

## Photometric Test Report

### Relevant Standards

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

Prepared For

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Issue Date: 2024-12-20

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		1239
Minimum Luminaire Efficacy (lm/W) (Goniophotometer – Section 4.2)	ANSI/IES LM-79:2019	Standard	Premium	104.1
		105	120	
Power (Input Wattage) (W) (Goniophotometer – Section 4.2)	ANSI/IES LM-79:2019	Worst Case		11.9
Total Harmonic Distortion (A%) (THD & PF – Section 4.3)	ANSI C82.77:2002 ANSI C82-77-10:2020	20.00%	1200V	14.28
Power Factor (THD & PF – Section 4.3)	ANSI C82.77:2002 ANSI C82-77-10:2020	0.9	120V	0.990
Allowable CCTs* (K) (Integrating Sphere – Section 4.1)	ANSI/IES LM-79:2019	7 steps	5029±283	5184
		4 steps	5029±220	
Minimum CRI (Integrating Sphere – Section 4.1)	ANSI/IES LM-79:2019 CIE13.3-1995	≥70		82.5
Minimum R9 (Integrating Sphere – Section 4.1)	ANSI/IES LM-79-2019 CIE13.3-1995	N/A		10
Minimum Rf (Integrating Sphere – Section 4.1)	ANSI/IES TM-30-18	≥70		83
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%		-12%
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		0.100
(Goniophotometer – Section 4.2)		Non-Worst Case		N/A
Power (Input Wattage – W)				
(Goniophotometer – Section 4.2)	ANSI/IES LM-79:2019	Worst Case		11.9
(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	2024-12-18	BULLET12 @12W5000K	ES 1st ES #3-1	241216012-S1
2	Goniophotometer Test	2024-12-18	BULLET12 @12W5000K	ES 1st ES #3-1	241216012-S1
3	THD and PF Test	2024-12-18	BULLET12 @12W5000K	ES 1st ES #3-1	241216012-S1

### Remark (If any):

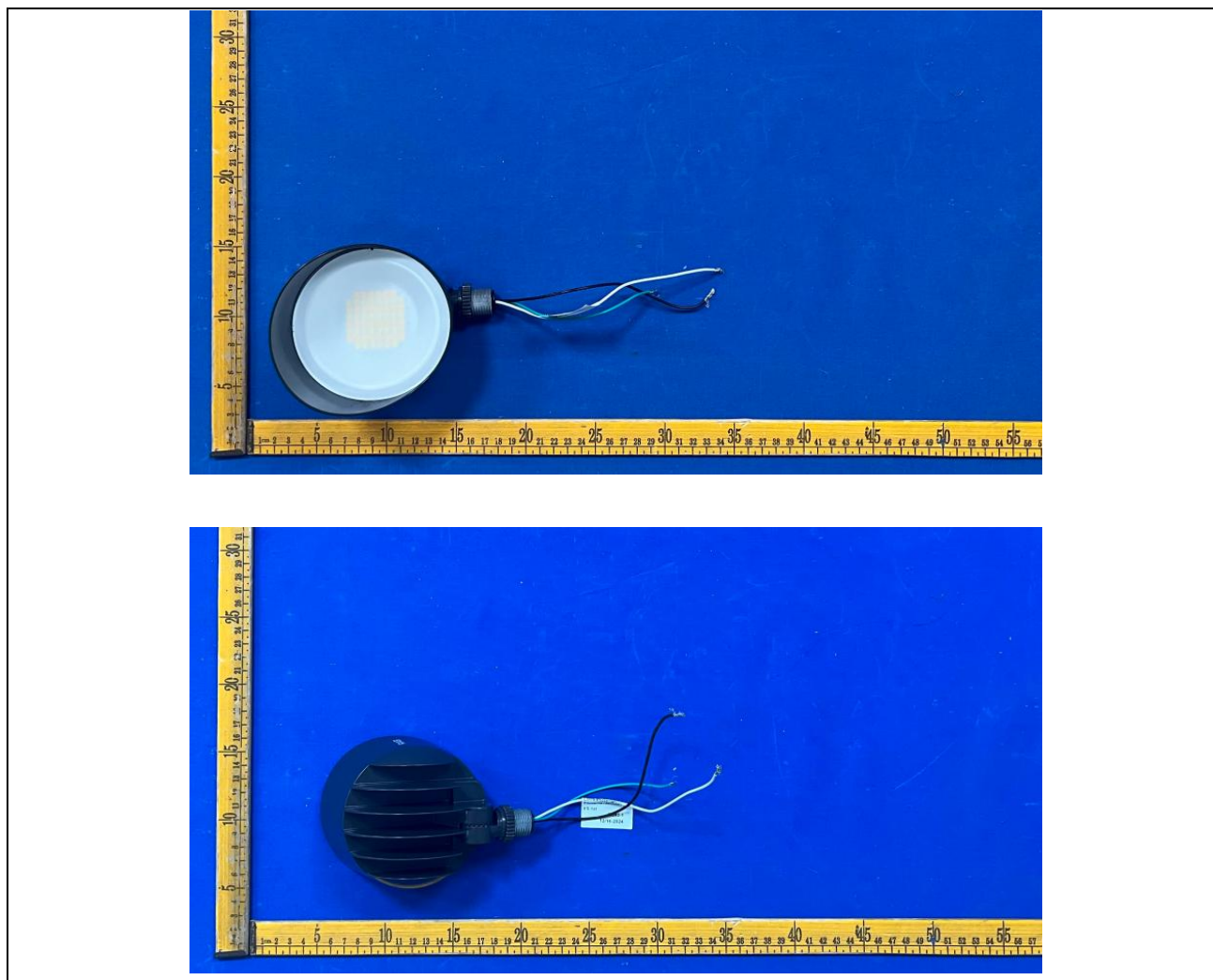
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3. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the U.S. Government.

### 3.0 Product Description

Luminaire Description: Model No. BULLET12 @12W5000K, 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 @12W5000K	<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

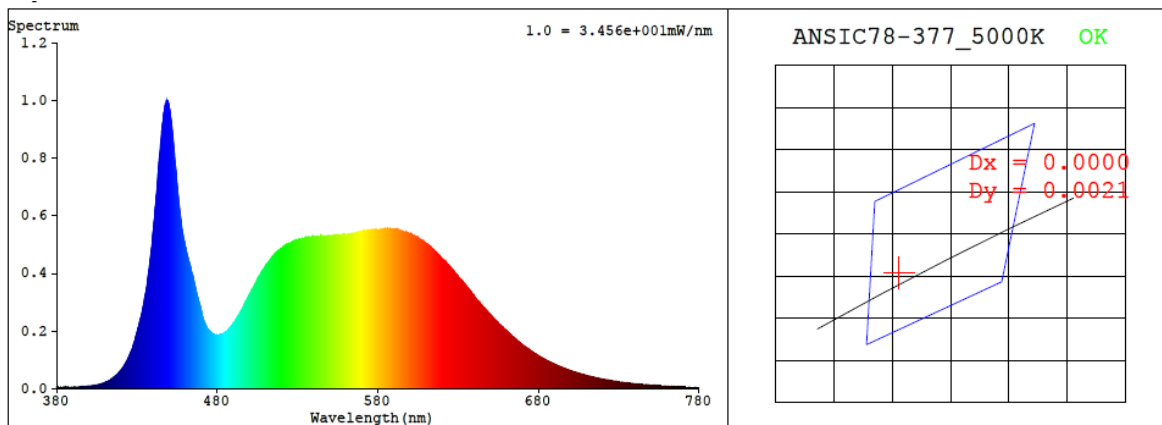
<b>Test Method</b>
<p>The Samples were tested according to the ANSI/IES LM-79:2019.</p> <p>Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25±1°C.</p> <p>The sample measurements were 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 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	0.100	11.9	0.990

<b>CCT (K)</b>	<b>CRI</b>	<b>R9</b>	<b>Duv</b>	<b>Rf</b>	<b>Rg</b>	<b>IES Rcs,h1</b>
5184	82.5	10	0.0011	83	98	-12%

## 4.1 Integrating Sphere Test



### Colorimetric Parameters

Chromaticity Coordinate:  $x = 0.3402$   $y = 0.3497$  /  $u' = 0.2088$   $v' = 0.4830$  ( $duv=1.07e-03$ )

CCT= 5184K Prcp WL: Ld=568.2nm Purity=7.0%

Peak WL: Lp=449nm FWHM: =20.7nm Ratio:R=15.5% G=80.3% B=4.2%

Render Index: Ra = 82.5 AvgR = 75.7 TM30:Rf=83 Rg=97

EEL: 0.13027 A+

R1 =82 R2 =86 R3 =88 R4 =84 R5 =83 R6 =81 R7 =87

R8 =69 R9 =10 R10=66 R11=84 R12=62 R13=83 R14=94 R15=77

## 4.1 Integrating Sphere Test

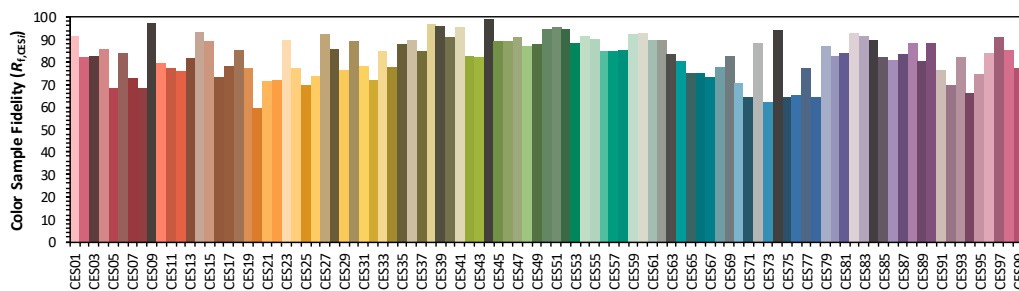
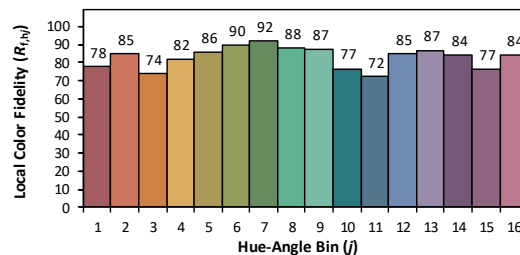
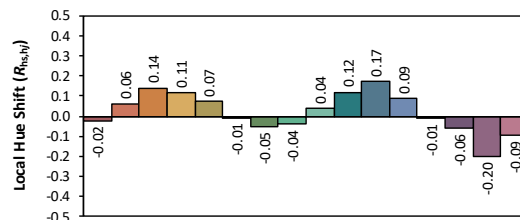
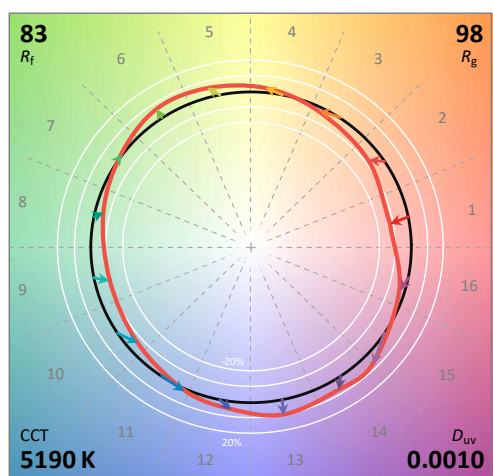
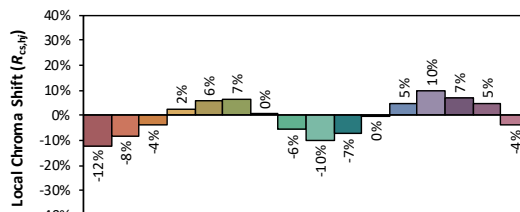
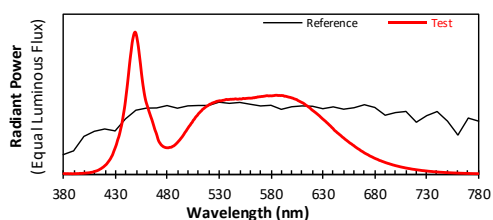
### ANSI/IES TM-30-18 Color Rendition Report

Source: 1 CIE F1

Manufacturer: RAB Lighting Inc.

Date: 2024/12/20

Model: BULLET12 @12W5000K



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

$x$  0.3401  
 $y$  0.3495  
 $u'$  0.2088  
 $v'$  0.4829

CIE 13.3-1995  
(CRI)  
 $R_a$  83  
 $R_g$  10



## 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	5.80E-06	447	9.62E-04	514	4.56E-04	581	5.51E-04	648	2.69E-04	715	3.89E-05
381	5.60E-06	448	9.90E-04	515	4.61E-04	582	5.52E-04	649	2.62E-04	716	3.76E-05
382	5.50E-06	449	9.97E-04	516	4.67E-04	583	5.52E-04	650	2.57E-04	717	3.63E-05
383	5.10E-06	450	9.78E-04	517	4.72E-04	584	5.54E-04	651	2.51E-04	718	3.55E-05
384	5.70E-06	451	9.39E-04	518	4.78E-04	585	5.55E-04	652	2.44E-04	719	3.44E-05
385	4.70E-06	452	8.93E-04	519	4.81E-04	586	5.55E-04	653	2.39E-04	720	3.32E-05
386	5.10E-06	453	8.32E-04	520	4.86E-04	587	5.53E-04	654	2.33E-04	721	3.23E-05
387	5.40E-06	454	7.72E-04	521	4.92E-04	588	5.54E-04	655	2.28E-04	722	3.12E-05
388	4.30E-06	455	7.06E-04	522	4.94E-04	589	5.52E-04	656	2.22E-04	723	3.02E-05
389	4.90E-06	456	6.49E-04	523	4.99E-04	590	5.53E-04	657	2.17E-04	724	2.93E-05
390	5.10E-06	457	5.99E-04	524	5.02E-04	591	5.52E-04	658	2.13E-04	725	2.82E-05
391	5.40E-06	458	5.54E-04	525	5.04E-04	592	5.52E-04	659	2.06E-04	726	2.72E-05
392	5.40E-06	459	5.19E-04	526	5.07E-04	593	5.48E-04	660	2.02E-04	727	2.65E-05
393	5.90E-06	460	4.94E-04	527	5.10E-04	594	5.48E-04	661	1.96E-04	728	2.59E-05
394	5.60E-06	461	4.72E-04	528	5.13E-04	595	5.46E-04	662	1.91E-04	729	2.49E-05
395	6.60E-06	462	4.47E-04	529	5.14E-04	596	5.44E-04	663	1.86E-04	730	2.42E-05
396	7.40E-06	463	4.26E-04	530	5.16E-04	597	5.42E-04	664	1.81E-04	731	2.34E-05
397	6.90E-06	464	4.04E-04	531	5.16E-04	598	5.41E-04	665	1.76E-04	732	2.25E-05
398	7.80E-06	465	3.84E-04	532	5.15E-04	599	5.39E-04	666	1.71E-04	733	2.18E-05
399	7.80E-06	466	3.60E-04	533	5.18E-04	600	5.36E-04	667	1.66E-04	734	2.11E-05
400	9.00E-06	467	3.36E-04	534	5.20E-04	601	5.35E-04	668	1.62E-04	735	2.06E-05
401	9.20E-06	468	3.12E-04	535	5.21E-04	602	5.31E-04	669	1.57E-04	736	2.00E-05
402	1.02E-05	469	2.93E-04	536	5.23E-04	603	5.29E-04	670	1.52E-04	737	1.89E-05
403	1.07E-05	470	2.71E-04	537	5.26E-04	604	5.26E-04	671	1.48E-04	738	1.89E-05
404	1.14E-05	471	2.45E-04	538	5.24E-04	605	5.24E-04	672	1.44E-04	739	1.80E-05
405	1.23E-05	472	2.29E-04	539	5.25E-04	606	5.18E-04	673	1.40E-04	740	1.75E-05
406	1.40E-05	473	2.18E-04	540	5.25E-04	607	5.15E-04	674	1.37E-04	741	1.70E-05
407	1.50E-05	474	2.07E-04	541	5.27E-04	608	5.11E-04	675	1.32E-04	742	1.64E-05
408	1.66E-05	475	2.01E-04	542	5.26E-04	609	5.07E-04	676	1.28E-04	743	1.57E-05
409	1.87E-05	476	1.95E-04	543	5.27E-04	610	5.04E-04	677	1.25E-04	744	1.53E-05
410	2.13E-05	477	1.92E-04	544	5.27E-04	611	5.00E-04	678	1.22E-04	745	1.49E-05
411	2.36E-05	478	1.89E-04	545	5.28E-04	612	4.96E-04	679	1.18E-04	746	1.44E-05
412	2.58E-05	479	1.87E-04	546	5.30E-04	613	4.90E-04	680	1.14E-04	747	1.40E-05
413	2.88E-05	480	1.87E-04	547	5.28E-04	614	4.84E-04	681	1.11E-04	748	1.34E-05
414	3.24E-05	481	1.87E-04	548	5.27E-04	615	4.80E-04	682	1.08E-04	749	1.31E-05
415	3.71E-05	482	1.89E-04	549	5.28E-04	616	4.74E-04	683	1.05E-04	750	1.27E-05
416	4.08E-05	483	1.90E-04	550	5.30E-04	617	4.70E-04	684	1.01E-04	751	1.22E-05
417	4.64E-05	484	1.91E-04	551	5.28E-04	618	4.64E-04	685	9.78E-05	752	1.19E-05
418	5.10E-05	485	1.96E-04	552	5.29E-04	619	4.56E-04	686	9.60E-05	753	1.16E-05
419	5.74E-05	486	1.99E-04	553	5.32E-04	620	4.50E-04	687	9.27E-05	754	1.12E-05
420	6.38E-05	487	2.05E-04	554	5.32E-04	621	4.45E-04	688	9.02E-05	755	1.09E-05
421	7.04E-05	488	2.11E-04	555	5.31E-04	622	4.39E-04	689	8.75E-05	756	1.05E-05
422	7.95E-05	489	2.18E-04	556	5.33E-04	623	4.34E-04	690	8.48E-05	757	1.02E-05
423	8.92E-05	490	2.26E-04	557	5.33E-04	624	4.28E-04	691	8.20E-05	758	1.00E-05
424	9.91E-05	491	2.34E-04	558	5.34E-04	625	4.22E-04	692	7.98E-05	759	9.50E-06
425	1.10E-04	492	2.42E-04	559	5.35E-04	626	4.16E-04	693	7.73E-05	760	9.30E-06
426	1.24E-04	493	2.52E-04	560	5.34E-04	627	4.10E-04	694	7.54E-05	761	9.00E-06
427	1.37E-04	494	2.61E-04	561	5.35E-04	628	4.02E-04	695	7.29E-05	762	8.80E-06
428	1.57E-04	495	2.71E-04	562	5.35E-04	629	3.96E-04	696	7.07E-05	763	8.50E-06
429	1.76E-04	496	2.82E-04	563	5.38E-04	630	3.89E-04	697	6.85E-05	764	8.20E-06
430	1.95E-04	497	2.94E-04	564	5.37E-04	631	3.83E-04	698	6.61E-05	765	8.00E-06
431	2.16E-04	498	3.04E-04	565	5.40E-04	632	3.76E-04	699	6.44E-05	766	7.80E-06
432	2.42E-04	499	3.15E-04	566	5.39E-04	633	3.70E-04	700	6.22E-05	767	7.50E-06
433	2.63E-04	500	3.26E-04	567	5.43E-04	634	3.63E-04	701	6.04E-05	768	7.30E-06
434	2.90E-04	501	3.37E-04	568	5.43E-04	635	3.57E-04	702	5.87E-05	769	7.10E-06
435	3.22E-04	502	3.46E-04	569	5.44E-04	636	3.49E-04	703	5.69E-05	770	6.80E-06
436	3.54E-04	503	3.57E-04	570	5.45E-04	637	3.43E-04	704	5.51E-05	771	6.70E-06
437	3.96E-04	504	3.66E-04	571	5.46E-04	638	3.36E-04	705	5.32E-05	772	6.50E-06
438	4.41E-04	505	3.79E-04	572	5.46E-04	639	3.28E-04	706	5.17E-05	773	6.10E-06
439	4.88E-04	506	3.87E-04	573	5.48E-04	640	3.22E-04	707	5.01E-05	774	6.10E-06
440	5.46E-04	507	3.98E-04	574	5.49E-04	641	3.12E-04	708	4.86E-05	775	5.80E-06
441	6.07E-04	508	4.07E-04	575	5.50E-04	642	3.05E-04	709	4.71E-05	776	5.70E-06
442	6.71E-04	509	4.15E-04	576	5.52E-04	643	3.00E-04	710	4.54E-05	777	5.70E-06
443	7.41E-04	510	4.25E-04	577	5.51E-04	644	2.93E-04	711	4.42E-05	778	5.40E-06
444	8.08E-04	511	4.32E-04	578	5.50E-04	645	2.87E-04	712	4.29E-05	779	5.40E-06
445	8.65E-04	512	4.40E-04	579	5.51E-04	646	2.81E-04	713	4.15E-05	780	5.40E-06
446	9.24E-04	513	4.47E-04	580	5.51E-04	647	2.75E-04	714	4.05E-05	N/A	N/A



## 4.0 LM-79 Measurement and Test Results

### 4.2 Goniophotometer Test

<b>Model No.</b>	BULLET12 @12W5000K	<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>	41.3

<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

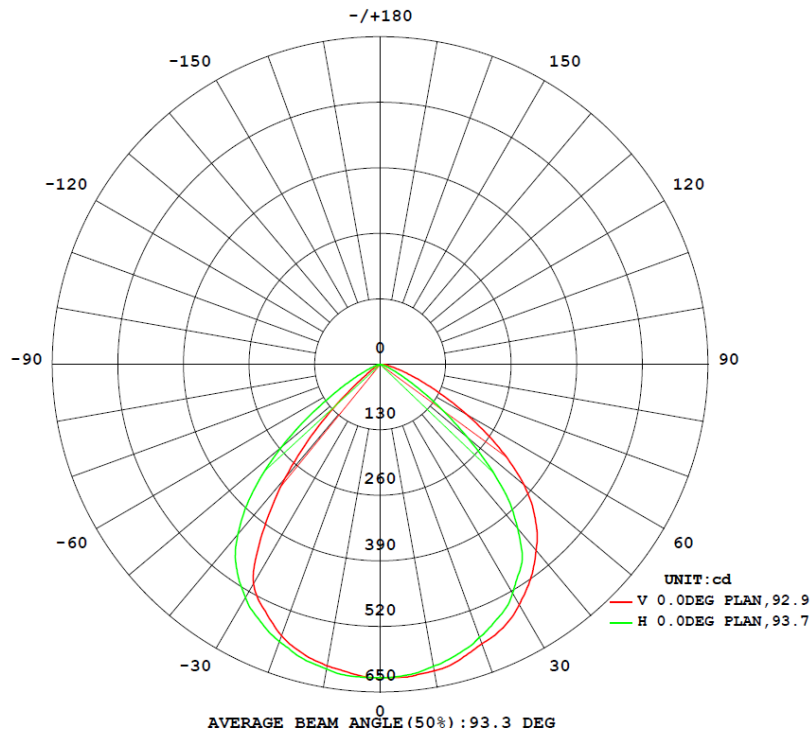
Condition	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
<b>WORST CASE</b>	120.0	60	0.100	11.9	0.990
<b>NON-WORST CASE</b>	N/A	N/A	N/A	N/A	N/A

### Test Result

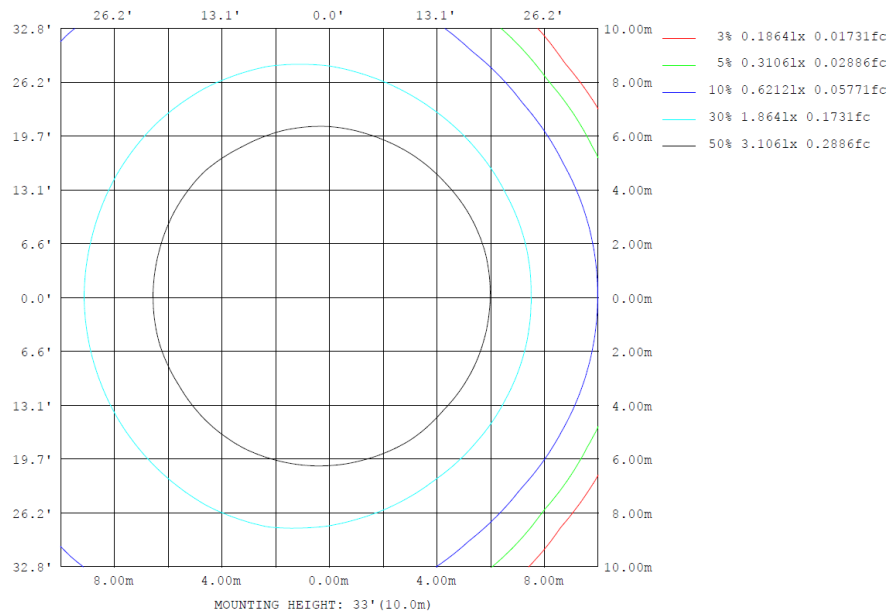
Flux (lm)	Field Angle (10%)		Beam Angle (50%)		Luminous Efficacy (lm/W)	Zonal Lumen Requirement	NEMA Type
	C0-180	C90-270	C0-180	C90-270		(0°-90°)	
1239	124.0	125.9	92.6	94.9	104.1	100.0%	6H x 6V

## 4.2 Goniophotometer Test

### Lighting Distribution Curve



### Isolux Plot



## 4.2 Goniophotometer Test

### Zonal Lumen Summary

ZONAL FLUX DIAGRAM:

$\gamma$	C0	C45	C90	C135	C180	C225	C270	C315	$\gamma$	$\Phi$ zone	$\Phi$ total	%lum, lamp
10	607.0	606.6	608.0	612.2	617.2	616.5	613.7	610.6	0- 10	58.83	58.83	4.75, 4.75
20	572.8	573.9	576.0	584.8	589.9	594.5	585.2	580.9	10- 20	169.3	228.1	18.4, 18.4
30	503.2	499.0	524.9	541.5	551.0	552.8	534.3	510.1	20- 30	257.1	485.2	39.2, 39.2
40	292.4	311.2	423.9	473.4	481.0	483.1	439.0	320.6	30- 40	295.0	780.1	63, 63
50	73.03	77.51	226.4	362.7	372.8	372.3	256.7	89.93	40- 50	243.7	1024	82.7, 82.7
60	13.38	19.16	66.48	180.4	197.7	200.5	79.67	20.38	50- 60	140.2	1164	94, 94
70	0.0125	0.6845	14.60	55.37	67.23	65.86	18.16	0.8837	60- 70	56.12	1220	98.5, 98.5
80	0.0130	0.0133	2.446	12.39	17.74	13.96	3.117	0.0218	70- 80	15.49	1236	99.8, 99.8
90	0	0	0	0	0	0	0	0	80- 90	2.990	1239	100, 100
100	0	0	0	0	0	0	0	0	90-100	0	1239	100, 100
110	0	0	0	0	0	0	0	0	100-110	0	1239	100, 100
120	0	0	0	0	0	0	0	0	110-120	0	1239	100, 100
130	0	0	0	0	0	0	0	0	120-130	0	1239	100, 100
140	0	0	0	0	0	0	0	0	130-140	0	1239	100, 100
150	0	0	0	0	0	0	0	0	140-150	0	1239	100, 100
160	0	0	0	0	0	0	0	0	150-160	0	1239	100, 100
170	0	0	0	0	0	0	0	0	160-170	0	1239	100, 100
180	0	0	0	0	0	0	0	0	170-180	0	1239	100, 100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

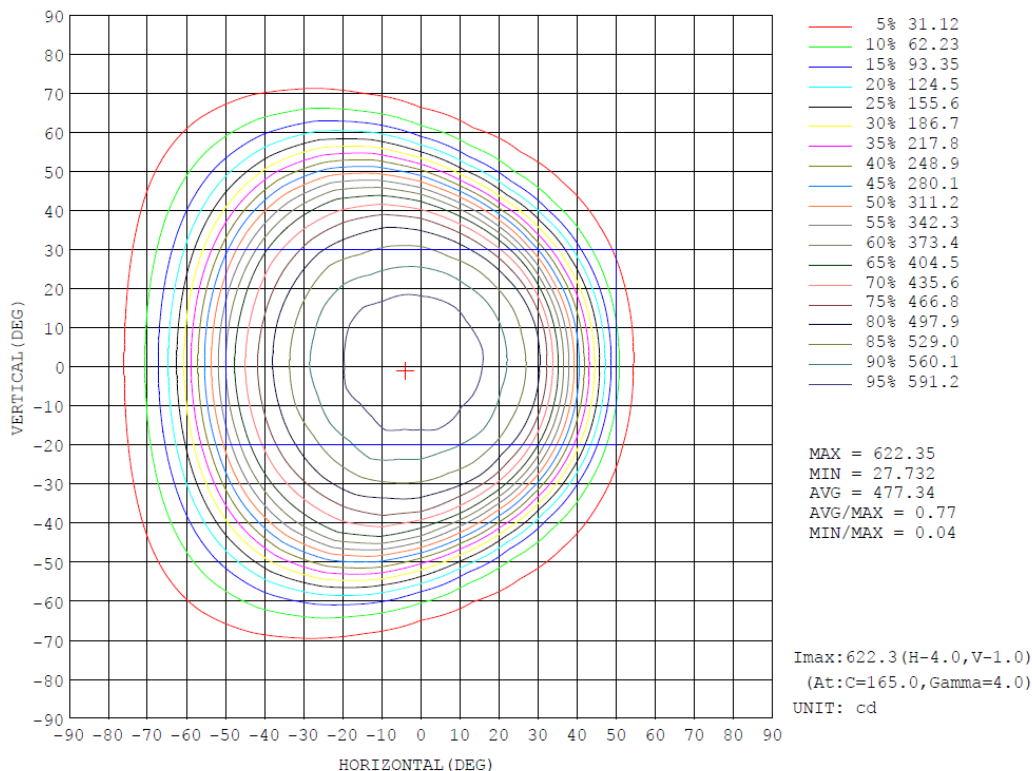
Zonal (lm)		Total (lm) Percent	
0-10	58.83	0-10	58.83 4.75%
10-20	169.27	0-20	228.10 18.41%
20-30	257.05	0-30	485.15 39.17%
30-40	294.99	0-40	780.14 62.98%
40-50	243.70	0-50	1023.84 82.66%
50-60	140.24	0-60	1164.08 93.98%
60-70	56.12	0-70	1220.20 98.51%
70-80	15.49	0-80	1235.69 99.76%
80-90	2.99	0-90	1238.68 100.00%
90-100	0.00	0-100	1238.68 100.00%
100-110	0.00	0-110	1238.68 100.00%
110-120	0.00	0-120	1238.68 100.00%
120-130	0.00	0-130	1238.68 100.00%
130-140	0.00	0-140	1238.68 100.00%
140-150	0.00	0-150	1238.68 100.00%
150-160	0.00	0-160	1238.68 100.00%
160-170	0.00	0-170	1238.68 100.00%
170-180	0.00	0-180	1238.68 100.00%

## 4.2 Goniophotometer Test

### Area Flux Diagram

		AREA FLUX DIAGRAM																UNIT: lm				Φ t	Φ a
VERTICAL (DEG)	90	0.00	0.02	0.05	0.07	0.09	0.09	0.09	0.07	0.05	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.56	0.00		
	80	0.01	0.05	0.12	0.22	0.35	0.46	0.51	0.45	0.34	0.22	0.11	0.04	0.01	0.00	0.00	0.00	0.00	0.00	2.90	0.00		
	70	0.01	0.08	0.24	0.55	1.04	1.61	2.07	2.06	1.62	1.02	0.56	0.27	0.08	0.01	0.00	0.00	0.00	0.00	11.2	5.22		
	60	0.02	0.12	0.42	1.12	2.38	4.07	5.59	6.21	5.57	3.96	2.14	0.98	0.42	0.10	0.00	0.00	0.00	0.00	33.1	30.0		
	50	0.02	0.16	0.67	1.97	4.36	7.34	9.84	11.2	11.2	9.66	6.59	3.23	1.17	0.39	0.06	0.00	0.00	0.00	67.9	65.9		
	40	0.02	0.21	0.96	2.99	6.42	9.98	12.7	14.4	15.1	14.4	12.1	7.76	3.25	0.87	0.19	0.01	0.00	0.00	101	99.9		
	30	0.03	0.26	1.26	3.96	7.96	11.6	14.4	16.1	17.0	16.8	15.3	11.9	6.29	1.82	0.34	0.02	0.00	0.00	125	124		
	20	0.03	0.30	1.50	4.66	8.86	12.5	15.4	17.3	18.2	18.1	16.8	14.1	8.81	3.01	0.49	0.04	0.00	0.00	140	139		
	10	0.03	0.31	1.63	5.01	9.28	12.9	15.8	17.8	18.7	18.6	17.4	14.8	10.0	3.74	0.58	0.06	0.00	0.00	147	146		
	0	0.03	0.31	1.62	4.97	9.25	12.8	15.7	17.7	18.7	18.5	17.3	14.8	9.93	3.70	0.57	0.06	0.00	0.00	146	145		
	-10	0.03	0.29	1.46	4.55	8.75	12.3	15.1	17.1	18.0	17.9	16.6	13.9	8.67	2.90	0.46	0.04	0.00	0.00	138	137		
	-20	0.03	0.25	1.21	3.79	7.77	11.4	14.1	16.0	16.8	16.5	15.1	11.6	6.18	1.66	0.32	0.02	0.00	0.00	123	122		
	-30	0.02	0.21	0.91	2.81	6.17	9.72	12.4	14.2	14.7	14.1	11.6	7.39	2.97	0.78	0.18	0.01	0.00	0.00	98.1	96.7		
	-40	0.02	0.16	0.62	1.81	4.04	6.95	9.48	10.9	10.7	9.03	6.05	2.88	1.05	0.37	0.05	0.00	0.00	0.00	64.1	62.0		
	-50	0.02	0.11	0.39	1.01	2.10	3.55	4.87	5.39	4.82	3.39	1.82	0.88	0.39	0.09	0.00	0.00	0.00	0.00	28.8	25.4		
	-60	0.01	0.08	0.22	0.49	0.89	1.33	1.64	1.62	1.30	0.85	0.50	0.24	0.07	0.01	0.00	0.00	0.00	0.00	9.25	2.90		
	-70	0.01	0.05	0.12	0.21	0.31	0.39	0.41	0.36	0.27	0.18	0.09	0.03	0.01	0.00	0.00	0.00	0.00	0.00	2.44	0.00		
	-80	0.00	0.02	0.05	0.07	0.08	0.09	0.08	0.06	0.04	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.51	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	0.00		
		-90	-80	-70	-60	-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90			
Φ t	0	0.34	3.00	13.4	40.3	80.1	119	150	169	173	163	140	105	59.3	19.4	3.24	0.26	0.00	0.00	1239	---		
Φ a	0	0.00	0.08	10.2	37.6	77.7	117	148	166	171	161	137	102	56.5	16.2	0.15	0.00	0.00	0.00	---	1200		

### Isocandela



## 4.2 Goniophotometer Test

### Luminous Distribution Intensity Data

Table--1

UNIT: cd

H (DEG)	-90	-85	-80	-75	-70	-65	-60	-55	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0
V (DEG)	-180	-170	-160	-150	-140	-130	-120	-110	-100	-90	-80	-70	-60	-50	-40	-30	-20	-10	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	2.50	3.68	4.64	5.43	6.13	6.87	7.22	7.45	7.65	7.52	7.21	6.80	6.25	5.52	4.63	3.97	3.24	2.45
-70	0.00	3.77	5.79	7.84	9.88	12.2	15.0	17.9	20.9	24.0	26.5	28.2	29.1	28.9	27.3	24.5	21.8	18.5	14.6
-60	0.00	4.76	7.83	11.4	16.0	22.1	30.2	40.0	50.6	63.4	76.3	87.1	96.8	104	105	103	95.2	82.6	66.5
-50	0.00	5.67	9.89	15.8	24.4	37.0	53.9	76.5	103	136	173	208	238	264	277	280	275	255	226
-40	0.00	6.45	12.0	20.9	34.9	55.8	86.0	128	179	238	295	345	383	412	431	441	446	438	424
-30	0.00	7.11	14.0	26.0	46.0	77.6	124	186	259	330	387	430	462	488	507	518	525	527	525
-20	0.00	7.61	15.9	30.7	56.4	98.1	160	238	320	389	442	481	509	533	552	567	575	577	576
-10	0.00	7.93	17.2	34.1	64.2	114	187	273	358	423	471	508	540	563	581	591	604	610	608
0	0.00	8.05	17.7	35.4	67.2	120	198	287	373	435	481	520	551	576	590	607	617	622	621
10	0.00	7.93	17.3	34.4	65.0	116	190	278	362	426	473	513	542	570	588	601	611	612	614
20	0.00	7.61	16.0	31.4	58.1	102	166	246	328	397	448	486	518	544	564	573	579	583	585
30	0.00	7.11	14.2	26.8	48.1	81.5	131	197	270	339	397	440	471	497	514	524	532	535	534
40	0.00	6.44	12.1	21.8	36.8	59.6	92.8	138	193	252	309	356	392	419	438	448	455	450	439
50	0.00	5.67	9.96	16.4	26.0	39.7	58.6	84.0	115	151	192	229	259	286	299	303	297	280	257
60	0.00	4.77	7.82	11.6	16.9	23.9	32.9	44.2	57.3	73.1	90.0	105	119	129	130	127	118	101	79.7
70	0.00	3.80	5.78	7.82	10.0	12.7	15.9	20.0	23.8	27.9	31.5	34.2	36.6	36.7	34.7	31.1	27.6	23.3	18.2
80	0.00	2.55	3.74	4.67	5.44	6.14	6.80	7.29	7.73	8.09	8.16	7.99	7.62	7.14	6.49	5.60	4.87	4.03	3.12
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)		UNIT: cd																	
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	1.88	1.29	0.73	0.49	0.27	0.10	0.06	0.03	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.00	
-70	12.3	9.84	7.30	5.00	2.88	1.35	0.65	0.21	0.03	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	
-60	53.7	40.2	29.7	23.6	17.4	11.9	6.73	2.55	0.77	0.14	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.00	
-50	193	153	113	77.5	48.1	35.2	25.8	17.0	9.16	2.99	0.36	0.01	0.01	0.01	0.01	0.01	0.01	0.00	
-40	397	358	308	244	176	110	63.9	36.9	24.5	13.5	5.17	0.65	0.01	0.01	0.01	0.01	0.01	0.00	
-30	516	501	473	425	357	272	180	94.2	44.1	26.1	13.4	3.90	0.22	0.01	0.01	0.01	0.01	0.00	
-20	571	560	544	520	479	403	306	198	95.9	38.3	21.3	8.56	1.09	0.01	0.01	0.01	0.01	0.00	
-10	605	593	581	557	528	480	382	268	152	61.5	26.8	12.1	2.28	0.01	0.01	0.01	0.01	0.00	
0	616	607	594	573	540	503	407	292	173	73.0	28.8	13.4	2.77	0.01	0.01	0.01	0.01	0.00	
10	610	598	586	564	531	489	386	270	155	64.7	27.6	12.4	2.36	0.01	0.01	0.01	0.01	0.00	
20	581	569	552	527	491	414	308	202	106	43.3	22.3	8.98	1.18	0.01	0.01	0.01	0.01	0.00	
30	523	509	483	440	370	279	189	107	51.6	27.7	14.3	4.25	0.26	0.01	0.01	0.01	0.01	0.00	
40	414	378	327	260	191	124	71.8	41.4	26.0	14.5	5.49	0.77	0.01	0.02	0.02	0.02	0.02	0.00	
50	219	173	129	89.4	57.1	39.3	27.3	18.1	9.77	3.41	0.44	0.02	0.02	0.02	0.02	0.02	0.02	0.00	
60	64.1	47.2	33.7	25.8	18.7	12.7	7.42	2.97	0.93	0.20	0.03	0.02	0.02	0.02	0.03	0.03	0.03	0.00	
70	14.9	11.5	8.25	5.78	3.45	1.68	0.82	0.28	0.04	0.03	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.00	
80	2.40	1.66	0.94	0.63	0.35	0.13	0.08	0.04	0.02	0.03	0.03	0.03	0.03	0.04	0.04	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>	BULLET12 @12W5000K	<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	0.100	11.9	0.990	14.28

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