WORST CASE	277.07	60	0.034	8.77	0.936
NON-WROST CASE	120.04	60	0.070	8.36	0.997

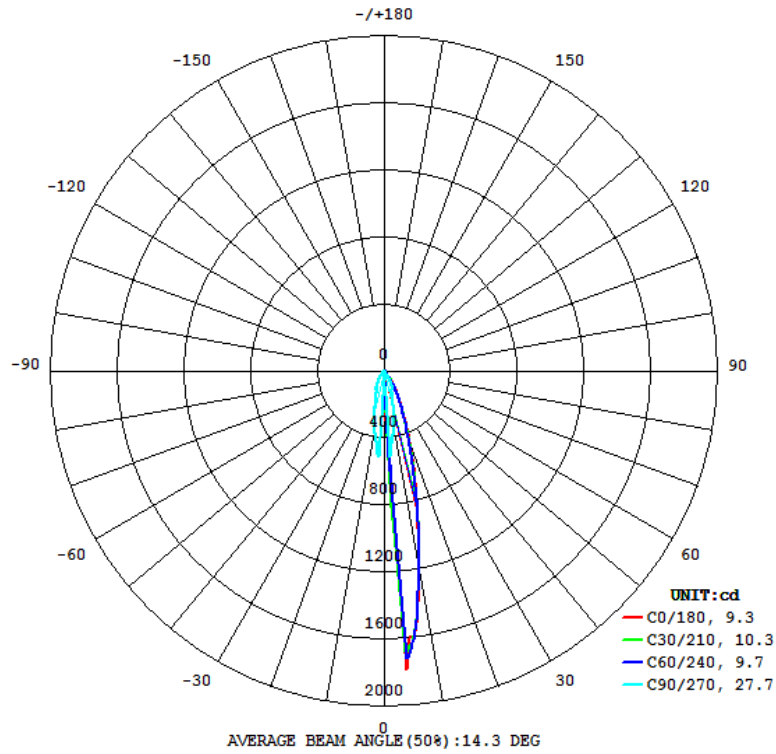
#### Test Result

Flux (lm)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
	C0-180	C90-270	C0-180	C90-270	
341	27.8	73.6	9.3	27.7	38.9

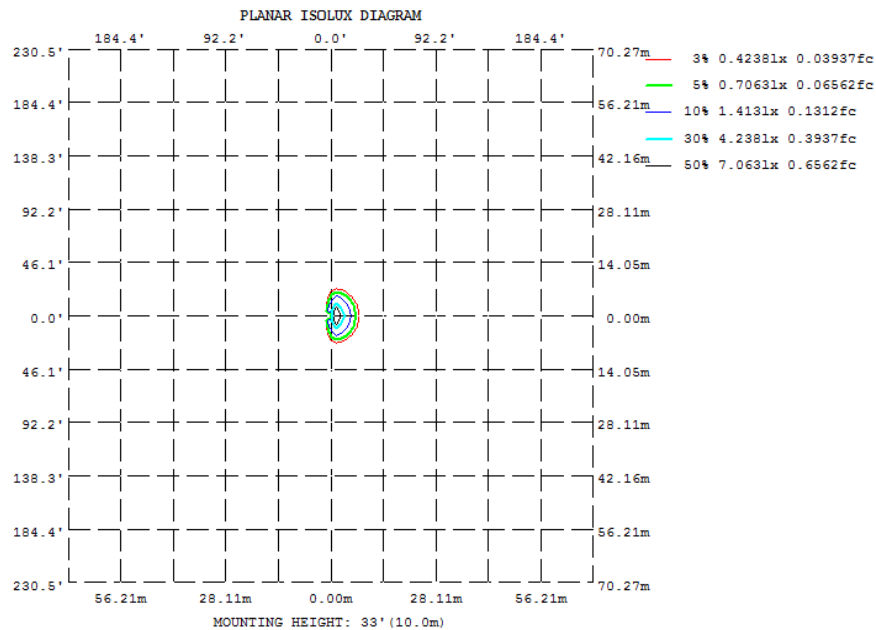
Zonal Lumen Requirement ( $0^{\circ}$ - $90^{\circ}$ )	Zonal Lumen Requirement ( $80^{\circ}$ - $90^{\circ}$ )	BUG rating
89.09%	2.53%	B0-U2-G0

## 4.2 Goniophotometer Test

### Light Distribution Curve



### Isolux Plot



## 4.2 Goniophotometer Test

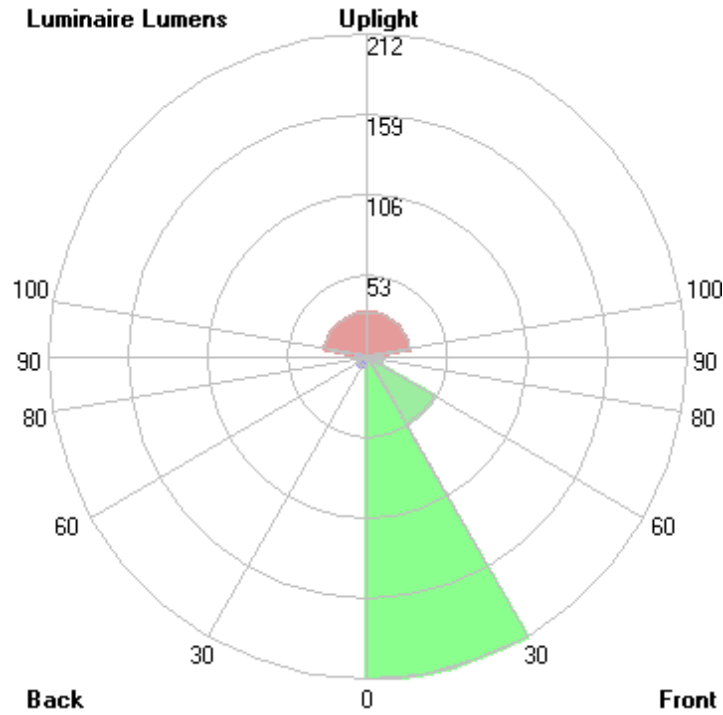
### Zonal Lumen Summary

γ	C0	C45	C90	C135	C180	C225	C270	C315
10	1216	1232	346.9	0.7626	0.3572	0.7626	346.9	1232
20	472.2	453.5	149.7	1.558	1.107	1.558	149.7	453.5
30	171.6	168.0	95.14	2.656	2.588	2.656	95.14	168.0
40	50.17	50.02	33.42	3.961	3.978	3.961	33.42	50.02
50	24.32	23.65	13.99	5.151	5.144	5.151	13.99	23.65
60	16.30	15.20	9.684	6.091	6.055	6.091	9.684	15.20
70	10.04	9.474	7.480	6.743	6.686	6.743	7.480	9.474
80	9.539	8.899	7.407	7.088	7.021	7.088	7.407	8.899
90	9.268	8.661	7.395	7.140	7.067	7.140	7.395	8.661
100	8.864	8.318	7.152	6.890	6.813	6.890	7.152	8.318
110	8.121	7.696	6.688	6.438	6.340	6.438	6.688	7.696
120	7.182	6.919	6.092	5.894	5.695	5.894	6.092	6.919
130	6.027	5.876	5.271	5.133	4.893	5.133	5.271	5.876
140	4.837	4.825	4.387	4.239	4.377	4.239	4.387	4.825
150	4.432	4.027	3.554	3.302	3.423	3.302	3.554	4.027
160	4.522	3.663	2.934	2.455	2.207	2.455	2.934	3.663
170	4.345	3.381	2.437	1.638	1.355	1.638	2.437	3.381
180	1.256	1.256	1.256	1.256	1.256	1.256	1.256	1.256
DEG	LUMINOUS INTENSITY:cd							

	Zonal (lm)	Total (lm)	Percent	
0-10	55.08	0 - 10	55.08	16.14%
10-20	99.77	0 - 20	154.85	45.37%
20-30	63.93	0 - 30	218.78	64.10%
30-40	33.29	0 - 40	252.07	73.85%
40-50	14.57	0 - 50	266.64	78.12%
50-60	10.88	0 - 60	277.52	81.31%
60-70	9.55	0 - 70	287.07	84.11%
70-80	8.39	0 - 80	295.46	86.57%
80-90	8.63	0 - 90	304.09	89.09%
90-100	8.44	0 - 100	312.53	91.57%
100-110	7.74	0 - 110	320.27	93.84%
110-120	6.66	0 - 120	326.93	95.79%
120-130	5.33	0 - 130	332.26	97.35%
130-140	3.88	0 - 140	336.14	98.49%
140-150	2.58	0 - 150	338.72	99.24%
150-160	1.57	0 - 160	340.29	99.70%
160-170	0.81	0 - 170	341.10	99.94%
170-180	0.21	0 - 180	341.31	100.00%

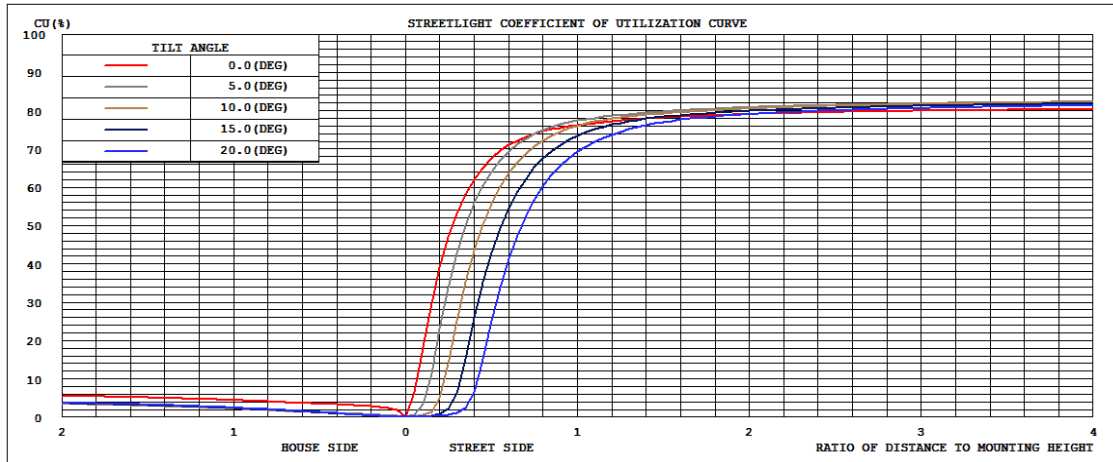
## 4.2 Goniophotometer Test

LCS/BUG

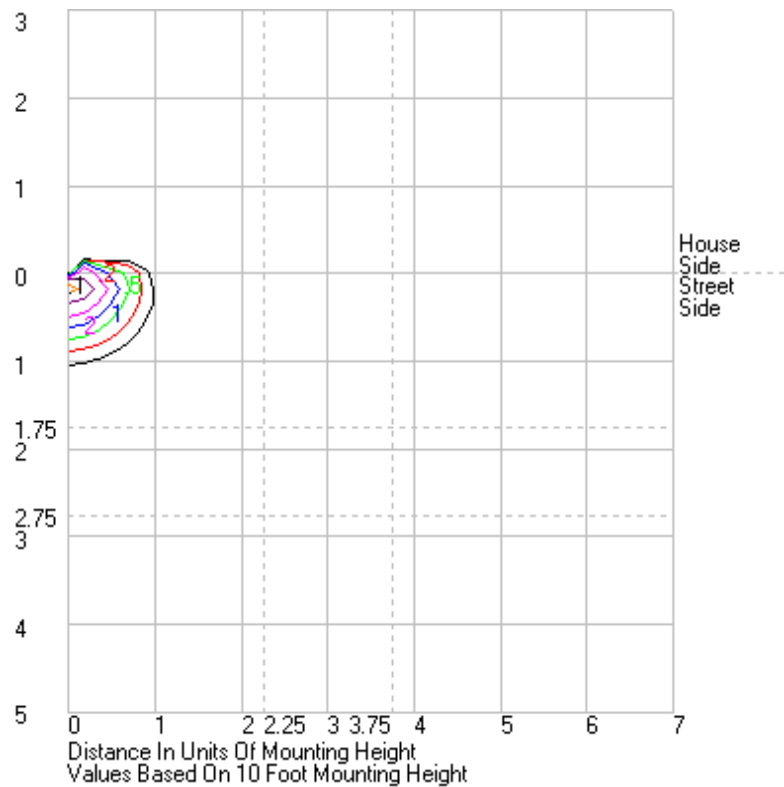


	Lumens	% Lamp	% Luminaire
FL - Front-Low (0-30)	211.8	N.A.	62.1
FM - Front-Medium (30-60)	51.0	N.A.	15.0
FH - Front-High (60-80)	10.9	N.A.	3.2
FVH - Front-Very High (80-90)	4.7	N.A.	1.4
BL - Back-Low (0-30)	6.9	N.A.	2.0
BM - Back-Medium (30-60)	7.7	N.A.	2.3
BH - Back-High (60-80)	7.0	N.A.	2.1
BVH - Back-Very High (80-90)	3.9	N.A.	1.1
UL - Uplight-Low (90-100)	8.4	N.A.	2.5
UH - Uplight-High (100-180)	28.8	N.A.	8.4
<b>Total</b>	<b>341.1</b>	<b>N.A.</b>	<b>100.0</b>
<b>BUG Rating</b>	<b>B0-U2-G0</b>		

Coefficients of Utilization



Isolines





## 4.2 Goniophotometer Test

	0	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300	315	330	345	360
0	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
1	0.14	0.67	0.68	0.73	0.76	0.77	0.95	0.72	0.48	0.35	0.22	0.15	0.11	0.15	0.22	0.35	0.48	0.72	0.95	0.77	0.76	0.73	0.68	0.67	0.14
2	0.15	0.81	0.79	0.86	0.9	0.88	0.98	0.76	0.58	0.41	0.19	0.14	0.11	0.14	0.19	0.41	0.58	0.76	0.98	0.88	0.9	0.86	0.79	0.81	0.15
3	295.32	125.55	115.51	94.79	90.41	83.82	45.89	0.68	0.52	0.41	0.2	0.15	0.1	0.15	0.2	0.41	0.52	0.68	45.89	83.82	90.41	94.79	115.51	125.55	295.32
4	904.22	1083.59	1048.54	1046.67	964.12	324.33	143.17	0.71	0.44	0.34	0.18	0.12	0.08	0.12	0.18	0.34	0.44	0.71	143.17	324.33	964.12	1046.67	1048.54	1083.59	904.22
5	1682.12	1628.88	1675.06	1744.87	1720.74	1140.71	494.12	0.9	0.48	0.35	0.21	0.15	0.1	0.15	0.21	0.35	0.48	0.9	494.12	1140.71	1720.74	1744.87	1675.06	1628.88	1682.12
6	1590.84	1609.15	1630.67	1658.8	1626.79	1240.65	446.35	1.03	0.6	0.44	0.31	0.2	0.13	0.2	0.31	0.44	0.6	1.03	446.35	1240.65	1626.79	1658.8	1630.67	1609.15	1590.84
7	1569.8	1550.07	1547.12	1570.2	1559.58	1192.84	420.58	1.09	0.66	0.54	0.42	0.28	0.18	0.28	0.42	0.54	0.66	1.09	420.58	1192.84	1559.58	1570.2	1547.12	1550.07	1569.8
8	1454.65	1434.46	1437.61	1453.76	1438.37	1115.66	398.46	1.28	0.75	0.62	0.5	0.34	0.23	0.34	0.5	0.62	0.75	1.28	398.46	1115.66	1438.37	1453.76	1437.61	1434.46	1454.65
9	1335.37	1320.83	1330.36	1347.27	1329.17	1047.2	373.44	1.39	0.84	0.69	0.56	0.39	0.28	0.39	0.56	0.69	0.84	1.39	373.44	1047.2	1329.17	1347.27	1330.36	1320.83	1335.37
10	1216.07	1208.19	1213.38	1232.13	1219.72	979.41	346.9	1.35	0.92	0.76	0.63	0.46	0.36	0.46	0.63	0.76	0.92	1.35	346.9	979.41	1219.72	1232.13	1213.38	1208.19	1216.07
11	1097.67	1100.86	1105.52	1116.68	1115.8	910.89	321.81	1.52	1.02	0.85	0.7	0.53	0.42	0.53	0.7	0.85	1.02	1.52	321.81	910.89	1115.8	1116.68	1105.52	1100.86	1097.67
12	1003.37	1006.46	1010.03	1014.54	1014.33	848.23	296.79	1.54	1.11	0.93	0.77	0.6	0.49	0.6	0.77	0.93	1.11	1.54	296.79	848.23	1014.33	1014.54	1010.03	1006.46	1003.37
13	914.45	915.53	913.91	918.91	917.35	786.56	274.24	1.61	1.2	1.01	0.84	0.66	0.53	0.66	0.84	1.01	1.2	1.61	274.24	786.56	917.35	918.91	913.91	915.53	914.45
14	832.61	828.17	828.95	831.95	829.56	728.25	251.77	1.74	1.28	1.09	0.91	0.72	0.6	0.72	0.91	1.09	1.28	1.74	251.77	728.25	829.56	831.95	828.95	828.17	832.61
15	758.02	752.65	752	756.42	750.92	669.89	229.28	1.86	1.37	1.16	0.98	0.79	0.68	0.79	0.98	1.16	1.37	1.86	229.28	669.89	750.92	756.42	752	752.65	758.02
16	690.58	683.19	680.91	683.65	676.28	613.59	208.08	1.92	1.45	1.23	1.05	0.86	0.76	0.86	1.05	1.23	1.45	1.92	208.08	613.59	676.28	683.65	680.91	683.19	690.58
17	631.35	625.13	621.1	620.56	611.76	560.23	189.97	2.02	1.54	1.3	1.11	0.94	0.84	0.94	1.11	1.3	1.54	2.02	189.97	560.23	611.76	620.56	621.1	625.13	631.35
18	575.87	569.81	562.59	560.03	551.63	512	174.78	2.11	1.64	1.38	1.18	1.02	0.92	1.02	1.18	1.38	1.64	2.11	174.78	512	551.63	560.03	562.59	569.81	575.87
19	525.26	517.3	509.09	504.23	494.85	466.36	160.9	2.16	1.75	1.47	1.25	1.1	1	1.1	1.25	1.47	1.75	2.16	160.9	466.36	494.85	504.23	509.09	517.3	525.26
20	472.24	465.72	458.41	453.5	447.14	424.36	149.72	2.27	1.87	1.56	1.33	1.19	1.11	1.19	1.33	1.56	1.87	2.27	149.72	424.36	447.14	453.5	458.41	465.72	472.24
21	423.16	418.28	411.97	409.59	404.48	386.04	139.56	2.35	1.98	1.65	1.41	1.31	1.24	1.31	1.41	1.65	1.98	2.35	139.56	386.04	404.48	409.59	411.97	418.28	423.16
22	381.84	378.06	372.99	371.55	367	351.08	130.63	2.48	2.1	1.73	1.5	1.44	1.39	1.44	1.5	1.73	2.1	2.48	130.63	351.08	367	371.55	372.99	378.06	381.84
23	343.64	341.27	336.48	336.54	333.34	319.19	124.13	2.54	2.17	1.82	1.6	1.57	1.54	1.57	1.6	1.82	2.17	2.54	124.13	319.19	333.34	336.54	336.48	341.27	343.64
24	311.21	308.41	304.91	305.99	303.07	290.61	121.13	2.65	2.29	1.93	1.72	1.71	1.68	1.71	1.72	1.93	2.29	2.65	121.13	290.61	303.07	305.99	304.91	308.41	311.21
25	281.85	279.03	276.6	277.84	275.99	264.58	120.39	2.76	2.4	2.05	1.85	1.86	1.83	1.86	1.85	2.05	2.4	2.76	120.39	264.58	275.99	277.84	276.6	279.03	281.85
26	254.42	252.62	250.31	251.84	249.57	239.81	116.6	2.88	2.52	2.17	1.98	2	1.99	2	1.98	2.17	2.52	2.88	116.6	239.81	249.57	251.84	250.31	252.62	254.42
27	229.64	228.29	225.82	227.11	226.31	217.82	112	2.99	2.64	2.29	2.11	2.15	2.14	2.15	2.11	2.29	2.64	2.99	112	217.82	226.31	227.11	225.82	228.29	229.64
28	207.75	206.1	203.79	204.47	204.59	197.51	106.72	3.11	2.75	2.41	2.25	2.3	2.29	2.3	2.25	2.41	2.75	3.11	106.72	197.51	204.59	204.47	203.79	206.1	207.75
29	188.97	187.04	184.31	184.93	185.18	179.61	101.21	3.23	2.87	2.53	2.4	2.44	2.44	2.44	2.4	2.53	2.87	3.23	101.21	179.61	185.18	184.93	184.31	187.04	188.97
30	171.59	170.27	167.32	168.01	168.65	162.81	95.14	3.35	2.99	2.66	2.54	2.58	2.59	2.58	2.54	2.66	2.99	3.35	95.14	162.81	168.65	168.01	167.32	170.27	171.59
31	156.75	155.22	152.89	153.63	153.89	147.78	88.6	3.47	3.1	2.78	2.68	2.73	2.73	2.73	2.68	2.78	3.1	3.47	88.6	147.78	153.89	153.63	152.89	155.22	156.75
32	141.92	140.64	138.75	139.92	139.11	133.01	82.05	3.58	3.22	2.91	2.82	2.88	2.88	2.88	2.82	2.91	3.22	3.58	82.05	133.01	139.11	139.92	138.75	140.64	141.92
33	128.03	126.98	125.5	126.29	125.2	120.62	76.03	3.7	3.33	3.03	2.96	3.02	3.03	3.02	2.96	3.03	3.33	3.7	76.03	120.62	125.2	126.29	125.5	126.98	128.03
34	114.98	114.28	113.15	113.52	112.88	108.59	69.5	3.81	3.45	3.16	3.1	3.16	3.17	3.16	3.1	3.16	3.45	3.81	69.5	108.59	112.88	113.52	113.15	114.28	114.98
35	102.74	102.15	101.11	101.03	100.67	96.94	63.07	3.93	3.57	3.3	3.24	3.3	3.31	3.3	3.24	3.3	3.57	3.93	63.07	96.94	100.67	101.03	101.11	102.15	102.74
36	90.93	90.69	89.45	89.28	88.92	85.73	56.65	4.04	3.7	3.43	3.38	3.43	3.45	3.43	3.38	3.43	3.7	4.04	56.65	85.73	88.92	89.28	89.45	90.69	90.93
37	79.94	79.47	78.27	78.23	77.68	75.19	49.89	4.16	3.82	3.56	3.52	3.57	3.58	3.57	3.52	3.56	3.82	4.16	49.89	75.19	77.68	78.23	78.27	79.47	79.94
38	69.53	68.82	67.76	68.06	67.56	66.35	43.73	4.27	3.94	3.7	3.66	3.7	3.72	3.7	3.66	3.7	3.94	4.27	43.73	66.35	67.56	68.06	67.76	68.82	69.53
39	59.57	59.28	58.44	58.95	58.95	58.37	38.33	4.39	4.06	3.83	3.79	3.83	3.85	3.83	3.79	3.83	4.06	4.39	38.33	58.37	58.95	58.95	58.44	59.28	59.57
40	50.17	50.36	49.71	50.02	50.9	51.07	33.42	4.5	4.17	3.96	3.92	3.96	3.98	3.96	3.92	3.96	4.17	4.5	33.42	51.07	50.9	50.02	49.71	50.36	50.17
41	43.8	43.77	43.83	44.42	45.36	45.44	29.5	4.6	4.29	4.09	4.05	4.09	4.1	4.09	4.05	4.09	4.29	4.6	29.5	45.44	45.36	44.42	43.83	43.77	43.8
42	40.02	39.44	39.42	39.75	40.57	40.85	26.21	4.72	4.41	4.21	4.18	4.21	4.23	4.21	4.18	4.21	4.41	4.72	26.21	40.85	40.57	39.75	39.42	39.44	40.02
43	36.81	36.38	36.1	36.23	36.92	37.29	23.56	4.82	4.52	4.34	4.31	4.34	4.35	4.34	4.31	4.34	4.52	4.82	23.56	37.29	36.92	36.23	36.1	36.38	36.81
44	34.24	33.81	33.48	33.44	33.91	33.85	21.3	4.92	4.64	4.46	4.43	4.46	4.47	4.46	4.43	4.46	4.64	4.92	21.3	33.85	33.91	33.44	33.48	33.81	34.24
45	31.76	31.36	31.17	31.19	31.43	31.01	19.31	5.03	4.75	4.58	4.55	4.58	4.59	4.58	4.55	4.58	4.75	5.03	19.31	31.01	31.43	31.19	31.17	31.36	31.76
46	29.42	29.09	29.11	29.23	29.26	28.58	17.72																		



51	23.58	23.19	23.07	22.78	22.17	21.1	13.43	5.61	5.38	5.26	5.22	5.23	5.25	5.23	5.22	5.26	5.38	5.61	13.43	21.1	22.17	22.78	23.07	23.19	23.58
52	22.71	22.46	22.25	22.02	21.33	20.05	12.83	5.7	5.48	5.36	5.33	5.33	5.35	5.33	5.33	5.36	5.48	5.7	12.83	20.05	21.33	22.02	22.25	22.46	22.71
53	22.1	21.77	21.56	21.25	20.03	18.82	12.03	5.79	5.58	5.46	5.43	5.43	5.44	5.43	5.43	5.46	5.58	5.79	12.03	18.82	20.03	21.25	21.56	21.77	22.1
54	20.76	20.46	19.97	19.67	18.68	17.54	11.43	5.88	5.67	5.56	5.53	5.53	5.54	5.53	5.53	5.56	5.67	5.88	11.43	17.54	18.68	19.67	19.97	20.46	20.76
55	19.86	19.54	18.98	18.47	17.58	16.57	10.91	5.96	5.76	5.66	5.62	5.62	5.64	5.62	5.62	5.66	5.76	5.96	10.91	16.57	17.58	18.47	18.98	19.54	19.86
56	18.93	18.64	18.13	17.59	16.75	15.75	10.49	6.04	5.85	5.75	5.71	5.71	5.73	5.71	5.71	5.75	5.85	6.04	10.49	15.75	16.75	17.59	18.13	18.64	18.93
57	18.06	17.77	17.35	16.82	15.96	14.99	10.22	6.12	5.94	5.84	5.8	5.8	5.81	5.8	5.8	5.84	5.94	6.12	10.22	14.99	15.96	16.82	17.35	17.77	18.06
58	17.31	17.05	16.61	16.11	15.35	14.41	10.02	6.2	6.02	5.92	5.89	5.88	5.9	5.88	5.89	5.92	6.02	6.2	10.02	14.41	15.35	16.11	16.61	17.05	17.31
59	16.73	16.49	16.07	15.58	14.87	14.01	9.84	6.28	6.11	6.01	5.98	5.97	5.98	5.97	5.98	6.01	6.11	6.28	9.84	14.01	14.87	15.58	16.07	16.49	16.73
60	16.3	16.06	15.66	15.2	14.51	13.66	9.68	6.35	6.19	6.09	6.06	6.04	6.06	6.04	6.06	6.09	6.19	6.35	9.68	13.66	14.51	15.2	15.66	16.06	16.3
61	15.94	15.72	15.34	14.91	14.28	13.41	9.54	6.42	6.26	6.17	6.13	6.12	6.13	6.12	6.13	6.17	6.26	6.42	9.54	13.41	14.28	14.91	15.34	15.72	15.94
62	15.63	15.48	15.11	14.68	14.04	13.08	9.4	6.48	6.33	6.25	6.21	6.19	6.2	6.19	6.21	6.25	6.33	6.48	9.4	13.08	14.04	14.68	15.11	15.48	15.63
63	15.28	15.13	14.74	14.21	13.57	12.72	9.26	6.55	6.4	6.32	6.28	6.26	6.27	6.26	6.28	6.32	6.4	6.55	9.26	12.72	13.57	14.21	14.74	15.13	15.28
64	14.9	14.77	14.33	13.82	13.12	12.38	9.09	6.61	6.47	6.39	6.35	6.33	6.34	6.33	6.35	6.39	6.47	6.61	9.09	12.38	13.12	13.82	14.33	14.77	14.9
65	14.44	14.29	13.85	13.33	12.73	11.96	8.92	6.67	6.54	6.46	6.42	6.39	6.41	6.39	6.42	6.46	6.54	6.67	8.92	11.96	12.73	13.33	13.85	14.29	14.44
66	13.7	13.68	13.26	12.72	12.17	11.45	8.71	6.73	6.6	6.52	6.48	6.46	6.47	6.46	6.48	6.52	6.6	6.73	8.71	11.45	12.17	12.72	13.26	13.68	13.7
67	12.97	12.83	12.45	12	11.49	10.81	8.44	6.78	6.66	6.58	6.54	6.51	6.53	6.51	6.54	6.58	6.66	6.78	10.81	11.49	12	12.45	12.83	12.97	
68	12.3	12.07	11.72	11.31	10.86	10.41	8.09	6.84	6.71	6.64	6.59	6.57	6.58	6.57	6.59	6.64	6.71	6.84	8.09	10.41	10.86	11.31	11.72	12.07	12.3
69	11.07	11.13	10.79	10.51	10.11	9.68	7.77	6.88	6.77	6.69	6.65	6.62	6.63	6.62	6.65	6.69	6.77	6.88	7.77	9.68	10.11	10.51	10.79	11.13	11.07
70	10.04	10	9.85	9.47	8.99	8.5	7.48	6.93	6.82	6.74	6.7	6.68	6.69	6.68	6.7	6.74	6.82	6.93	7.48	8.5	8.99	9.47	9.85	10	10.04
71	9.91	9.79	9.57	9.2	8.78	8.27	7.33	6.98	6.87	6.79	6.75	6.72	6.74	6.72	6.75	6.79	6.87	6.98	7.33	8.27	8.78	9.2	9.57	9.79	9.91
72	9.81	9.69	9.48	9.12	8.7	8.19	7.33	7.02	6.91	6.84	6.79	6.76	6.77	6.76	6.79	6.84	6.91	7.02	7.33	8.19	8.7	9.12	9.48	9.69	9.81
73	9.74	9.61	9.4	9.06	8.64	8.13	7.33	7.05	6.96	6.88	6.83	6.81	6.82	6.81	6.83	6.88	6.96	7.05	7.33	8.13	8.64	9.06	9.4	9.61	9.74
74	9.68	9.56	9.35	9.01	8.6	8.09	7.34	7.09	6.99	6.91	6.87	6.85	6.85	6.85	6.87	6.91	6.99	7.09	7.34	8.09	8.6	9.01	9.35	9.56	9.68
75	9.64	9.52	9.31	8.98	8.56	8.06	7.35	7.12	7.03	6.95	6.91	6.88	6.89	6.88	6.91	6.95	7.03	7.12	7.35	8.06	8.56	8.98	9.31	9.52	9.64
76	9.62	9.49	9.29	8.95	8.54	8.04	7.36	7.15	7.06	6.99	6.95	6.91	6.92	6.91	6.95	6.99	7.06	7.15	7.36	8.04	8.54	8.95	9.29	9.49	9.62
77	9.61	9.48	9.27	8.94	8.53	8.04	7.39	7.18	7.09	7.01	6.97	6.94	6.95	6.94	6.97	7.01	7.09	7.18	7.39	8.04	8.53	8.94	9.27	9.48	9.61
78	9.59	9.47	9.25	8.92	8.51	8.03	7.39	7.21	7.12	7.04	7	6.97	6.98	6.97	7	7.04	7.12	7.21	7.39	8.03	8.51	8.92	9.25	9.47	9.59
79	9.57	9.45	9.24	8.91	8.5	8.01	7.4	7.23	7.14	7.07	7.02	6.99	7.01	6.99	7.02	7.07	7.14	7.23	7.4	8.01	8.5	8.91	9.24	9.45	9.57
80	9.54	9.43	9.22	8.9	8.48	8	7.41	7.25	7.16	7.09	7.04	7.01	7.02	7.01	7.04	7.09	7.16	7.25	7.41	8	8.48	8.9	9.22	9.43	9.54
81	9.51	9.4	9.2	8.87	8.46	7.98	7.41	7.27	7.18	7.11	7.06	7.03	7.04	7.03	7.06	7.11	7.18	7.27	7.41	7.98	8.46	8.87	9.2	9.4	9.51
82	9.48	9.37	9.16	8.84	8.44	7.96	7.42	7.28	7.19	7.12	7.08	7.04	7.05	7.04	7.08	7.12	7.19	7.28	7.42	7.96	8.44	8.84	9.16	9.37	9.48
83	9.45	9.34	9.14	8.82	8.42	7.94	7.42	7.29	7.2	7.13	7.09	7.05	7.06	7.05	7.09	7.13	7.2	7.29	7.42	7.94	8.42	8.82	9.14	9.34	9.45
84	9.43	9.31	9.11	8.79	8.39	7.93	7.42	7.3	7.21	7.14	7.09	7.06	7.07	7.06	7.09	7.14	7.21	7.3	7.42	7.93	8.39	8.79	9.11	9.31	9.43
85	9.4	9.29	9.09	8.77	8.38	7.91	7.42	7.3	7.22	7.15	7.1	7.07	7.08	7.07	7.1	7.15	7.22	7.3	7.42	7.91	8.38	8.77	9.09	9.29	9.4
86	9.37	9.26	9.07	8.75	8.36	7.9	7.42	7.31	7.22	7.15	7.1	7.07	7.08	7.07	7.1	7.15	7.22	7.31	7.42	7.9	8.36	8.75	9.07	9.26	9.37
87	9.35	9.24	9.04	8.73	8.33	7.88	7.42	7.31	7.22	7.15	7.1	7.07	7.08	7.07	7.1	7.15	7.22	7.31	7.42	7.88	8.33	8.73	9.04	9.24	9.35
88	9.31	9.21	9.01	8.7	8.31	7.86	7.41	7.31	7.22	7.15	7.1	7.07	7.08	7.07	7.1	7.15	7.22	7.31	7.41	7.86	8.31	8.7	9.01	9.21	9.31
89	9.3	9.19	8.99	8.68	8.29	7.85	7.41	7.3	7.22	7.15	7.1	7.06	7.08	7.06	7.1	7.15	7.22	7.3	7.41	7.85	8.29	8.68	8.99	9.19	9.3
90	9.27	9.17	8.97	8.66	8.28	7.84	7.39	7.29	7.21	7.14	7.09	7.06	7.07	7.06	7.09	7.14	7.21	7.29	7.39	7.84	8.28	8.66	8.97	9.17	9.27
91	9.24	9.14	8.94	8.64	8.25	7.82	7.38	7.28	7.19	7.13	7.08	7.04	7.05	7.04	7.08	7.13	7.19	7.28	7.38	7.82	8.25	8.64	8.94	9.14	9.24
92	9.21	9.11	8.92	8.61	8.23	7.8	7.36	7.26	7.18	7.11	7.06	7.03	7.04	7.03	7.06	7.11	7.18	7.26	7.36	7.8	8.23	8.61	8.92	9.11	9.21
93	9.18	9.08	8.89	8.59	8.21	7.78	7.35	7.25	7.16	7.09	7.04	7	7.02	7	7.04	7.09	7.16	7.25	7.35	7.78	8.21	8.59	8.89	9.08	9.18
94	9.15	9.05	8.86	8.56	8.18	7.76	7.33	7.22	7.14	7.07	7.02	6.98	7	6.98	7.02	7.07	7.14	7.22	7.33	7.76	8.18	8.56	8.86	9.05	9.15
95	9.11	9.01	8.82	8.53	8.16	7.74	7.31	7.2	7.11	7.05	7	6.96	6.97	6.96	7	7.05	7.11	7.2	7.31	7.74	8.16	8.53	8.82	9.01	9.11
96	9.08	8.97	8.79	8.49	8.13	7.71	7.28	7.17	7.09	7.02	6.97	6.94	6.95	6.94	6.97	7.02	7.09	7.17	7.28	7.71	8.13	8.49	8.79	8.97	9.08
97	9.03	8.93	8.74	8.45	8.09	7.67	7.25	7.14	7.06	6.99	6.94	6.91	6.92	6.91	6.94	6.99	7.06	7.14	7.25	7.67	8.09	8.45	8.74	8.93	9.03
98	8.98	8.88	8.7	8.41	8.05	7.64	7.22	7.11	7.03	6.96	6.91	6.88	6.89	6.88	6.91	6.96	7.03	7.11	7.22	7.64	8.05	8.41	8.7	8.88	8.98
99	8.92	8.83	8.65	8.36	8.01	7.61	7.19	7.08	6.99	6.93	6.88	6.85	6.85	6.85	6.88	6.93	6.99	7.08	7.19	7.61	8.01	8.36	8.65	8.83	8.92
100	8.86	8.77	8.6	8.32	7.97	7.57	7.15	7.04	6.95	6.89	6.84	6.81	6.81	6.81	6.84	6.89	6.95	7.04	7.15	7.57	7.97	8.32	8.6	8.77	8.86
101	8.8	8.72	8.54	8.27	7.92	7.54	7.12	7.01	6.92	6.85	6.8	6.78	6.78	6.78	6.8	6.85	6.92	7.01	7.12	7.54	7.92	8.27	8.54	8.72	8.8
102	8.74	8.66	8.49	8.21	7.87	7.49	7																		



106	8.45	8.39	8.22	7.97	7.65	7.29	6.89	6.79	6.7	6.63	6.59	6.56	6.55	6.56	6.59	6.63	6.7	6.79	6.89	7.29	7.65	7.97	8.22	8.39	8.45
107	8.37	8.32	8.15	7.9	7.58	7.23	6.84	6.74	6.65	6.59	6.54	6.52	6.5	6.52	6.54	6.59	6.65	6.74	6.84	7.23	7.58	7.9	8.15	8.32	8.37
108	8.29	8.24	8.08	7.83	7.53	7.18	6.79	6.69	6.61	6.54	6.49	6.47	6.45	6.47	6.49	6.54	6.61	6.69	6.79	7.18	7.53	7.83	8.08	8.24	8.29
109	8.21	8.16	8.01	7.77	7.47	7.12	6.74	6.64	6.56	6.49	6.45	6.42	6.39	6.42	6.45	6.49	6.56	6.64	6.74	7.12	7.47	7.77	8.01	8.16	8.21
110	8.12	8.08	7.93	7.7	7.41	7.06	6.69	6.59	6.5	6.44	6.39	6.37	6.34	6.37	6.39	6.44	6.5	6.59	6.69	7.06	7.41	7.7	7.93	8.08	8.12
111	8.04	8	7.86	7.63	7.34	7	6.63	6.53	6.45	6.39	6.34	6.32	6.28	6.32	6.34	6.39	6.45	6.53	6.63	7	7.34	7.63	7.86	8	8.04
112	7.95	7.92	7.78	7.55	7.27	6.94	6.58	6.48	6.4	6.34	6.29	6.27	6.23	6.27	6.29	6.34	6.4	6.48	6.58	6.94	7.27	7.55	7.78	7.92	7.95
113	7.86	7.83	7.7	7.47	7.2	6.88	6.52	6.42	6.35	6.28	6.24	6.22	6.17	6.22	6.24	6.28	6.35	6.42	6.52	6.88	7.2	7.47	7.7	7.83	7.86
114	7.76	7.75	7.62	7.4	7.13	6.81	6.46	6.36	6.3	6.23	6.18	6.16	6.11	6.16	6.18	6.23	6.3	6.36	6.46	6.81	7.13	7.4	7.62	7.75	7.76
115	7.67	7.66	7.54	7.33	7.06	6.75	6.4	6.31	6.24	6.18	6.13	6.1	6.04	6.1	6.13	6.18	6.24	6.31	6.4	6.75	7.06	7.33	7.54	7.66	7.67
116	7.58	7.58	7.46	7.26	6.99	6.69	6.35	6.25	6.19	6.13	6.07	6.05	5.98	6.05	6.07	6.13	6.19	6.25	6.35	6.69	6.99	7.26	7.46	7.58	7.58
117	7.48	7.49	7.37	7.18	6.91	6.62	6.29	6.19	6.13	6.08	6.02	5.98	5.91	5.98	6.02	6.08	6.13	6.19	6.29	6.62	6.91	7.18	7.37	7.49	7.48
118	7.39	7.4	7.29	7.09	6.84	6.56	6.23	6.14	6.08	6.02	5.97	5.92	5.84	5.92	5.97	6.02	6.08	6.14	6.23	6.56	6.84	7.09	7.29	7.4	7.39
119	7.29	7.31	7.21	7.01	6.76	6.49	6.16	6.07	6.02	5.96	5.91	5.86	5.77	5.86	5.91	5.96	6.02	6.07	6.16	6.49	6.76	7.01	7.21	7.31	7.29
120	7.18	7.21	7.11	6.92	6.67	6.41	6.09	6	5.95	5.89	5.85	5.8	5.7	5.8	5.85	5.89	5.95	6	6.09	6.41	6.67	6.92	7.11	7.21	7.18
121	7.08	7.12	7.02	6.82	6.59	6.33	6.02	5.93	5.88	5.83	5.78	5.73	5.62	5.73	5.78	5.83	5.88	5.93	6.02	6.33	6.59	6.82	7.02	7.12	7.08
122	6.97	7.01	6.91	6.72	6.5	6.24	5.95	5.86	5.81	5.76	5.71	5.66	5.54	5.66	5.71	5.76	5.81	5.86	5.95	6.24	6.5	6.72	6.91	7.01	6.97
123	6.86	6.9	6.8	6.62	6.4	6.16	5.87	5.78	5.73	5.68	5.64	5.59	5.46	5.59	5.64	5.68	5.73	5.78	5.87	6.16	6.4	6.62	6.8	6.9	6.86
124	6.74	6.79	6.7	6.52	6.31	6.07	5.78	5.7	5.65	5.61	5.56	5.52	5.38	5.52	5.56	5.61	5.65	5.7	5.78	6.07	6.31	6.52	6.7	6.79	6.74
125	6.62	6.68	6.59	6.42	6.21	5.98	5.7	5.62	5.57	5.53	5.49	5.44	5.3	5.44	5.49	5.53	5.57	5.62	6.21	6.42	6.59	6.68	6.62	6.62	6.62
126	6.51	6.57	6.48	6.31	6.11	5.89	5.62	5.54	5.49	5.45	5.41	5.36	5.22	5.36	5.41	5.45	5.49	5.54	5.62	5.89	6.11	6.31	6.48	6.57	6.51
127	6.39	6.45	6.36	6.2	6.01	5.8	5.53	5.45	5.41	5.37	5.33	5.29	5.14	5.29	5.33	5.37	5.41	5.45	5.53	5.8	6.01	6.2	6.36	6.45	6.39
128	6.27	6.33	6.25	6.1	5.91	5.71	5.45	5.37	5.33	5.29	5.25	5.21	5.06	5.21	5.25	5.29	5.33	5.37	5.45	5.71	5.91	6.1	6.25	6.33	6.27
129	6.15	6.21	6.13	5.99	5.81	5.61	5.36	5.28	5.24	5.21	5.17	5.13	4.97	5.13	5.17	5.21	5.24	5.28	5.36	5.61	5.81	5.99	6.13	6.21	6.15
130	6.03	6.09	6.02	5.88	5.71	5.52	5.27	5.19	5.16	5.13	5.09	5.05	4.89	5.05	5.09	5.13	5.16	5.19	5.27	5.52	5.71	5.88	6.02	6.03	6.03
131	5.91	5.98	5.9	5.77	5.6	5.42	5.19	5.11	5.07	5.05	5.01	4.97	4.81	4.97	5.01	5.05	5.07	5.11	5.19	5.42	5.6	5.77	5.9	5.98	5.91
132	5.78	5.86	5.79	5.66	5.5	5.33	5.1	5.02	4.98	4.97	4.93	4.89	4.73	4.89	4.93	4.97	4.98	5.02	5.1	5.33	5.5	5.66	5.79	5.86	5.78
133	5.66	5.74	5.67	5.55	5.4	5.23	5.01	4.93	4.9	4.88	4.85	4.81	4.65	4.81	4.85	4.88	4.9	4.93	5.01	5.23	5.4	5.55	5.67	5.74	5.66
134	5.54	5.62	5.56	5.44	5.3	5.14	4.93	4.84	4.81	4.8	4.78	4.73	4.57	4.73	4.78	4.8	4.81	4.84	4.93	5.14	5.3	5.44	5.56	5.62	5.54
135	5.42	5.5	5.45	5.33	5.2	5.04	4.84	4.75	4.72	4.71	4.66	4.51	4.66	4.71	4.71	4.72	4.72	4.75	4.84	5.04	5.2	5.33	5.45	5.5	5.42
136	5.3	5.39	5.33	5.23	5.1	4.95	4.75	4.66	4.63	4.62	4.64	4.6	4.46	4.6	4.64	4.62	4.63	4.66	4.75	4.95	5.1	5.23	5.33	5.39	5.3
137	5.18	5.27	5.22	5.13	5	4.86	4.66	4.56	4.54	4.53	4.56	4.55	4.43	4.55	4.56	4.53	4.54	4.56	4.66	4.86	5	5.13	5.22	5.27	5.18
138	5.07	5.15	5.12	5.02	4.9	4.76	4.57	4.47	4.44	4.44	4.48	4.5	4.41	4.5	4.48	4.44	4.44	4.47	4.57	4.76	4.9	5.02	5.12	5.15	5.07
139	4.95	5.04	5.01	4.92	4.81	4.67	4.48	4.37	4.35	4.34	4.39	4.46	4.39	4.46	4.39	4.34	4.35	4.37	4.48	4.67	4.81	4.92	5.01	5.04	4.95
140	4.84	4.93	4.9	4.82	4.71	4.58	4.39	4.28	4.25	4.24	4.3	4.41	4.38	4.41	4.3	4.24	4.25	4.28	4.39	4.58	4.71	4.82	4.9	4.93	4.84
141	4.73	4.83	4.8	4.72	4.61	4.48	4.29	4.18	4.15	4.14	4.2	4.35	4.36	4.35	4.2	4.14	4.15	4.18	4.29	4.48	4.61	4.72	4.8	4.83	4.73
142	4.62	4.72	4.7	4.63	4.52	4.39	4.2	4.09	4.05	4.04	4.1	4.28	4.34	4.28	4.1	4.04	4.05	4.09	4.2	4.39	4.52	4.63	4.7	4.72	4.62
143	4.53	4.62	4.6	4.53	4.43	4.3	4.11	3.99	3.96	3.94	3.99	4.19	4.3	4.19	3.99	3.94	3.96	3.99	4.11	4.3	4.43	4.53	4.6	4.62	4.53
144	4.45	4.53	4.51	4.44	4.34	4.22	4.02	3.9	3.86	3.85	3.89	4.1	4.22	4.1	3.89	3.85	3.86	3.9	4.02	4.22	4.34	4.44	4.51	4.53	4.45
145	4.4	4.45	4.43	4.36	4.26	4.14	3.94	3.82	3.77	3.75	3.78	3.99	4.12	3.99	3.78	3.75	3.77	3.82	3.94	4.14	4.26	4.36	4.43	4.45	4.4
146	4.38	4.38	4.35	4.29	4.19	4.06	3.86	3.73	3.68	3.66	3.68	3.88	4.01	3.88	3.68	3.66	3.68	3.73	3.86	4.06	4.19	4.29	4.35	4.38	4.38
147	4.37	4.34	4.28	4.22	4.12	3.99	3.78	3.65	3.6	3.57	3.58	3.76	3.88	3.76	3.58	3.57	3.6	3.65	3.78	3.99	4.12	4.22	4.28	4.34	4.37
148	4.38	4.3	4.22	4.15	4.05	3.92	3.71	3.56	3.51	3.48	3.48	3.64	3.73	3.64	3.48	3.48	3.51	3.56	3.71	3.92	4.05	4.15	4.22	4.3	4.38
149	4.4	4.28	4.16	4.09	3.98	3.85	3.63	3.48	3.42	3.39	3.39	3.53	3.58	3.53	3.39	3.39	3.42	3.48	3.63	3.85	3.98	4.09	4.16	4.28	4.4
150	4.43	4.25	4.11	4.03	3.92	3.78	3.55	3.4	3.34	3.3	3.3	3.42	3.42	3.42	3.3	3.3	3.34	3.4	3.55	3.78	3.92	4.03	4.11	4.25	4.43
151	4.47	4.23	4.07	3.97	3.86	3.72	3.48	3.32	3.25	3.21	3.21	3.32	3.28	3.32	3.21	3.21	3.25	3.32	3.48	3.72	3.86	3.97	4.07	4.23	4.47
152	4.5	4.21	4.03	3.92	3.81	3.66	3.41	3.24	3.17	3.12	3.12	3.22	3.14	3.22	3.12	3.12	3.17	3.24	3.41	3.66	3.81	3.92	4.03	4.21	4.5
153	4.53	4.19	3.99	3.87	3.76	3.6	3.34	3.17	3.08	3.03	3.03	3.12	3.01	3.12	3.03	3.03	3.08	3.17	3.34	3.6	3.76	3.87	3.99	4.19	4.53
154	4.54	4.16	3.96	3.83	3.71	3.55	3.28	3.1	3	2.95	2.94	3.02	2.88	3.02	2.94	2.95	3	3.1	3.28	3.55	3.71	3.83	3.96	4.16	4.54
155	4.55	4.12	3.92	3.8	3.67	3.5	3.21	3.02	2.92	2.87	2.85	2.92	2.76	2.92	2.85	2.87	2.92	3.02	3.21	3.5	3.67	3.8	3.92	4.12	4.55
156	4.55	4.09	3.89	3.76	3.63	3.45	3.15	2.96	2.84	2.78	2.77	2.83	2.64	2.83	2.77	2.78	2.84	2.96	3.15	3.45	3.63	3.76	3.89	4.09	4.55
157	4.55	4.05	3.86	3.73	3.6	3.41	3.1	2.89	2.77	2.7	2.68	2.74	2.52	2.74	2.68	2.7	2.77	2.89	3.1	3.41	3.6	3.73	3.86	4.05	4.55
158	4.54	4.02	3.84	3.71	3																				



161	4.51	3.94	3.78	3.64	3.48	3.24	2.88	2.64	2.46	2.37	2.34	2.37	2.1	2.37	2.34	2.37	2.46	2.64	2.88	3.24	3.48	3.64	3.78	3.94	4.51
162	4.5	3.92	3.76	3.62	3.45	3.2	2.82	2.57	2.38	2.29	2.25	2.27	2	2.27	2.25	2.29	2.38	2.57	2.82	3.2	3.45	3.62	3.76	3.92	4.5
163	4.49	3.9	3.73	3.59	3.41	3.15	2.76	2.5	2.3	2.2	2.15	2.17	1.9	2.17	2.15	2.2	2.3	2.5	2.76	3.15	3.41	3.59	3.73	3.9	4.49
164	4.48	3.87	3.71	3.56	3.38	3.1	2.7	2.43	2.22	2.11	2.06	2.07	1.81	2.07	2.06	2.11	2.22	2.43	2.7	3.1	3.38	3.56	3.71	3.87	4.48
165	4.47	3.85	3.69	3.53	3.34	3.06	2.64	2.35	2.13	2.02	1.97	1.97	1.73	1.97	1.97	2.02	2.13	2.35	2.64	3.06	3.34	3.53	3.69	3.85	4.47
166	4.46	3.82	3.66	3.51	3.31	3.02	2.59	2.29	2.06	1.94	1.88	1.87	1.64	1.87	1.88	1.94	2.06	2.29	2.59	3.02	3.31	3.51	3.66	3.82	4.46
167	4.45	3.8	3.64	3.48	3.28	2.98	2.55	2.23	1.99	1.86	1.8	1.79	1.57	1.79	1.8	1.86	1.99	2.23	2.55	2.98	3.28	3.48	3.64	3.8	4.45
168	4.42	3.78	3.62	3.46	3.25	2.94	2.51	2.17	1.92	1.78	1.72	1.71	1.49	1.71	1.72	1.78	1.92	2.17	2.51	2.94	3.25	3.46	3.62	3.78	4.42
169	4.39	3.75	3.59	3.42	3.21	2.9	2.47	2.12	1.86	1.71	1.65	1.62	1.42	1.62	1.65	1.71	1.86	2.12	2.47	2.9	3.21	3.42	3.59	3.75	4.39
170	4.35	3.7	3.55	3.38	3.17	2.86	2.44	2.06	1.79	1.64	1.57	1.54	1.35	1.54	1.57	1.64	1.79	2.06	2.44	2.86	3.17	3.38	3.55	3.7	4.35
171	4.27	3.65	3.49	3.33	3.12	2.81	2.39	2	1.72	1.56	1.49	1.46	1.3	1.46	1.49	1.56	1.72	2	2.39	2.81	3.12	3.33	3.49	3.65	4.27
172	4.19	3.58	3.42	3.27	3.06	2.75	2.34	1.94	1.65	1.49	1.42	1.39	1.24	1.39	1.42	1.49	1.65	1.94	2.34	2.75	3.06	3.27	3.42	3.58	4.19
173	4.04	3.47	3.3	3.14	2.94	2.63	2.24	1.86	1.59	1.42	1.35	1.32	1.2	1.32	1.35	1.42	1.59	1.86	2.24	2.63	2.94	3.14	3.3	3.47	4.04
174	3.76	3.23	3.06	2.91	2.71	2.43	2.09	1.75	1.51	1.35	1.28	1.26	1.17	1.26	1.28	1.35	1.51	1.75	2.09	2.43	2.71	2.91	3.06	3.23	3.76
175	3.32	2.87	2.7	2.58	2.39	2.15	1.88	1.61	1.42	1.28	1.21	1.2	1.13	1.2	1.21	1.28	1.42	1.61	1.88	2.15	2.39	2.58	2.7	2.87	3.32
176	2.77	2.39	2.27	2.16	2.01	1.84	1.64	1.44	1.31	1.21	1.15	1.14	1.11	1.14	1.15	1.21	1.31	1.44	1.64	1.84	2.01	2.16	2.27	2.39	2.77
177	2.28	1.96	1.84	1.73	1.63	1.51	1.4	1.29	1.2	1.14	1.09	1.09	1.09	1.09	1.09	1.14	1.2	1.29	1.4	1.51	1.63	1.73	1.84	1.96	2.28
178	1.85	1.58	1.47	1.38	1.31	1.25	1.2	1.15	1.11	1.06	1.03	1.04	1.08	1.04	1.03	1.06	1.11	1.15	1.2	1.25	1.31	1.38	1.47	1.58	1.85
179	1.49	1.28	1.21	1.15	1.12	1.08	1.05	1.02	1.01	0.99	1	1.03	1.12	1.03	1	0.99	1.01	1.02	1.05	1.08	1.12	1.15	1.21	1.28	1.49
180	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26

## 4.0 LM-79 Measurement and Test Results

### 4.3 THD and PF Test

Model No.	SA-REBR	Sample ID.	H1
Temperature (°C)	25.3	Humidity (%RH)	56.0

#### Test Method

The samples were tested according to the ANSI C82.77:2014.  
The total harmonic distortion shall be measured to the 40th order.  
The ambient temperature condition was maintained at 25° C ± 1° C. The sample measurements were made using a digital power meter and power supply. The sample was operated at rated voltage and was stabilized before measurement. The total harmonic distortion were calculated.

#### Test Results

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD
120.08	60	0.071	8.45	0.997	7.61%
277.01	60	0.034	8.86	0.936	8.34%

## 5.0 Equipment Information

Test Equipment			
Equipment ID	Equipment Name	Last Calibration Date	Calibration Due Date
DLF107	Integrating Sphere System	2023/12/24	2024/12/23
DLF108	Auxiliary Lamp	2023/12/24	2024/12/23
DLF122	Measurement Standard Lamp Standard Lamp Type: 220 V, 0.4720 A, Tungsten, Omni-derectional	2023/12/24	2024/12/23
DLF116	AC Power Source	2023/12/16	2024/12/15
DLF516	Power Meter	2023/12/16	2024/12/15
DLF112	Temperature Recorder	2023/12/28	2024/12/27
DLF114	Temperature & Humidity Datalogger	2023/12/28	2024/12/27
DLF101	Goniophotometer	2023/12/24	2024/12/23
DLF511	AC Power Source	2023/12/16	2024/12/15
DLF512	AC Power Source	2023/12/16	2024/12/15
DLF513	AC Power Source	2023/12/16	2024/12/15
DLF507	DC Power Source	2023/12/16	2024/12/15
DLF111	Temperature & Humidity Datalogger	2023/12/28	2024/12/27
DLF119	Power Meter	2023/12/16	2024/12/15
DLF031	Temperature data logger	2024/6/20	2025/6/19
DLF073	Power Analyzer	2024/6/20	2025/6/19
DLF003	Temperature & Humidity Datalogger	2024/6/20	2025/6/19

\*\*\*\*\* End of Test Report\*\*\*\*\*