

## Photometric Test Report

### Relevant Standards

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

Prepared For

**RAB Lighting Inc.**

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Prepared By

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Issue Date: 2025-02-21

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		1279
Minimum Luminaire Efficacy (lm/W) (Goniophotometer – Section 4.2)	ANSI/IES LM-79:2019	Standard	Premium	112.2
		105	120	
Power (Input Wattage) (W) (Goniophotometer – Section 4.2)	ANSI/IES LM-79:2019	Worst Case		11.4
Total Harmonic Distortion (A%) (THD & PF – Section 4.3)	ANSI C82.77:2002 ANSI C82-77-10:2020	20.00%	120V	13.28
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	3045±175	3070
		4 steps	3045±100	
Minimum CRI (Integrating Sphere – Section 4.1)	ANSI/IES LM-79:2019 CIE13.3-1995	≥70		82.9
Minimum R9 (Integrating Sphere – Section 4.1)	ANSI/IES LM-79-2019 CIE13.3-1995	N/A		8
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		0.096
(Goniophotometer – Section 4.2)		Non-Worst Case		N/A
Power (Input Wattage – W)				
(Goniophotometer – Section 4.2)	ANSI/IES LM-79:2019	Worst Case		11.4
(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	2025-02-20	BULLET2X12 @12W3000K	ES 1st ES #3-3	241216022-S1
2	Goniophotometer Test	2025-02-20	BULLET2X12 @12W3000K	ES 1st ES #3-3	241216022-S1
3	THD and PF Test	2025-02-20	BULLET2X12 @12W3000K	ES 1st ES #3-3	241216022-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. BULLET2X12 @12W3000K, 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>	BULLET2X12 @12W3000K	<b>Sample ID</b>	241216022-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

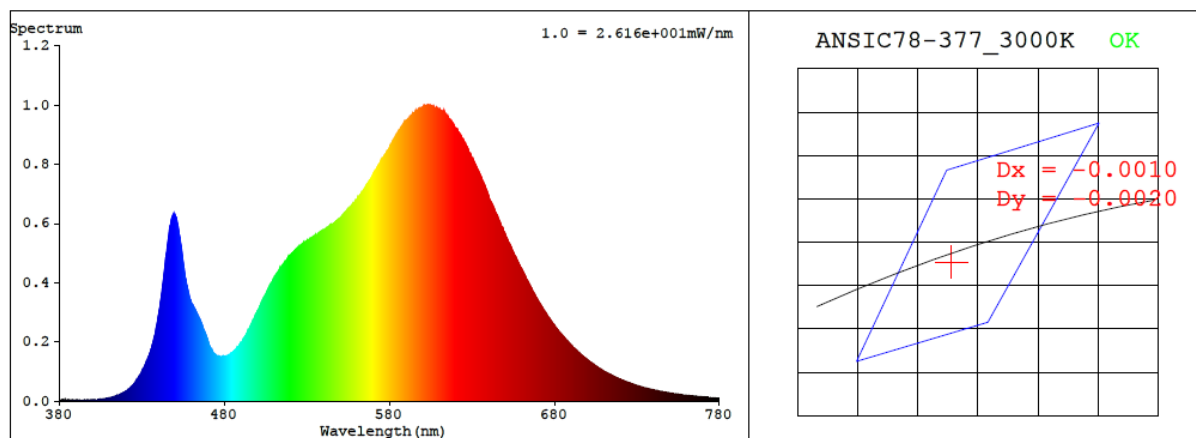
<b>Test Method</b>
<p>The Samples were tested according to the ANSI/IES LM-79:2019.</p> <p>Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25±1°C.</p> <p>The sample measurements were 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 4<math>\pi</math> 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	0.096	11.4	0.991

<b>CCT (K)</b>	<b>CRI</b>	<b>R9</b>	<b>Duv</b>	<b>SDCM</b>	<b>Rf</b>	<b>Rg</b>	<b>IES Rcs,h1</b>
3070	82.9	8	-0.0007	1.5	84	98	-11%

## 4.1 Integrating Sphere Test



### Colorimetric Parameters

Chromaticity Coordinate:  $x = 0.4311$   $y = 0.4003$  /  $u' = 0.2484$   $v' = 0.5190$  ( $duv = -6.81e-04$ )

CCT= 3070K Prcp WL:  $L_d = 582.8nm$  Purity=49.6%

Peak WL:  $L_p = 605nm$  FWHM:  $= 134.6nm$  Ratio: R=22.6% G=75.0% B=2.3%

Render Index:  $R_a = 82.9$  AvgR = 77.0 TM30:  $R_f = 83$   $R_g = 97$

EEL: 0.12071 A+

R1 =82 R2 =90 R3 =96 R4 =82 R5 =81 R6 =87 R7 =84

R8 =61 R9 =8 R10=77 R11=82 R12=69 R13=84 R14=98 R15=74

## 4.1 Integrating Sphere Test

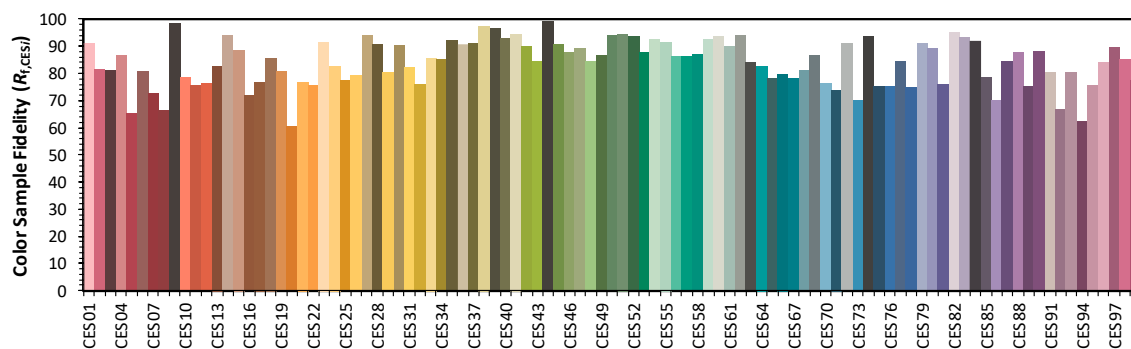
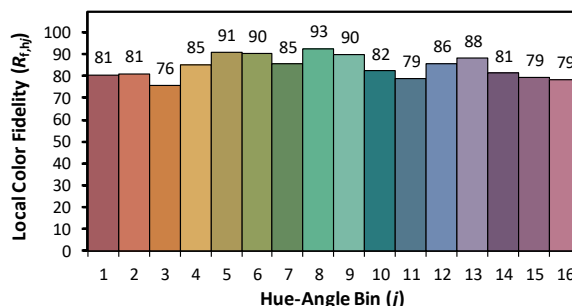
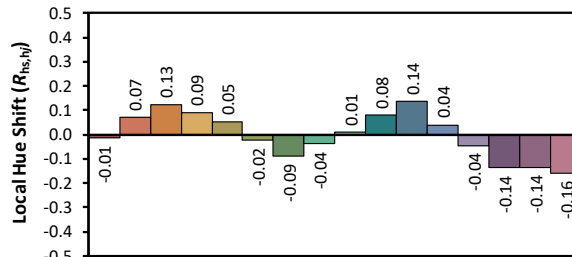
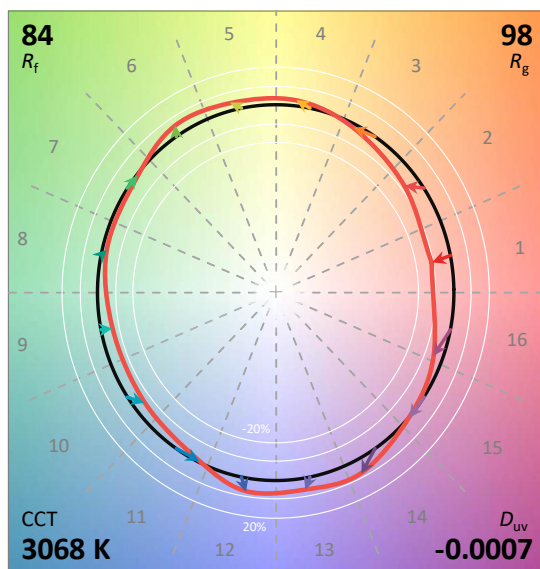
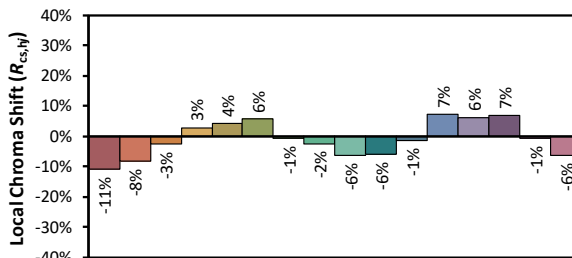
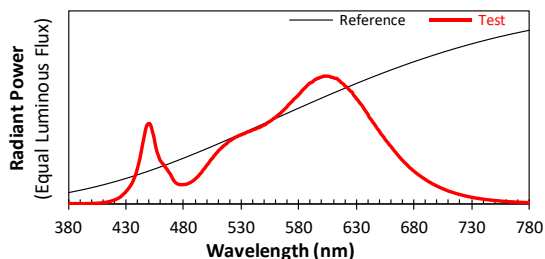
### ANSI/IES TM-30-18 Color Rendition Report

Source: 1 CIE F1

Manufacturer: RAB Lighting Inc.

Date: 2025/2/21

Model: BULLET2X12 @12W3000K



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

$x$  0.4311  
 $y$  0.4002  
 $u'$  0.2485  
 $v'$  0.5190

CIE 13.3-1995  
(CRI)

$R_a$  83  
 $R_g$  8



## 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	2.60E-06	447	5.91E-04	514	4.50E-04	581	8.65E-04	648	5.90E-04	715	8.68E-05
381	3.70E-06	448	6.16E-04	515	4.57E-04	582	8.77E-04	649	5.79E-04	716	8.35E-05
382	4.70E-06	449	6.25E-04	516	4.64E-04	583	8.87E-04	650	5.65E-04	717	8.10E-05
383	9.00E-07	450	6.28E-04	517	4.71E-04	584	8.96E-04	651	5.52E-04	718	7.86E-05
384	3.00E-06	451	6.18E-04	518	4.79E-04	585	9.06E-04	652	5.39E-04	719	7.55E-05
385	3.70E-06	452	5.90E-04	519	4.89E-04	586	9.13E-04	653	5.29E-04	720	7.38E-05
386	4.00E-06	453	5.55E-04	520	4.93E-04	587	9.23E-04	654	5.17E-04	721	7.14E-05
387	3.30E-06	454	5.20E-04	521	4.98E-04	588	9.31E-04	655	5.03E-04	722	6.87E-05
388	3.60E-06	455	4.72E-04	522	5.04E-04	589	9.41E-04	656	4.91E-04	723	6.68E-05
389	2.20E-06	456	4.30E-04	523	5.11E-04	590	9.45E-04	657	4.81E-04	724	6.44E-05
390	3.70E-06	457	3.98E-04	524	5.16E-04	591	9.51E-04	658	4.69E-04	725	6.23E-05
391	3.10E-06	458	3.75E-04	525	5.22E-04	592	9.54E-04	659	4.58E-04	726	6.05E-05
392	3.30E-06	459	3.48E-04	526	5.25E-04	593	9.64E-04	660	4.48E-04	727	5.83E-05
393	2.00E-06	460	3.34E-04	527	5.29E-04	594	9.71E-04	661	4.37E-04	728	5.64E-05
394	2.60E-06	461	3.22E-04	528	5.36E-04	595	9.73E-04	662	4.25E-04	729	5.45E-05
395	3.60E-06	462	3.12E-04	529	5.37E-04	596	9.81E-04	663	4.13E-04	730	5.27E-05
396	3.40E-06	463	3.00E-04	530	5.41E-04	597	9.81E-04	664	4.03E-04	731	5.13E-05
397	4.00E-06	464	2.86E-04	531	5.44E-04	598	9.87E-04	665	3.92E-04	732	4.93E-05
398	3.80E-06	465	2.76E-04	532	5.49E-04	599	9.90E-04	666	3.81E-04	733	4.76E-05
399	4.20E-06	466	2.62E-04	533	5.51E-04	600	9.92E-04	667	3.70E-04	734	4.62E-05
400	4.70E-06	467	2.48E-04	534	5.56E-04	601	9.98E-04	668	3.61E-04	735	4.49E-05
401	4.60E-06	468	2.37E-04	535	5.61E-04	602	9.96E-04	669	3.50E-04	736	4.36E-05
402	5.50E-06	469	2.20E-04	536	5.63E-04	603	9.98E-04	670	3.40E-04	737	4.18E-05
403	5.40E-06	470	2.04E-04	537	5.66E-04	604	9.97E-04	671	3.31E-04	738	4.05E-05
404	5.80E-06	471	1.86E-04	538	5.69E-04	605	9.98E-04	672	3.22E-04	739	3.96E-05
405	6.80E-06	472	1.75E-04	539	5.74E-04	606	9.96E-04	673	3.14E-04	740	3.81E-05
406	6.80E-06	473	1.65E-04	540	5.79E-04	607	9.94E-04	674	3.04E-04	741	3.69E-05
407	7.90E-06	474	1.60E-04	541	5.81E-04	608	9.89E-04	675	2.96E-04	742	3.52E-05
408	8.50E-06	475	1.55E-04	542	5.85E-04	609	9.89E-04	676	2.85E-04	743	3.43E-05
409	9.90E-06	476	1.53E-04	543	5.88E-04	610	9.85E-04	677	2.79E-04	744	3.35E-05
410	1.11E-05	477	1.52E-04	544	5.94E-04	611	9.81E-04	678	2.71E-04	745	3.28E-05
411	1.22E-05	478	1.50E-04	545	5.96E-04	612	9.80E-04	679	2.63E-04	746	3.10E-05
412	1.35E-05	479	1.52E-04	546	5.99E-04	613	9.80E-04	680	2.56E-04	747	3.04E-05
413	1.52E-05	480	1.52E-04	547	6.04E-04	614	9.70E-04	681	2.48E-04	748	2.93E-05
414	1.64E-05	481	1.53E-04	548	6.08E-04	615	9.64E-04	682	2.42E-04	749	2.85E-05
415	1.97E-05	482	1.54E-04	549	6.14E-04	616	9.54E-04	683	2.34E-04	750	2.75E-05
416	2.09E-05	483	1.57E-04	550	6.17E-04	617	9.46E-04	684	2.27E-04	751	2.67E-05
417	2.35E-05	484	1.62E-04	551	6.22E-04	618	9.40E-04	685	2.22E-04	752	2.59E-05
418	2.66E-05	485	1.65E-04	552	6.29E-04	619	9.33E-04	686	2.15E-04	753	2.52E-05
419	2.92E-05	486	1.70E-04	553	6.36E-04	620	9.21E-04	687	2.08E-04	754	2.41E-05
420	3.24E-05	487	1.76E-04	554	6.41E-04	621	9.16E-04	688	2.03E-04	755	2.36E-05
421	3.60E-05	488	1.82E-04	555	6.47E-04	622	9.07E-04	689	1.96E-04	756	2.26E-05
422	4.10E-05	489	1.88E-04	556	6.53E-04	623	8.99E-04	690	1.91E-04	757	2.18E-05
423	4.49E-05	490	1.96E-04	557	6.60E-04	624	8.87E-04	691	1.85E-04	758	2.12E-05
424	5.10E-05	491	2.05E-04	558	6.68E-04	625	8.80E-04	692	1.79E-04	759	2.06E-05
425	5.64E-05	492	2.14E-04	559	6.72E-04	626	8.74E-04	693	1.74E-04	760	2.00E-05
426	6.38E-05	493	2.23E-04	560	6.79E-04	627	8.58E-04	694	1.68E-04	761	1.93E-05
427	7.34E-05	494	2.34E-04	561	6.88E-04	628	8.44E-04	695	1.63E-04	762	1.86E-05
428	8.09E-05	495	2.43E-04	562	6.94E-04	629	8.34E-04	696	1.58E-04	763	1.78E-05
429	8.89E-05	496	2.56E-04	563	7.03E-04	630	8.21E-04	697	1.53E-04	764	1.76E-05
430	1.01E-04	497	2.69E-04	564	7.08E-04	631	8.12E-04	698	1.49E-04	765	1.68E-05
431	1.10E-04	498	2.78E-04	565	7.19E-04	632	8.00E-04	699	1.45E-04	766	1.68E-05
432	1.23E-04	499	2.91E-04	566	7.27E-04	633	7.88E-04	700	1.40E-04	767	1.58E-05
433	1.34E-04	500	3.04E-04	567	7.35E-04	634	7.76E-04	701	1.35E-04	768	1.55E-05
434	1.49E-04	501	3.13E-04	568	7.44E-04	635	7.67E-04	702	1.31E-04	769	1.51E-05
435	1.64E-04	502	3.26E-04	569	7.53E-04	636	7.51E-04	703	1.27E-04	770	1.44E-05
436	1.83E-04	503	3.39E-04	570	7.63E-04	637	7.37E-04	704	1.24E-04	771	1.41E-05
437	2.06E-04	504	3.50E-04	571	7.75E-04	638	7.24E-04	705	1.20E-04	772	1.35E-05
438	2.26E-04	505	3.59E-04	572	7.83E-04	639	7.11E-04	706	1.16E-04	773	1.34E-05
439	2.57E-04	506	3.73E-04	573	7.92E-04	640	6.99E-04	707	1.12E-04	774	1.26E-05
440	2.90E-04	507	3.82E-04	574	8.01E-04	641	6.77E-04	708	1.08E-04	775	1.23E-05
441	3.25E-04	508	3.95E-04	575	8.12E-04	642	6.67E-04	709	1.04E-04	776	1.21E-05
442	3.65E-04	509	4.03E-04	576	8.21E-04	643	6.55E-04	710	1.01E-04	777	1.17E-05
443	4.11E-04	510	4.15E-04	577	8.29E-04	644	6.41E-04	711	9.80E-05	778	1.13E-05
444	4.60E-04	511	4.24E-04	578	8.37E-04	645	6.30E-04	712	9.58E-05	779	1.13E-05
445	5.04E-04	512	4.33E-04	579	8.46E-04	646	6.18E-04	713	9.23E-05	780	1.13E-05
446	5.49E-04	513	4.41E-04	580	8.55E-04	647	6.04E-04	714	8.99E-05	N/A	N/A



## 4.0 LM-79 Measurement and Test Results

### 4.2 Goniophotometer Test

<b>Model No.</b>	BULLET2X12 @12W3000K	<b>Sample ID</b>	241216022-S1
<b>Operate time (Min.)</b>	30	<b>Stabilization time (Min.)</b>	60
<b>Temperature (°C)</b>	24.8	<b>Humidity (%RH)</b>	41.1

<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 \pm 1^\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

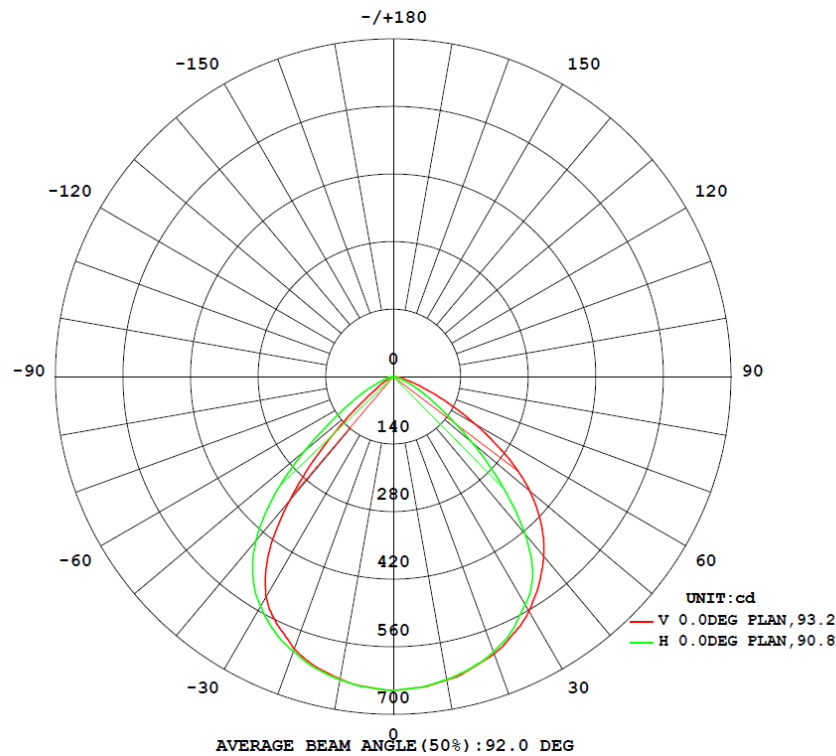
Condition	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
<b>WORST CASE</b>	120.0	60	0.096	11.4	0.991
<b>NON-WORST CASE</b>	N/A	N/A	N/A	N/A	N/A

#### Test Result

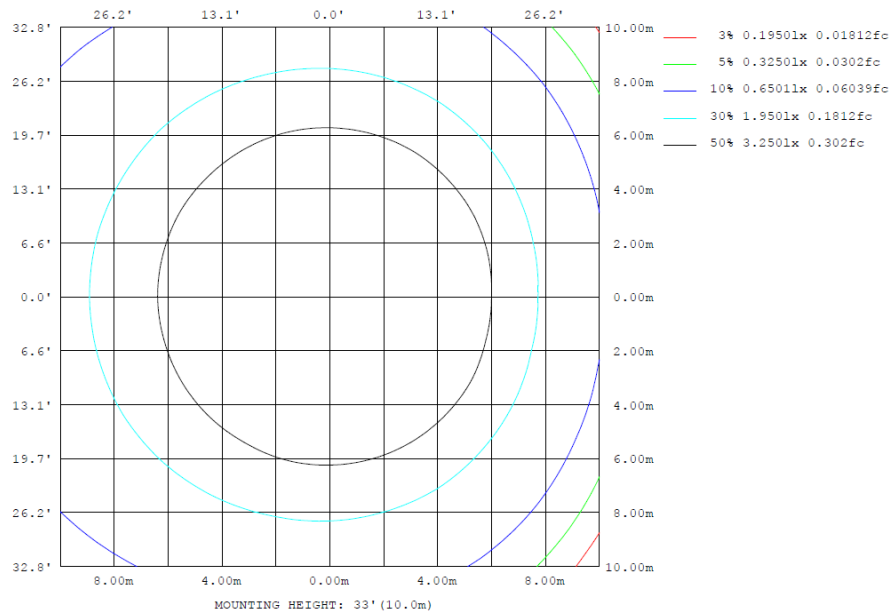
Flux (lm)	Field Angle (10%)		Beam Angle (50%)		Luminous Efficacy (lm/W)	Zonal Lumen Requirement	NEMA Type
	C0-180	C90-270	C0-180	C90-270		(0°-90°)	
1279	124.4	126.0	92.9	90.7	112.2	100.0%	6H x 6V

## 4.2 Goniophotometer Test

### Lighting Distribution Curve



### Isolux Plot



## 4.2 Goniophotometer Test

### Zonal Lumen Summary

$\gamma$	C0	C45	C90	C135	C180	C225	C270	C315	$\gamma$	$\Phi$ zone	$\Phi$ total	$\%lum, lamp$
10	635.9	635.6	637.4	639.0	638.6	638.7	637.8	635.3	0- 10	61.35	61.35	4.8,4.8
20	600.0	600.1	606.7	605.5	611.0	607.6	605.8	603.7	10- 20	176.2	237.5	18.6,18.6
30	527.4	536.8	546.2	552.5	562.3	555.2	549.8	540.8	20- 30	266.8	504.3	39.4,39.4
40	334.1	380.5	424.1	469.0	485.0	478.5	443.1	397.8	30- 40	309.8	814.1	63.6,63.6
50	95.14	153.9	214.1	302.3	369.6	337.5	242.1	179.0	40- 50	256.5	1071	83.7,83.7
60	22.36	36.10	79.53	125.2	195.0	149.6	88.52	47.76	50- 60	138.8	1209	94.6,94.6
70	1.239	6.422	21.94	38.02	63.61	42.02	24.87	7.842	60- 70	53.39	1263	98.7,98.7
80	0.0260	1.019	4.553	6.789	14.41	6.627	5.126	1.304	70- 80	14.07	1277	99.8,99.8
90	0	0	0	0	0	0	0	0	80- 90	2.112	1279	100,100
100	0	0	0	0	0	0	0	0	90-100	0	1279	100,100
110	0	0	0	0	0	0	0	0	100-110	0	1279	100,100
120	0	0	0	0	0	0	0	0	110-120	0	1279	100,100
130	0	0	0	0	0	0	0	0	120-130	0	1279	100,100
140	0	0	0	0	0	0	0	0	130-140	0	1279	100,100
150	0	0	0	0	0	0	0	0	140-150	0	1279	100,100
160	0	0	0	0	0	0	0	0	150-160	0	1279	100,100
170	0	0	0	0	0	0	0	0	160-170	0	1279	100,100
180	0	0	0	0	0	0	0	0	170-180	0	1279	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

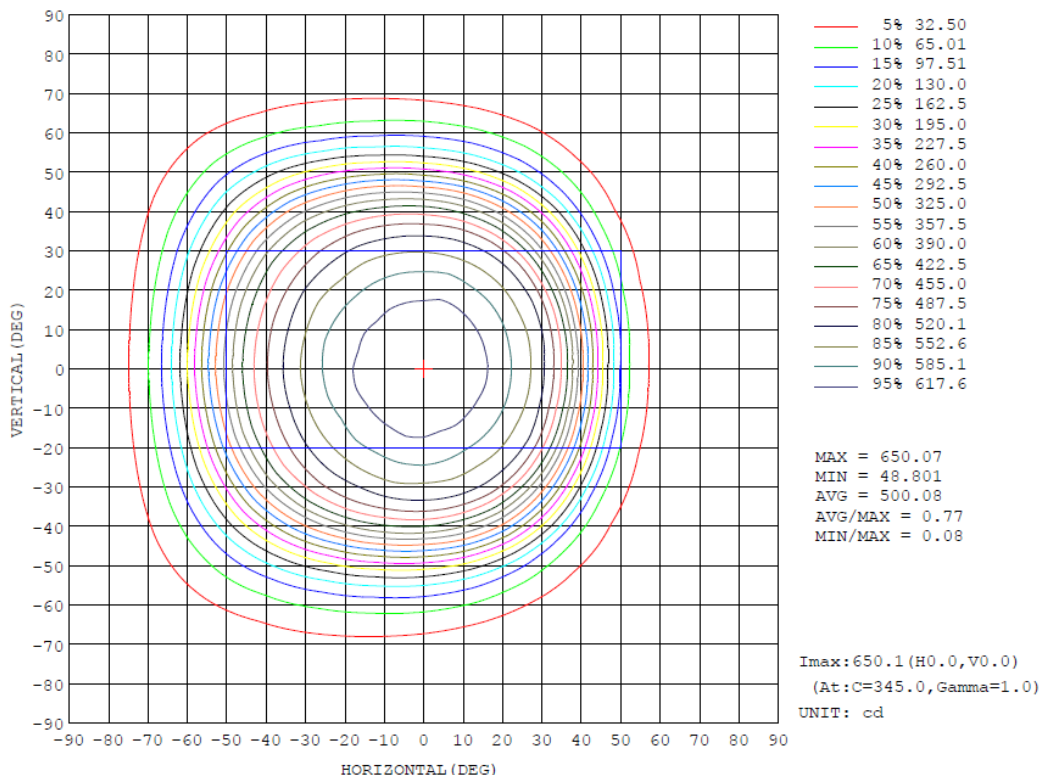
Zonal (lm)		Total (lm)		Percent
0-10	61.35	0-10	61.35	4.80%
10-20	176.16	0-20	237.51	18.57%
20-30	266.83	0-30	504.34	39.43%
30-40	309.76	0-40	814.10	63.65%
40-50	256.53	0-50	1070.63	83.71%
50-60	138.85	0-60	1209.48	94.56%
60-70	53.39	0-70	1262.87	98.73%
70-80	14.07	0-80	1276.94	99.84%
80-90	2.11	0-90	1279.05	100.00%
90-100	0.00	0-100	1279.05	100.00%
100-110	0.00	0-110	1279.05	100.00%
110-120	0.00	0-120	1279.05	100.00%
120-130	0.00	0-130	1279.05	100.00%
130-140	0.00	0-140	1279.05	100.00%
140-150	0.00	0-150	1279.05	100.00%
150-160	0.00	0-160	1279.05	100.00%
160-170	0.00	0-170	1279.05	100.00%
170-180	0.00	0-180	1279.05	100.00%

## 4.2 Goniophotometer Test

### Area Flux Diagram

		AREA FLUX DIAGRAM																UNIT: lm			$\Phi$ t	$\Phi$ a
VERTICAL (DEG)	90	0.00	0.01	0.03	0.04	0.04	0.04	0.05	0.06	0.05	0.03	0.02	0.02	0.01	0.01	0.00	0.00	0.00	0.40	0.00		
	80	0.01	0.03	0.07	0.13	0.18	0.27	0.36	0.42	0.41	0.35	0.26	0.16	0.08	0.03	0.01	0.00	0.00	2.78	0.00		
	70	0.01	0.06	0.17	0.37	0.67	1.03	1.35	1.57	1.63	1.48	1.14	0.69	0.31	0.11	0.03	0.01	0.00	10.6	2.51		
	60	0.01	0.09	0.33	0.87	1.76	2.86	3.86	4.55	4.77	4.40	3.47	2.22	1.05	0.34	0.08	0.01	0.00	30.7	27.4		
	50	0.01	0.13	0.57	1.69	3.67	6.14	8.40	10.0	10.6	10.2	8.39	5.53	2.61	0.85	0.19	0.03	0.00	69.0	67.2		
	40	0.02	0.18	0.88	2.76	5.96	9.45	12.3	14.3	15.2	15.1	13.5	9.97	5.35	1.69	0.38	0.05	0.00	0.00	107	106	
	30	0.02	0.23	1.19	3.82	7.76	11.5	14.4	16.5	17.6	17.5	16.2	13.3	8.14	2.89	0.58	0.08	0.00	0.00	132	130	
	20	0.02	0.26	1.44	4.59	8.80	12.5	15.6	17.7	18.8	18.8	17.5	15.0	10.2	3.97	0.76	0.11	0.00	0.00	146	145	
	10	0.02	0.29	1.58	4.97	9.26	13.0	16.1	18.3	19.4	19.4	18.1	15.6	11.1	4.54	0.86	0.13	0.00	0.00	153	152	
	0	0.02	0.28	1.56	4.91	9.22	13.0	16.1	18.3	19.5	19.4	18.1	15.5	11.0	4.45	0.84	0.13	0.00	0.00	152	151	
	-10	0.02	0.26	1.38	4.40	8.67	12.4	15.5	17.6	18.8	18.7	17.4	14.8	9.91	3.71	0.71	0.11	0.00	0.00	144	143	
	-20	0.02	0.22	1.11	3.53	7.39	11.3	14.3	16.3	17.5	17.4	16.0	13.1	7.72	2.53	0.52	0.07	0.00	0.00	129	128	
	-30	0.02	0.17	0.81	2.46	5.38	8.79	11.8	14.0	15.0	14.8	13.1	9.42	4.74	1.37	0.34	0.04	0.00	0.00	102	101	
	-40	0.01	0.13	0.53	1.49	3.16	5.31	7.41	9.00	9.73	9.33	7.63	4.83	2.08	0.68	0.17	0.02	0.00	0.00	61.5	59.3	
	-50	0.01	0.09	0.31	0.78	1.53	2.45	3.33	3.97	4.21	3.88	2.96	1.77	0.80	0.28	0.07	0.01	0.00	0.00	26.4	22.6	
	-60	0.01	0.06	0.16	0.34	0.61	0.94	1.25	1.44	1.47	1.29	0.93	0.53	0.24	0.09	0.02	0.00	0.00	0.00	9.38	1.34	
	-70	0.01	0.03	0.08	0.13	0.18	0.26	0.35	0.39	0.37	0.31	0.21	0.12	0.06	0.03	0.01	0.00	0.00	0.00	2.54	0.00	
	-80	0.00	0.01	0.03	0.04	0.04	0.04	0.05	0.06	0.04	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.39	0.00	
	-90	0.00	0.01	0.03	0.04	0.04	0.04	0.05	0.06	0.04	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.39	0.00	
		-90	-80	-70	-60	-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90		
$\Phi$ t	0.25	2.54	12.2	37.3	74.3	111	142	164	175	172	155	123	75.3	27.6	5.57	0.80	0.03	0.00	0.00	1279	---	
$\Phi$ a	0.00	0.00	8.88	34.6	71.7	109	140	162	172	170	152	120	72.3	24.0	0.95	0.00	0.00	0.00	0.00	---	1236	

### Isocandela



## 4.2 Goniophotometer Test

## Luminous Distribution Intensity Data

UNIT: °cd																			
H (DEG) 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	1.81	2.53	3.09	3.49	3.77	3.96	3.93	3.75	3.45	3.62	3.79	3.99	4.62	5.20	5.61	5.30	4.96	4.55
-70	0.00	2.63	3.94	5.37	6.82	8.40	9.97	11.7	13.3	14.9	17.4	20.3	22.7	24.2	25.0	25.3	24.8	23.7	21.9
-60	0.00	3.28	5.48	8.42	12.0	16.7	22.6	29.3	36.9	44.8	52.5	60.6	67.9	73.2	77.8	80.7	82.0	81.7	79.5
-50	0.00	3.92	7.27	12.3	20.0	30.3	43.8	60.8	80.8	102	124	146	166	183	199	209	215	218	214
-40	0.00	4.51	9.15	17.7	30.0	48.7	74.8	108	150	195	241	285	324	357	384	406	418	425	424
-30	0.00	5.04	11.1	22.3	41.0	71.0	113	168	233	300	362	413	455	487	509	525	540	547	546
-20	0.00	5.45	12.7	26.9	51.5	91.5	151	226	307	380	438	481	516	543	566	584	596	606	607
-10	0.00	5.72	13.9	30.4	59.7	109	180	267	352	421	473	513	548	575	597	614	626	637	637
0	0.00	5.84	14.4	32.0	63.6	117	195	287	370	435	485	526	562	588	611	626	639	647	650
10	0.00	5.72	13.9	30.8	60.8	112	186	275	358	424	477	516	551	580	599	615	628	635	638
20	0.00	5.44	12.8	27.5	53.3	96.6	161	242	323	391	444	486	522	549	569	586	599	606	606
30	0.00	5.02	11.1	23.1	43.0	75.6	124	186	256	324	384	430	465	493	516	532	544	550	550
40	0.00	4.48	9.17	17.9	31.8	52.7	82.6	123	172	223	273	321	358	388	412	428	440	445	443
50	0.00	3.88	7.24	12.6	21.6	32.6	48.1	68.8	93.2	119	147	173	196	217	233	243	249	250	242
60	0.00	3.24	5.42	8.42	12.4	17.9	24.5	32.2	40.9	50.1	59.2	68.3	75.2	80.4	86.2	89.0	90.7	90.8	88.5
70	0.00	2.60	3.85	5.28	6.74	8.32	10.2	12.2	14.2	15.8	18.8	21.8	24.0	25.6	26.7	27.4	27.1	26.3	24.9
80	0.00	1.80	2.47	2.96	3.32	3.60	3.77	3.81	3.69	3.43	3.60	3.77	3.96	4.59	5.19	5.62	5.51	5.35	5.13
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

H (DEG) V (DEG)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	UNIT: °cd
-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	3.60	2.58	1.58	1.39	1.28	1.29	1.00	0.73	0.49	0.31	0.17	0.07	0.04	0.03	0.03	0.03	0.02	0.00	
-70	19.6	17.0	14.1	11.3	8.72	6.38	4.68	3.27	2.15	1.34	0.71	0.32	0.15	0.06	0.02	0.02	0.03	0.00	
-60	74.0	66.4	56.7	45.8	34.9	25.2	17.1	10.7	6.64	3.89	2.12	1.01	0.41	0.13	0.04	0.02	0.03	0.00	
-50	205	188	164	134	102	73.0	49.2	32.1	19.9	11.1	5.52	2.28	0.83	0.22	0.07	0.03	0.02	0.00	
-40	413	391	361	318	259	193	125	71.9	41.4	24.5	13.2	5.37	1.48	0.37	0.10	0.03	0.02	0.00	
-30	542	532	516	481	421	343	251	156	79.5	41.1	23.4	10.7	3.02	0.64	0.14	0.04	0.02	0.00	
-20	599	590	573	551	522	459	362	249	139	63.4	32.2	16.7	5.47	0.97	0.17	0.04	0.02	0.00	
-10	632	624	608	586	555	511	423	313	188	86.5	39.5	21.0	7.66	1.24	0.18	0.03	0.02	0.00	
0	645	636	622	600	568	527	453	334	205	95.1	41.4	22.4	8.31	1.24	0.16	0.03	0.02	0.00	
10	636	626	612	588	558	519	438	320	197	93.3	41.3	21.4	7.86	1.41	0.23	0.04	0.02	0.00	
20	606	594	579	555	526	469	374	265	155	71.5	34.3	17.4	5.87	1.28	0.25	0.05	0.03	0.00	
30	545	536	521	490	436	361	273	179	97.7	48.8	25.3	11.4	3.68	1.00	0.23	0.06	0.03	0.00	
40	433	414	383	340	285	220	151	91.7	52.2	27.8	14.3	6.06	2.15	0.65	0.18	0.05	0.03	0.00	
50	231	214	188	156	124	93.0	65.2	41.6	24.3	12.8	6.18	2.98	1.25	0.39	0.13	0.04	0.03	0.00	
60	84.1	77.7	68.6	57.3	45.5	33.2	22.3	13.2	7.97	4.77	2.71	1.41	0.63	0.23	0.08	0.04	0.03	0.00	
70	23.1	20.9	18.1	14.5	11.1	8.28	5.95	4.05	2.66	1.73	1.00	0.50	0.24	0.11	0.05	0.04	0.03	0.00	
80	4.04	2.88	1.76	1.15	1.62	1.68	1.31	0.97	0.67	0.44	0.26	0.12	0.08	0.06	0.05	0.04	0.03	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>	BULLET2X12 @12W3000K	<b>Sample ID</b>	241216022-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	0.096	11.4	0.991	13.28

## 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\*\*\*\*\*