

## Photometric Test Report

### Relevant Standards

- ☒ ANSI/IES LM-79-2019
- ☒ ANSI C82.77-2017

Prepared For

**RAB Lighting Inc.**

Address: 408 W 14th St New York, NY 10014

Prepared By

**Dongguan New Testing Centre Co., Ltd.**

Address: 3F No. 1 the 1st North Industry Road, Songshan Lake Science & Technology Park, Dongguan, Guangdong, China

Prepare by:

*Alan Wang*

Engineer: Alan Wang

Date: 2024-12-25

Review by:

*Vincent Yuan*

Technical Lead: Vincent Yuan

Issue Date: 2024-12-25

Revised Date: N/A

## 1.0 Test Summary

DLC Technical Requirements V5.1

Architectural Flood and Spot Luminaires				
Requirement Category	Test Method	Requirements		Test Value
Luminaire Output (lm) (Goniophotometer – Section 4.2)	ANSI/IES LM-79:2019	1000		675
Minimum Luminaire Efficacy (lm/W) (Goniophotometer – Section 4.2)	ANSI/IES LM-79:2019	Standard	Premium	116.4
		105	120	
Power (Input Wattage) (W) (Goniophotometer – Section 4.2)	ANSI/IES LM-79:2019	Worst Case		5.8
Total Harmonic Distortion (A%) (THD & PF – Section 4.3)	ANSI C82.77:2002 ANSI C82-77-10:2020	20.00%	120V	13.51
Power Factor (THD & PF – Section 4.3)	ANSI C82.77:2002 ANSI C82-77-10:2020	0.9	120V	0.991
Allowable CCTs* (K) (Integrating Sphere – Section 4.1)	ANSI/IES LM-79:2019	7 steps	3985±275	3897
		4 steps	3985±154	
Minimum CRI (Integrating Sphere – Section 4.1)	ANSI/IES LM-79:2019 CIE13.3-1995	≥70		84.6
Minimum R9 (Integrating Sphere – Section 4.1)	ANSI/IES LM-79-2019 CIE13.3-1995	N/A		18
Minimum Rf (Integrating Sphere – Section 4.1)	ANSI/IES TM-30-18	≥70		84
Minimum Rg (Integrating Sphere – Section 4.1)	ANSI/IES TM-30-18	≥89		98
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)	ANSI/IES LM-79:2019	≥85%		100.0%
Input Voltage (V)				
(Goniophotometer – Section 4.2)	ANSI/IES LM-79:2019	Worst Cast		120.0
(Goniophotometer – Section 4.2)		Non-Worst Case		N/A
Input Current (A)				
(Goniophotometer – Section 4.2)	ANSI/IES LM-79:2019	Worst Case		0.049
(Goniophotometer – Section 4.2)		Non-Worst Case		N/A
Power (Input Wattage – W)				
(Goniophotometer – Section 4.2)	ANSI/IES LM-79:2019	Worst Case		5.8
(Goniophotometer – Section 4.2)		Non-Worst Case		N/A

## 2.0 Test List

Test Item	Test	Test Date	Model Number	Build Level	Sample No.
1	Integrating Sphere Test	2024-12-24	BULLET12 @6W4000K	ES 1st ES #3-1	241216012-S1
2	Goniophotometer Test	2024-12-24	BULLET12 @6W4000K	ES 1st ES #3-1	241216012-S1
3	THD and PF Test	2024-12-24	BULLET12 @6W4000K	ES 1st ES #3-1	241216012-S1

### Remark (If any):

1. The results contained in this report pertain only to the tested samples.
2. This report shall not be reproduced, no limited part or full, without approval of Dongguan New Testing Centre Co., Ltd.
3. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the U.S. Government.

### 3.0 Product Description

Luminaire Description: Model No. BULLET12 @6W4000K, color tunable from 3000K, 4000K and 5000K.

Electrical Specification: 120Vac, 60Hz

Photos of Luminaire Characteristics



## 4.0 LM-79 Measurement and Test Results

### 4.1 Integrating Sphere Test

<b>Model No.</b>	BULLET12 @6W4000K	<b>Sample ID</b>	241216012-S1
<b>Operate time (Min.)</b>	10	<b>Stabilization time (Min.)</b>	60
<b>Temperature (°C)</b>	25.4	<b>Humidity (%RH)</b>	41.0

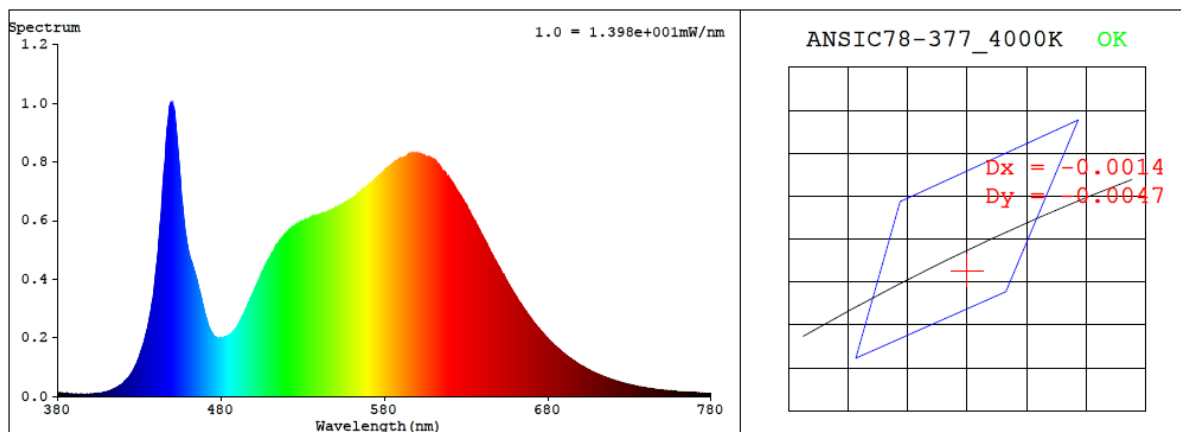
<b>Test Method</b>
<p>The Samples were tested according to the ANSI/IES LM-79:2019.</p> <p>Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25±1°C.</p> <p>The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere.</p> <p>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 ±0.2 percent under load.</p> <p>The sample was measured using 4π 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 780nm.</p>

### Test Result

<b>Voltage (Vac)</b>	<b>Frequency (Hz)</b>	<b>Current (A)</b>	<b>Power (W)</b>	<b>Power Factor</b>
120.0	60	0.049	5.8	0.991

<b>CCT (K)</b>	<b>CRI</b>	<b>R9</b>	<b>Duv</b>	<b>Rf</b>	<b>Rg</b>	<b>IES Rcs,h1</b>
3897	84.6	18	-0.0018	84	98	-11%

## 4.1 Integrating Sphere Test



### Colorimetric Parameters

Chromaticity Coordinate:  $x = 0.3837$   $y = 0.3749$  /  $u' = 0.2280$   $v' = 0.5013$  ( $duv = -1.78e-03$ )

CCT= 3897K Prcp WL: Ld=580.4nm Purity=27.7%

Peak WL: Lp=449nm FWHM: =18.4nm Ratio:R=19.2% G=77.5% B=3.3%

Render Index: Ra = 84.6 AvgR = 78.6 TM30:Rf=84 Rg=98

EEL: 0.10661 A++ Highest

R1=84 R2=90 R3=93 R4=85 R5=84 R6=86 R7=87

R8=68 R9=18 R10=75 R11=85 R12=64 R13=86 R14=96 R15=79



## 4.1 Integrating Sphere Test

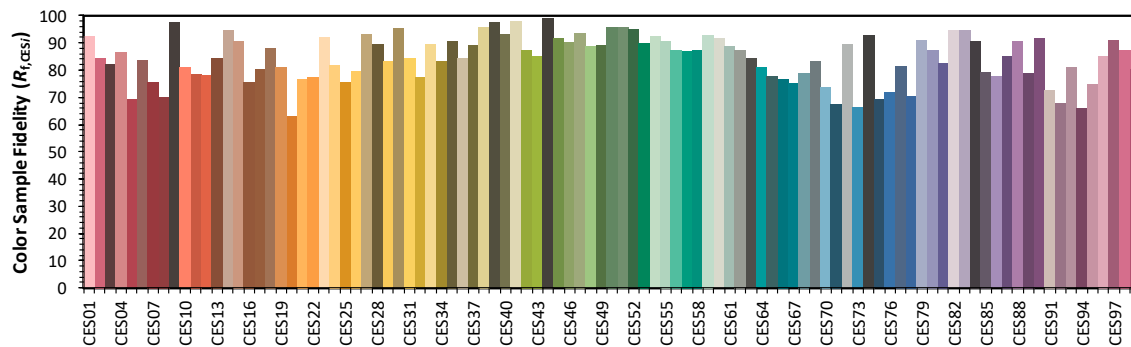
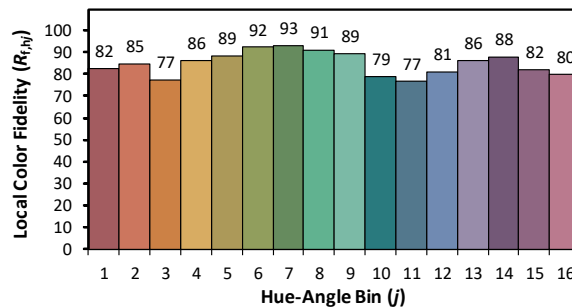
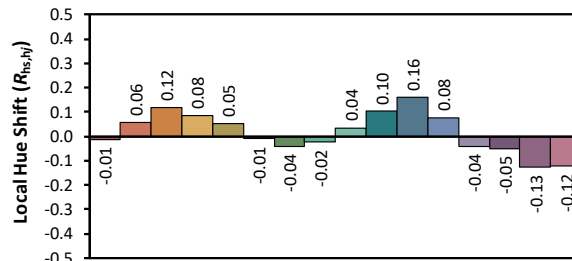
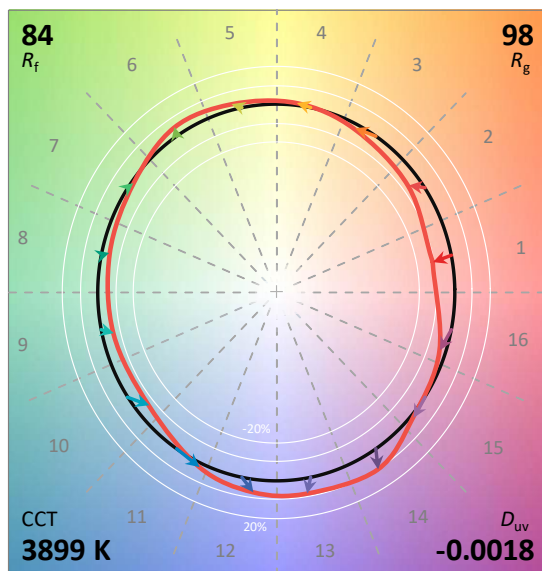
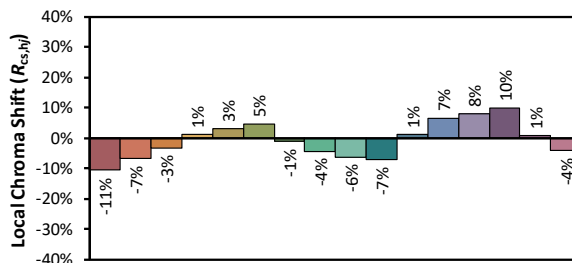
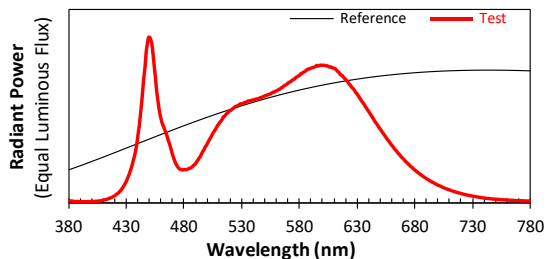
### ANSI/IES TM-30-18 Color Rendition Report

Source: 1 CIE F1

Manufacturer: RAB Lighting Inc.

Date: 2024/12/25

Model: BULLET12 @6W4000K



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

$x$  0.3836  
 $y$  0.3748  
 $u'$  0.2280  
 $v'$  0.5012

CIE 13.3-1995  
(CRI)

$R_a$  85  
 $R_g$  18

## 4.1 Integrating Sphere Test

Spectral Distribution over Visible Wavelength											
WL (nm)	Radiant (W/nm)	WL (nm)	Radiant (W/nm)	WL (nm)	Radiant (W/nm)	WL (nm)	Radiant (W/nm)	WL (nm)	Radiant (W/nm)	WL (nm)	Radiant (W/nm)
380	1.38E-05	447	9.10E-04	514	5.17E-04	581	7.76E-04	648	4.64E-04	715	6.60E-05
381	1.31E-05	448	9.57E-04	515	5.21E-04	582	7.78E-04	649	4.53E-04	716	6.40E-05
382	1.06E-05	449	9.94E-04	516	5.31E-04	583	7.84E-04	650	4.43E-04	717	6.19E-05
383	1.12E-05	450	9.95E-04	517	5.38E-04	584	7.87E-04	651	4.33E-04	718	6.01E-05
384	9.50E-06	451	9.79E-04	518	5.44E-04	585	7.91E-04	652	4.22E-04	719	5.81E-05
385	8.50E-06	452	9.49E-04	519	5.52E-04	586	7.98E-04	653	4.14E-04	720	5.64E-05
386	8.20E-06	453	8.87E-04	520	5.55E-04	587	8.03E-04	654	4.03E-04	721	5.46E-05
387	9.20E-06	454	8.18E-04	521	5.60E-04	588	8.03E-04	655	3.93E-04	722	5.25E-05
388	8.40E-06	455	7.52E-04	522	5.66E-04	589	8.08E-04	656	3.83E-04	723	5.11E-05
389	7.90E-06	456	6.75E-04	523	5.72E-04	590	8.10E-04	657	3.74E-04	724	4.93E-05
390	7.70E-06	457	6.21E-04	524	5.78E-04	591	8.12E-04	658	3.65E-04	725	4.77E-05
391	7.70E-06	458	5.70E-04	525	5.81E-04	592	8.15E-04	659	3.55E-04	726	4.58E-05
392	7.80E-06	459	5.31E-04	526	5.83E-04	593	8.17E-04	660	3.46E-04	727	4.47E-05
393	6.50E-06	460	5.01E-04	527	5.86E-04	594	8.21E-04	661	3.38E-04	728	4.32E-05
394	7.50E-06	461	4.74E-04	528	5.92E-04	595	8.26E-04	662	3.28E-04	729	4.22E-05
395	7.70E-06	462	4.60E-04	529	5.96E-04	596	8.23E-04	663	3.19E-04	730	4.07E-05
396	7.10E-06	463	4.40E-04	530	5.96E-04	597	8.25E-04	664	3.12E-04	731	3.92E-05
397	7.90E-06	464	4.21E-04	531	5.98E-04	598	8.28E-04	665	3.03E-04	732	3.82E-05
398	8.00E-06	465	4.02E-04	532	6.02E-04	599	8.27E-04	666	2.95E-04	733	3.67E-05
399	7.90E-06	466	3.78E-04	533	6.04E-04	600	8.27E-04	667	2.88E-04	734	3.58E-05
400	8.90E-06	467	3.58E-04	534	6.07E-04	601	8.28E-04	668	2.79E-04	735	3.47E-05
401	8.50E-06	468	3.37E-04	535	6.11E-04	602	8.26E-04	669	2.71E-04	736	3.33E-05
402	9.20E-06	469	3.10E-04	536	6.13E-04	603	8.24E-04	670	2.65E-04	737	3.24E-05
403	9.70E-06	470	2.86E-04	537	6.12E-04	604	8.24E-04	671	2.56E-04	738	3.12E-05
404	1.03E-05	471	2.66E-04	538	6.15E-04	605	8.20E-04	672	2.49E-04	739	3.03E-05
405	1.04E-05	472	2.47E-04	539	6.18E-04	606	8.16E-04	673	2.42E-04	740	2.92E-05
406	1.18E-05	473	2.31E-04	540	6.19E-04	607	8.18E-04	674	2.36E-04	741	2.84E-05
407	1.20E-05	474	2.20E-04	541	6.20E-04	608	8.13E-04	675	2.29E-04	742	2.75E-05
408	1.34E-05	475	2.10E-04	542	6.24E-04	609	8.12E-04	676	2.21E-04	743	2.69E-05
409	1.49E-05	476	2.04E-04	543	6.25E-04	610	8.07E-04	677	2.16E-04	744	2.63E-05
410	1.61E-05	477	2.00E-04	544	6.25E-04	611	8.06E-04	678	2.10E-04	745	2.52E-05
411	1.81E-05	478	1.99E-04	545	6.28E-04	612	7.98E-04	679	2.03E-04	746	2.43E-05
412	1.88E-05	479	1.99E-04	546	6.33E-04	613	7.90E-04	680	1.98E-04	747	2.37E-05
413	2.21E-05	480	2.00E-04	547	6.33E-04	614	7.84E-04	681	1.92E-04	748	2.33E-05
414	2.44E-05	481	1.99E-04	548	6.37E-04	615	7.76E-04	682	1.86E-04	749	2.28E-05
415	2.72E-05	482	2.01E-04	549	6.41E-04	616	7.68E-04	683	1.81E-04	750	2.22E-05
416	2.99E-05	483	2.03E-04	550	6.43E-04	617	7.65E-04	684	1.75E-04	751	2.13E-05
417	3.23E-05	484	2.07E-04	551	6.46E-04	618	7.56E-04	685	1.70E-04	752	2.13E-05
418	3.69E-05	485	2.09E-04	552	6.48E-04	619	7.48E-04	686	1.65E-04	753	2.04E-05
419	4.06E-05	486	2.12E-04	553	6.52E-04	620	7.42E-04	687	1.60E-04	754	1.98E-05
420	4.42E-05	487	2.18E-04	554	6.53E-04	621	7.34E-04	688	1.55E-04	755	1.91E-05
421	5.09E-05	488	2.25E-04	555	6.56E-04	622	7.26E-04	689	1.50E-04	756	1.86E-05
422	5.49E-05	489	2.31E-04	556	6.61E-04	623	7.14E-04	690	1.46E-04	757	1.81E-05
423	6.11E-05	490	2.39E-04	557	6.66E-04	624	7.07E-04	691	1.41E-04	758	1.80E-05
424	6.84E-05	491	2.49E-04	558	6.65E-04	625	6.97E-04	692	1.38E-04	759	1.75E-05
425	7.60E-05	492	2.59E-04	559	6.71E-04	626	6.89E-04	693	1.33E-04	760	1.72E-05
426	8.49E-05	493	2.72E-04	560	6.74E-04	627	6.83E-04	694	1.29E-04	761	1.66E-05
427	9.61E-05	494	2.80E-04	561	6.78E-04	628	6.72E-04	695	1.25E-04	762	1.62E-05
428	1.07E-04	495	2.95E-04	562	6.82E-04	629	6.61E-04	696	1.22E-04	763	1.60E-05
429	1.20E-04	496	3.08E-04	563	6.85E-04	630	6.54E-04	697	1.18E-04	764	1.54E-05
430	1.35E-04	497	3.19E-04	564	6.92E-04	631	6.43E-04	698	1.14E-04	765	1.52E-05
431	1.52E-04	498	3.35E-04	565	6.93E-04	632	6.32E-04	699	1.10E-04	766	1.49E-05
432	1.68E-04	499	3.44E-04	566	7.01E-04	633	6.21E-04	700	1.07E-04	767	1.46E-05
433	1.88E-04	500	3.56E-04	567	7.06E-04	634	6.11E-04	701	1.03E-04	768	1.39E-05
434	2.09E-04	501	3.70E-04	568	7.09E-04	635	6.01E-04	702	1.01E-04	769	1.37E-05
435	2.33E-04	502	3.82E-04	569	7.13E-04	636	5.92E-04	703	9.77E-05	770	1.37E-05
436	2.60E-04	503	3.94E-04	570	7.20E-04	637	5.80E-04	704	9.38E-05	771	1.33E-05
437	2.88E-04	504	4.07E-04	571	7.24E-04	638	5.70E-04	705	9.12E-05	772	1.29E-05
438	3.22E-04	505	4.20E-04	572	7.28E-04	639	5.59E-04	706	8.81E-05	773	1.28E-05
439	3.64E-04	506	4.31E-04	573	7.33E-04	640	5.49E-04	707	8.50E-05	774	1.26E-05
440	4.17E-04	507	4.42E-04	574	7.40E-04	641	5.37E-04	708	8.31E-05	775	1.22E-05
441	4.67E-04	508	4.54E-04	575	7.41E-04	642	5.27E-04	709	7.99E-05	776	1.20E-05
442	5.32E-04	509	4.66E-04	576	7.48E-04	643	5.16E-04	710	7.80E-05	777	1.17E-05
443	6.00E-04	510	4.74E-04	577	7.55E-04	644	5.05E-04	711	7.54E-05	778	1.16E-05
444	6.81E-04	511	4.86E-04	578	7.58E-04	645	4.93E-04	712	7.29E-05	779	1.14E-05
445	7.60E-04	512	4.93E-04	579	7.63E-04	646	4.83E-04	713	7.08E-05	780	1.14E-05
446	8.21E-04	513	5.04E-04	580	7.67E-04	647	4.74E-04	714	6.78E-05	N/A	N/A



## 4.0 LM-79 Measurement and Test Results

### 4.2 Goniophotometer Test

<b>Model No.</b>	BULLET12 @6W4000K	<b>Sample ID</b>	241216012-S1
<b>Operate time (Min.)</b>	30	<b>Stabilization time (Min.)</b>	60
<b>Temperature (°C)</b>	24.8	<b>Humidity (%RH)</b>	40.1

<b>Test Method</b>
<p>The Samples were tested according to the ANSI/IES LM-79:2019.</p> <p>Photometric parameters were measured using a type C goniophotometer and software.</p> <p>The ambient temperature shall be maintained at <math>25\pm1^{\circ}\text{C}</math>, measured at a point not more than 1 m from the sample and at the same height as the sample.</p> <p>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 <math>\pm 0.2</math> percent under load.</p> <p>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 <math>1.0^{\circ}</math> vertical intervals and <math>15^{\circ}</math> horizontal intervals.</p>

### Test Conditions

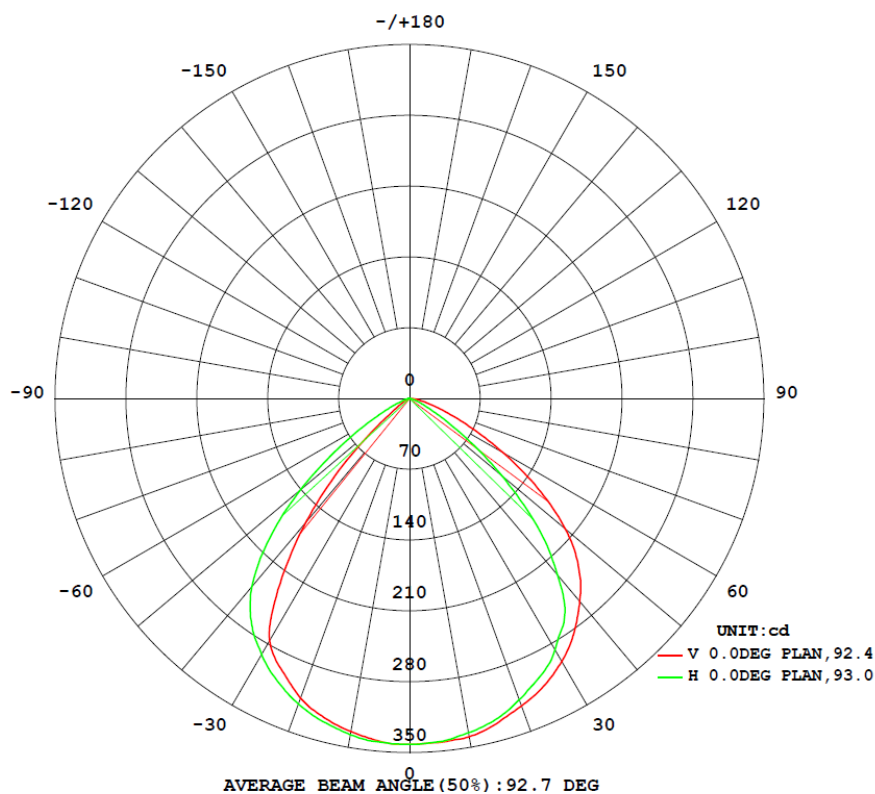
Condition	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
<b>WORST CASE</b>	120.0	60	0.049	5.8	0.991
<b>NON-WORST CASE</b>	N/A	N/A	N/A	N/A	N/A

### Test Result

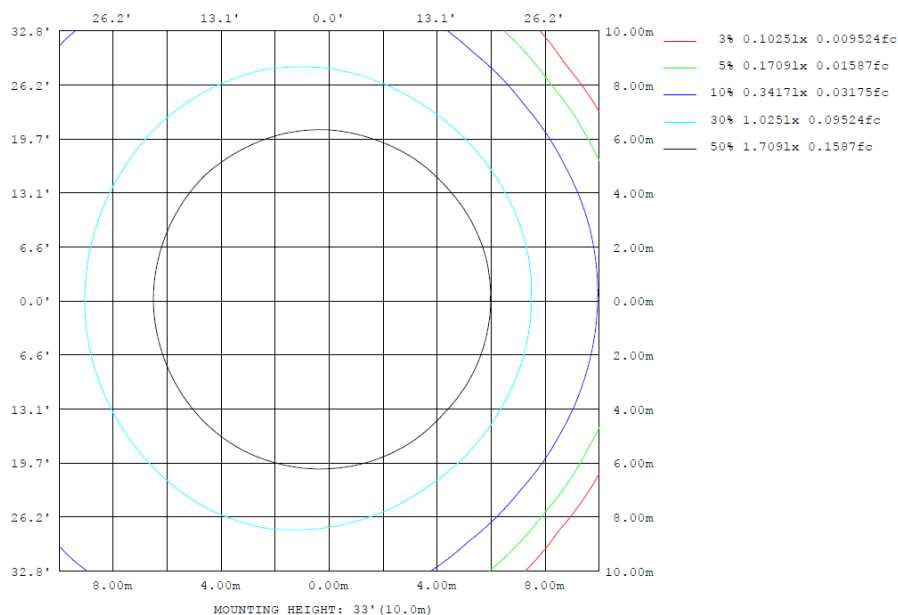
Flux (lm)	Field Angle (10%)		Beam Angle (50%)		Luminous Efficacy (lm/W)	Zonal Lumen Requirement	NEMA Type
	C0-180	C90-270	C0-180	C90-270		(0°-90°)	
675	123.8	125.0	92.3	93.2	116.4	100.0%	6H x 6V

## 4.2 Goniophotometer Test

### Lighting Distribution Curve



### Isolux Plot



## 4.2 Goniophotometer Test

### Zonal Lumen Summary

ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	± zone	± total	±lum, lamp
10	334.1	333.5	335.4	336.6	339.3	338.3	337.4	334.9	0- 10	32.37	32.37	4.79,4.79
20	315.1	316.2	316.7	321.7	323.2	325.2	321.4	318.9	10- 20	93.00	125.4	18.6,18.6
30	276.7	274.3	287.3	296.6	300.6	301.6	292.2	279.8	20- 30	141.0	266.3	39.4,39.4
40	158.5	163.5	227.5	258.0	261.6	263.0	242.2	178.7	30- 40	161.1	427.4	63.3,63.3
50	37.24	40.98	119.9	194.7	200.9	202.0	141.3	50.08	40- 50	132.0	559.4	82.8,82.8
60	7.214	10.20	34.03	95.32	106.2	109.3	45.48	10.89	50- 60	75.64	635.0	94,94
70	0.0063	0.3678	7.836	29.35	36.39	36.24	9.819	0.4773	60- 70	30.34	665.3	98.5,98.5
80	0.0063	0.0069	1.309	6.598	9.416	7.727	1.697	0.0112	70- 80	8.413	673.8	99.8,99.8
90	0	0	0	0	0	0	0	0	80- 90	1.628	675.4	100,100
100	0	0	0	0	0	0	0	0	90-100	0	675.4	100,100
110	0	0	0	0	0	0	0	0	100-110	0	675.4	100,100
120	0	0	0	0	0	0	0	0	110-120	0	675.4	100,100
130	0	0	0	0	0	0	0	0	120-130	0	675.4	100,100
140	0	0	0	0	0	0	0	0	130-140	0	675.4	100,100
150	0	0	0	0	0	0	0	0	140-150	0	675.4	100,100
160	0	0	0	0	0	0	0	0	150-160	0	675.4	100,100
170	0	0	0	0	0	0	0	0	160-170	0	675.4	100,100
180	0	0	0	0	0	0	0	0	170-180	0	675.4	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

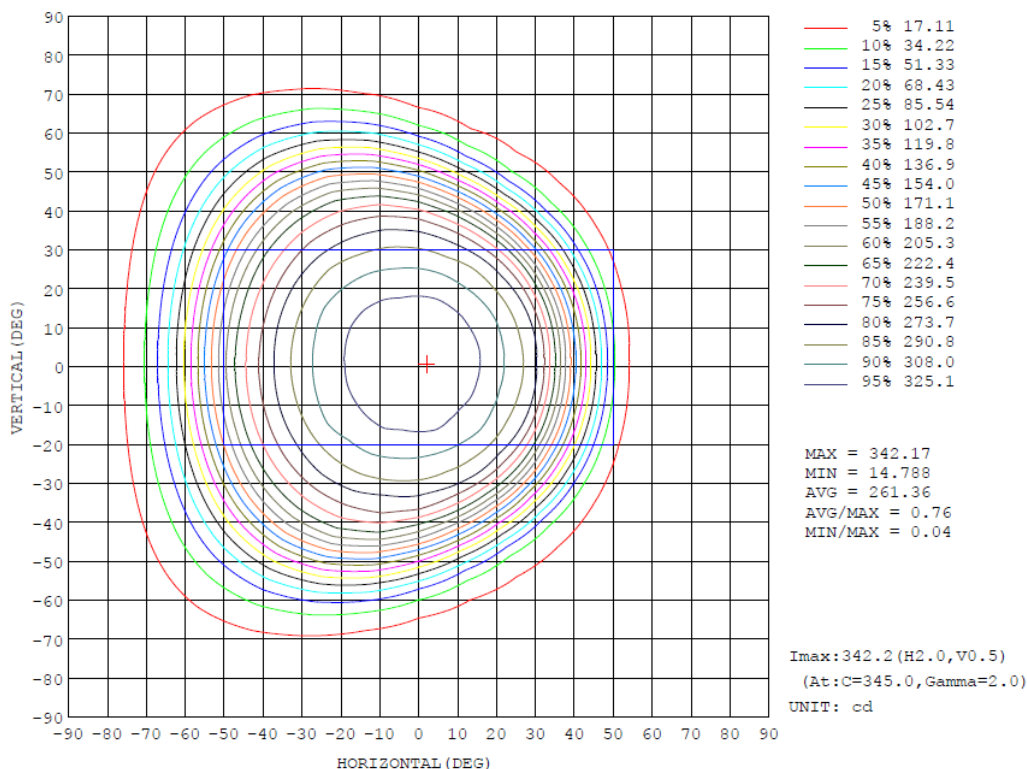
Zonal (lm)		Total (lm)		Percent
0-10	32.37	0-10	32.37	4.79%
10-20	93.00	0-20	125.37	18.56%
20-30	140.96	0-30	266.33	39.43%
30-40	161.07	0-40	427.40	63.28%
40-50	131.95	0-50	559.35	82.82%
50-60	75.64	0-60	634.99	94.02%
60-70	30.34	0-70	665.33	98.51%
70-80	8.41	0-80	673.74	99.76%
80-90	1.63	0-90	675.37	100.00%
90-100	0.00	0-100	675.37	100.00%
100-110	0.00	0-110	675.37	100.00%
110-120	0.00	0-120	675.37	100.00%
120-130	0.00	0-130	675.37	100.00%
130-140	0.00	0-140	675.37	100.00%
140-150	0.00	0-150	675.37	100.00%
150-160	0.00	0-160	675.37	100.00%
160-170	0.00	0-170	675.37	100.00%
170-180	0.00	0-180	675.37	100.00%

## 4.2 Goniophotometer Test

### Area Flux Diagram

		AREA FLUX DIAGRAM																UNIT:lm				Φ t	Φ a
VERTICAL (DEG)	90	0.00	0.01	0.03	0.04	0.05	0.05	0.05	0.04	0.03	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.31	0.00		
	80	0.01	0.03	0.07	0.12	0.19	0.26	0.29	0.26	0.19	0.12	0.06	0.02	0.00	0.00	0.00	0.00	0.00	0.00	1.61	0.00		
	70	0.01	0.04	0.13	0.30	0.57	0.89	1.15	1.16	0.91	0.58	0.30	0.14	0.04	0.00	0.00	0.00	0.00	0.00	6.24	2.99		
	60	0.01	0.06	0.23	0.61	1.31	2.23	3.05	3.39	3.07	2.22	1.21	0.54	0.23	0.06	0.00	0.00	0.00	0.00	18.2	16.5		
	50	0.01	0.09	0.37	1.08	2.38	3.99	5.36	6.13	6.17	5.33	3.68	1.82	0.65	0.21	0.03	0.00	0.00	0.00	37.3	36.2		
	40	0.01	0.12	0.53	1.63	3.49	5.41	6.90	7.87	8.26	7.92	6.64	4.32	1.82	0.47	0.10	0.00	0.00	0.00	55.5	54.7		
	30	0.01	0.14	0.69	2.15	4.31	6.28	7.84	8.86	9.32	9.20	8.40	6.58	3.52	1.00	0.18	0.01	0.00	0.00	68.5	67.9		
	20	0.02	0.16	0.81	2.52	4.81	6.78	8.40	9.47	9.98	9.92	9.21	7.75	4.87	1.65	0.26	0.02	0.00	0.00	76.6	76.1		
	10	0.02	0.17	0.88	2.70	5.03	7.01	8.61	9.73	10.3	10.2	9.54	8.15	5.50	2.03	0.31	0.03	0.00	0.00	80.2	79.7		
	0	0.02	0.17	0.87	2.68	5.02	6.99	8.59	9.69	10.3	10.2	9.50	8.11	5.42	1.98	0.30	0.03	0.00	0.00	79.8	79.3		
	-10	0.02	0.16	0.79	2.45	4.75	6.72	8.31	9.38	9.91	9.85	9.12	7.64	4.66	1.53	0.24	0.02	0.00	0.00	75.6	75.0		
	-20	0.01	0.14	0.65	2.04	4.20	6.18	7.71	8.74	9.20	9.06	8.25	6.29	3.24	0.88	0.17	0.01	0.00	0.00	66.8	66.1		
	-30	0.01	0.11	0.49	1.51	3.31	5.25	6.75	7.70	8.04	7.64	6.23	3.88	1.56	0.41	0.09	0.00	0.00	0.00	53.0	52.1		
	-40	0.01	0.08	0.33	0.97	2.15	3.70	5.05	5.77	5.69	4.75	3.16	1.51	0.55	0.20	0.03	0.00	0.00	0.00	34.0	32.7		
	-50	0.01	0.06	0.21	0.54	1.11	1.88	2.58	2.85	2.53	1.78	0.96	0.47	0.21	0.05	0.00	0.00	0.00	0.00	15.2	13.3		
	-60	0.01	0.04	0.12	0.26	0.47	0.70	0.86	0.85	0.68	0.45	0.27	0.13	0.04	0.00	0.00	0.00	0.00	0.00	4.87	1.36		
	-70	0.01	0.03	0.06	0.11	0.17	0.21	0.22	0.19	0.14	0.09	0.05	0.02	0.00	0.00	0.00	0.00	0.00	0.00	1.29	0.00		
	-80	0.00	0.01	0.02	0.04	0.04	0.05	0.04	0.03	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.27	0.00		
	-90	0.00	0.01	0.02	0.04	0.04	0.05	0.04	0.03	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.27	0.00		
		-90	-80	-70	-60	-50	-40	-30	-20	HORIZONTAL (DEG)	20	30	40	50	60	70	80	90					
Φ t	0.19	1.63	7.26	21.7	43.4	64.6	81.8	92.1	94.7	89.4	76.6	57.4	32.3	10.5	1.73	0.14	0.00	0.00	675	---			
Φ a	0.00	0.01	5.46	20.3	42.0	63.3	80.5	90.8	93.4	88.0	75.2	55.9	30.8	8.62	0.00	0.00	0.00	0.00	---	654			

### Isocandela



## 4.2 Goniophotometer Test

## Luminous Distribution Intensity Data

H (DEG)	UNIT: cd																			
V (DEG)	-90	-85	-80	-75	-70	-65	-60	-55	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	
-180	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
-170	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
-160	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
-150	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
-140	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
-130	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
-120	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
-110	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
-100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
-90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
-80	0.00	1.36	2.00	2.51	2.93	3.29	3.62	3.82	3.95	4.04	3.98	3.81	3.55	3.26	2.91	2.45	2.11	1.72	1.3	
-70	0.00	2.05	3.14	4.22	5.32	6.46	8.12	9.56	11.1	12.8	14.1	14.9	15.3	15.1	14.3	12.8	11.5	9.80	7.8	
-60	0.00	2.59	4.23	6.17	8.75	11.8	16.2	21.3	26.9	33.3	40.1	45.8	51.1	54.6	55.5	53.7	49.5	42.7	34.	
-50	0.00	3.09	5.37	8.64	13.1	19.8	28.8	40.6	55.1	72.8	91.6	110	126	140	146	148	145	134	120	
-40	0.00	3.51	6.52	11.2	18.8	29.9	46.0	68.7	96.0	127	158	185	206	222	233	238	241	238	228	
-30	0.00	3.87	7.65	14.0	24.8	41.5	66.8	99.8	139	177	209	233	251	266	276	282	287	286	278	
-20	0.00	4.14	8.57	16.6	30.4	52.8	85.9	128	173	211	240	261	278	292	303	310	316	317	317	
-10	0.00	4.32	9.18	18.6	34.6	61.3	100	147	193	230	256	277	295	309	319	326	332	335	335	
0	0.00	4.39	9.42	19.5	36.4	64.9	106	155	201	236	262	283	301	314	323	332	339	341	342	
10	0.00	4.32	9.22	18.9	35.3	62.6	102	150	195	231	257	279	296	311	321	329	335	337	337	
20	0.00	4.15	8.63	17.0	31.1	55.2	90.0	133	178	215	243	264	282	297	307	314	319	320	323	
30	0.00	3.88	7.72	14.6	26.2	44.4	71.5	107	147	184	215	238	256	270	280	287	292	293	292	
40	0.00	3.52	6.61	11.7	20.4	32.5	50.7	75.2	105	137	168	193	213	228	239	245	250	247	242	
50	0.00	3.10	5.43	8.84	14.1	22.0	32.1	46.0	63.2	83.2	105	125	141	156	163	166	163	154	141	
60	0.00	2.61	4.27	6.34	9.10	12.9	18.2	24.4	31.5	40.2	49.5	57.6	65.5	70.6	71.5	70.3	65.3	56.5	45.	
70	0.00	2.08	3.17	4.28	5.50	6.95	8.73	10.8	13.0	15.4	17.7	19.7	22.0	20.8	19.9	19.7	17.9	15.9	13.1	
80	0.00	1.40	2.06	2.57	2.99	3.38	3.74	4.02	4.28	4.50	4.56	4.50	4.36	4.07	3.67	3.14	2.71	2.23	1.7	
90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
110	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
120	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
130	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
140	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
150	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
160	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
170	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
180	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

																	UNIT: °C		
H (DEG)																			
V (DEG)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	
-180	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
-170	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
-160	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
-150	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
-140	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
-130	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
-120	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
-110	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
-100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
-90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
-80	1.00	0.69	0.39	0.26	0.14	0.05	0.03	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	
-70	6.57	5.18	3.80	2.63	1.54	0.73	0.35	0.11	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	
-60	27.8	21.1	15.9	12.6	9.39	6.39	3.59	1.36	0.42	0.08	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	
-50	102	80.3	59.5	40.0	25.6	18.8	13.7	9.08	4.82	1.59	0.19	0.01	0.01	0.01	0.01	0.01	0.01	0.01	
-40	212	190	161	126	91.8	58.7	32.7	19.7	13.1	7.25	2.66	0.35	0.01	0.01	0.01	0.01	0.01	0.01	
-30	283	274	257	230	191	142	93.9	50.3	23.9	13.9	7.21	2.06	0.11	0.01	0.01	0.01	0.01	0.01	
-20	315	309	299	286	263	218	162	104	51.2	20.7	11.4	4.54	0.58	0.01	0.01	0.01	0.01	0.01	
-10	333	327	320	306	290	264	207	144	81.0	31.3	14.3	6.50	1.21	0.01	0.01	0.01	0.01	0.01	
0	340	334	326	315	297	277	223	159	93.3	37.2	15.3	7.21	1.47	0.01	0.01	0.01	0.01	0.01	
10	335	329	322	310	292	268	214	149	84.7	33.7	14.7	6.64	1.26	0.01	0.01	0.01	0.01	0.01	
20	319	313	302	289	269	229	172	112	57.6	23.9	11.9	4.76	0.63	0.01	0.01	0.01	0.01	0.01	
30	287	279	266	242	204	156	106	59.0	27.8	14.8	7.60	2.27	0.14	0.01	0.01	0.01	0.01	0.01	
40	228	208	180	145	108	70.0	39.8	22.8	13.9	7.72	2.93	0.41	0.01	0.01	0.01	0.01	0.01	0.01	
50	121	97.4	73.5	50.6	31.9	21.7	14.8	9.66	5.26	1.83	0.24	0.01	0.01	0.01	0.01	0.01	0.01	0.01	
60	36.5	26.9	18.9	14.0	10.0	6.85	3.99	1.60	0.50	0.11	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	
70	8.09	6.24	4.46	3.11	1.86	0.90	0.44	0.15	0.02	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.00	
80	1.30	0.90	0.50	0.34	0.19	0.07	0.04	0.02	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.01	0.00	
90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
110	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
120	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
130	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
140	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
150	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
160	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
170	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
180	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

## 4.0 LM-79 Measurement and Test Results

### 4.3 THD and PF Test

<b>Model No.</b>	BULLET12 @6W4000K	<b>Sample ID</b>	241216012-S1
<b>Temperature (°C)</b>	25.4	<b>Humidity (%RH)</b>	41.0

<b>Test Method</b>
<p>The samples were tested according to the and Ansi C82.77: 2002 and ANSI C82.77-10:2020</p> <p>The total harmonic distortion shall be measured to the 40th order.</p> <p>The ambient temperature shall be maintained at <math>25 \pm 1^\circ\text{C}</math>. 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 was calculated.</p>

### Test Results

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	iTHD(%)
120.0	60	0.049	5.8	0.991	13.51



## 5.0 Equipment List:

Equipment ID	Equipment Name	Last Cal.	Due Cal.
NTC-F01-001	Goniophotometer System	2024-11-07	2025-11-06
NTC-F01-006	2.0 meter Integrating Sphere	2024-11-07	2025-11-06
NTC-F01-012	Standard Lamp	2024-10-28	2025-10-27
NTC-F01-013	Standard Lamp	2024-10-28	2025-10-27
NTC-F01-031	Digital Power Meter	2024-08-06	2025-08-05
NTC-F01-019	Temperature & Humidity Meter	2024-10-29	2025-10-28

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