

## 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		3119
Minimum Luminaire Efficacy (lm/W) (Goniophotometer – Section 4.2)	ANSI/IES LM-79:2019	Standard	Premium	102.6
		105	120	
Power (Input Wattage) (W) (Goniophotometer – Section 4.2)	ANSI/IES LM-79:2019	Worst Case		30.4
Total Harmonic Distortion (A%) (THD & PF – Section 4.3)	ANSI C82.77:2002 ANSI C82-77-10:2020	20.00%	120V	14.31
Power Factor (THD & PF – Section 4.3)	ANSI C82.77:2002 ANSI C82-77-10:2020	0.9	120V	0.989
Allowable CCTs* (K) (Integrating Sphere – Section 4.1)	ANSI/IES LM-79:2019	7 steps	3045±175	3082
		4 steps	3045±100	
Minimum CRI (Integrating Sphere – Section 4.1)	ANSI/IES LM-79:2019 CIE13.3-1995	≥70		82.4
Minimum R9 (Integrating Sphere – Section 4.1)	ANSI/IES LM-79-2019 CIE13.3-1995	N/A		6
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		0.256
(Goniophotometer – Section 4.2)		Non-Worst Case		N/A
Power (Input Wattage – W)				
(Goniophotometer – Section 4.2)	ANSI/IES LM-79:2019	Worst Case		30.4
(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	BULLET2X20 @30W3000K	ES 1st ES #3-4	241216023-S1
2	Goniophotometer Test	2025-02-20	BULLET2X20 @30W3000K	ES 1st ES #3-4	241216023-S1
3	THD and PF Test	2025-02-20	BULLET2X20 @30W3000K	ES 1st ES #3-4	241216023-S1

### Remark (If any):

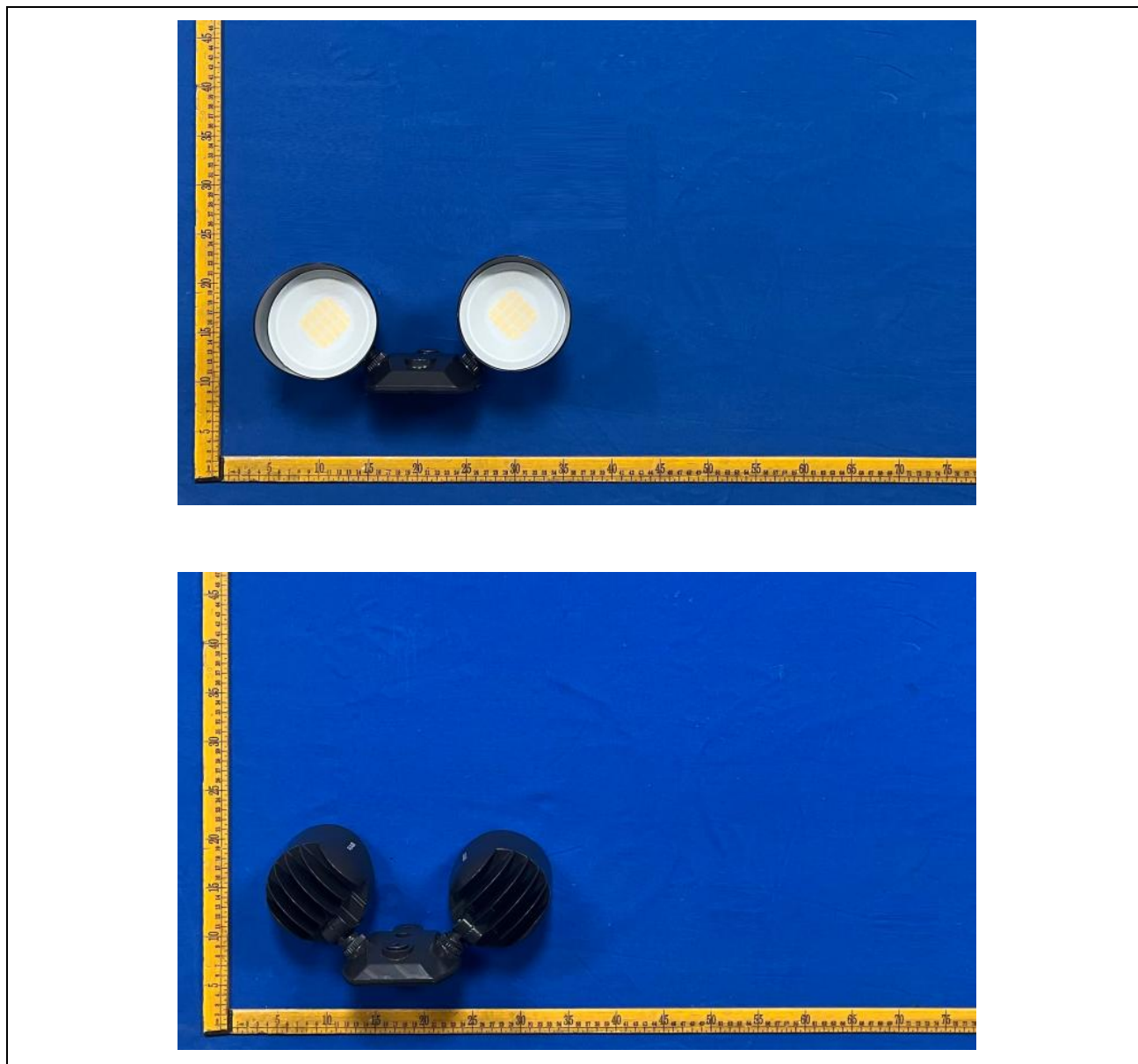
1. The results contained in this report pertain only to the tested samples.
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3. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the U.S. Government.

### 3.0 Product Description

Luminaire Description: Model No. BULLET2X20 @30W3000K, 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>	BULLET2X20 @30W3000K	<b>Sample ID</b>	241216023-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

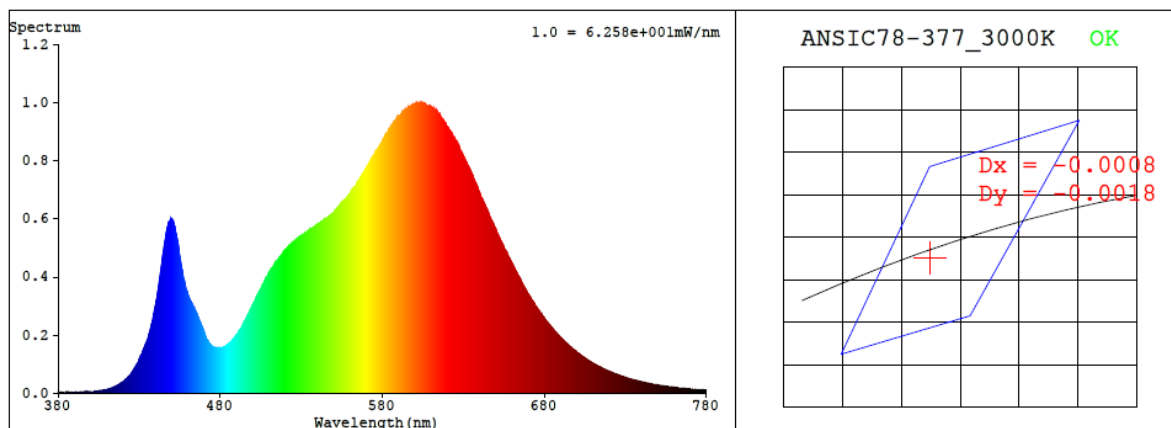
<b>Test Method</b>
<p>The Samples were tested according to the ANSI/IES LM-79:2019.</p> <p>Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25±1°C.</p> <p>The sample measurements were 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	0.256	30.4	0.989

<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>
3082	82.4	6	-0.0006	1.8	84	98	-11%

## 4.1 Integrating Sphere Test



### Colorimetric Parameters

Chromaticity Coordinate:  $x = 0.4304$   $y = 0.4003$  /  $u' = 0.2480$   $v' = 0.5189$  ( $duv = -5.98e-04$ )

CCT= 3082K Prcp WL:  $L_d = 582.7\text{nm}$  Purity=49.3%

Peak WL:  $L_p = 605\text{nm}$  FWHM:  $= 133.9\text{nm}$  Ratio:  $R = 22.4\%$   $G = 75.2\%$   $B = 2.4\%$

Render Index:  $R_a = 82.4$   $\text{Avg}R = 76.3$  TM30:  $R_f = 83$   $R_g = 97$

EEL: 0.13299 A+

R1 =81	R2 =89	R3 =96	R4 =81	R5 =81	R6 =87	R7 =83
R8 =60	R9 =6	R10=76	R11=81	R12=69	R13=83	R14=98 R15=74

## 4.1 Integrating Sphere Test

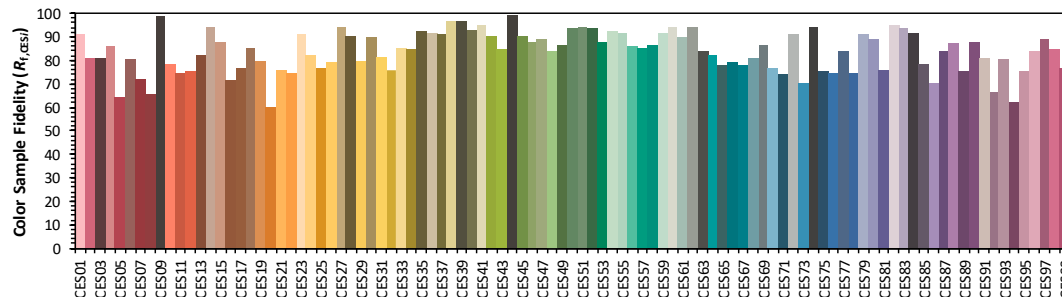
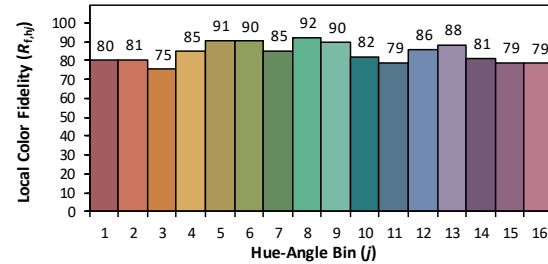
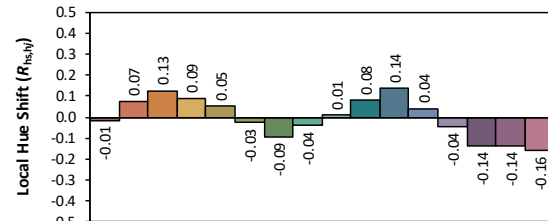
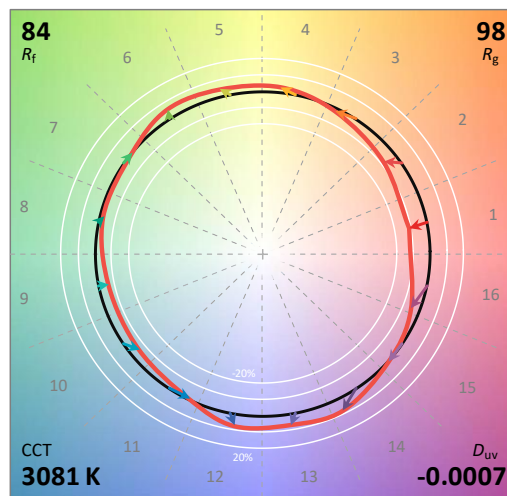
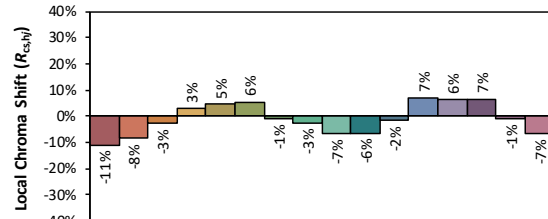
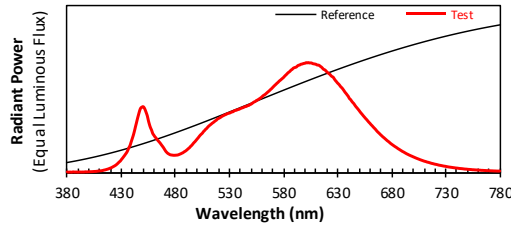
### ANSI/IES TM-30-18 Color Rendition Report

Source: 1 CIE F1

Manufacturer: RAB Lighting Inc.

Date: 2025/2/21

Model: BULLET2X20 @30W3000K



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

$x$  0.4304  
 $y$  0.4001  
 $u'$  0.2480  
 $v'$  0.5188

CIE 13.3-1995  
(CRI)  
 $R_a$  82  
 $R_g$  6



## 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	4.70E-06	447	5.64E-04	514	4.47E-04	581	8.75E-04	648	5.88E-04	715	8.86E-05
381	2.00E-06	448	5.87E-04	515	4.54E-04	582	8.85E-04	649	5.75E-04	716	8.54E-05
382	2.60E-06	449	5.94E-04	516	4.62E-04	583	8.95E-04	650	5.63E-04	717	8.23E-05
383	2.80E-06	450	5.99E-04	517	4.70E-04	584	9.05E-04	651	5.49E-04	718	8.02E-05
384	1.40E-06	451	5.90E-04	518	4.76E-04	585	9.13E-04	652	5.38E-04	719	7.75E-05
385	3.90E-06	452	5.70E-04	519	4.87E-04	586	9.21E-04	653	5.26E-04	720	7.48E-05
386	4.20E-06	453	5.44E-04	520	4.92E-04	587	9.32E-04	654	5.14E-04	721	7.31E-05
387	2.50E-06	454	5.15E-04	521	4.96E-04	588	9.38E-04	655	5.02E-04	722	7.08E-05
388	3.50E-06	455	4.72E-04	522	5.03E-04	589	9.48E-04	656	4.91E-04	723	6.81E-05
389	2.50E-06	456	4.35E-04	523	5.10E-04	590	9.53E-04	657	4.80E-04	724	6.55E-05
390	2.00E-06	457	4.06E-04	524	5.15E-04	591	9.57E-04	658	4.68E-04	725	6.40E-05
391	3.50E-06	458	3.84E-04	525	5.20E-04	592	9.61E-04	659	4.57E-04	726	6.20E-05
392	3.30E-06	459	3.55E-04	526	5.25E-04	593	9.70E-04	660	4.47E-04	727	6.01E-05
393	2.70E-06	460	3.40E-04	527	5.29E-04	594	9.76E-04	661	4.35E-04	728	5.78E-05
394	3.40E-06	461	3.25E-04	528	5.35E-04	595	9.78E-04	662	4.25E-04	729	5.63E-05
395	3.10E-06	462	3.14E-04	529	5.37E-04	596	9.85E-04	663	4.14E-04	730	5.48E-05
396	3.90E-06	463	3.01E-04	530	5.40E-04	597	9.86E-04	664	4.03E-04	731	5.26E-05
397	5.20E-06	464	2.88E-04	531	5.44E-04	598	9.90E-04	665	3.93E-04	732	5.08E-05
398	4.10E-06	465	2.77E-04	532	5.50E-04	599	9.93E-04	666	3.81E-04	733	4.90E-05
399	5.00E-06	466	2.65E-04	533	5.51E-04	600	9.94E-04	667	3.70E-04	734	4.76E-05
400	5.60E-06	467	2.52E-04	534	5.57E-04	601	9.99E-04	668	3.61E-04	735	4.63E-05
401	5.80E-06	468	2.39E-04	535	5.64E-04	602	9.97E-04	669	3.52E-04	736	4.49E-05
402	6.10E-06	469	2.25E-04	536	5.65E-04	603	1.00E-03	670	3.41E-04	737	4.33E-05
403	6.60E-06	470	2.09E-04	537	5.69E-04	604	9.97E-04	671	3.33E-04	738	4.21E-05
404	7.40E-06	471	1.93E-04	538	5.73E-04	605	9.97E-04	672	3.23E-04	739	4.05E-05
405	8.30E-06	472	1.82E-04	539	5.75E-04	606	9.96E-04	673	3.15E-04	740	3.93E-05
406	8.60E-06	473	1.73E-04	540	5.81E-04	607	9.91E-04	674	3.06E-04	741	3.85E-05
407	9.40E-06	474	1.67E-04	541	5.84E-04	608	9.89E-04	675	2.98E-04	742	3.67E-05
408	1.12E-05	475	1.61E-04	542	5.88E-04	609	9.87E-04	676	2.89E-04	743	3.56E-05
409	1.18E-05	476	1.59E-04	543	5.91E-04	610	9.85E-04	677	2.82E-04	744	3.46E-05
410	1.31E-05	477	1.57E-04	544	5.98E-04	611	9.79E-04	678	2.73E-04	745	3.38E-05
411	1.45E-05	478	1.56E-04	545	5.99E-04	612	9.77E-04	679	2.65E-04	746	3.26E-05
412	1.57E-05	479	1.56E-04	546	6.03E-04	613	9.75E-04	680	2.57E-04	747	3.12E-05
413	1.80E-05	480	1.56E-04	547	6.08E-04	614	9.67E-04	681	2.50E-04	748	3.01E-05
414	2.09E-05	481	1.57E-04	548	6.10E-04	615	9.60E-04	682	2.43E-04	749	2.96E-05
415	2.27E-05	482	1.58E-04	549	6.17E-04	616	9.50E-04	683	2.36E-04	750	2.85E-05
416	2.57E-05	483	1.61E-04	550	6.21E-04	617	9.39E-04	684	2.30E-04	751	2.74E-05
417	2.86E-05	484	1.66E-04	551	6.28E-04	618	9.35E-04	685	2.23E-04	752	2.68E-05
418	3.17E-05	485	1.69E-04	552	6.36E-04	619	9.27E-04	686	2.16E-04	753	2.59E-05
419	3.57E-05	486	1.75E-04	553	6.42E-04	620	9.16E-04	687	2.10E-04	754	2.51E-05
420	3.97E-05	487	1.79E-04	554	6.46E-04	621	9.08E-04	688	2.04E-04	755	2.38E-05
421	4.38E-05	488	1.78E-04	555	6.55E-04	622	8.99E-04	689	1.98E-04	756	2.37E-05
422	4.95E-05	489	1.92E-04	556	6.59E-04	623	8.93E-04	690	1.91E-04	757	2.26E-05
423	5.49E-05	490	1.99E-04	557	6.66E-04	624	8.80E-04	691	1.86E-04	758	2.23E-05
424	6.05E-05	491	2.08E-04	558	6.72E-04	625	8.72E-04	692	1.80E-04	759	2.13E-05
425	6.71E-05	492	2.17E-04	559	6.79E-04	626	8.67E-04	693	1.75E-04	760	2.06E-05
426	7.54E-05	493	2.25E-04	560	6.87E-04	627	8.52E-04	694	1.69E-04	761	2.02E-05
427	8.47E-05	494	2.36E-04	561	6.97E-04	628	8.38E-04	695	1.64E-04	762	1.99E-05
428	9.48E-05	495	2.45E-04	562	7.04E-04	629	8.26E-04	696	1.59E-04	763	1.86E-05
429	1.03E-04	496	2.57E-04	563	7.10E-04	630	8.14E-04	697	1.55E-04	764	1.86E-05
430	1.16E-04	497	2.69E-04	564	7.19E-04	631	8.05E-04	698	1.50E-04	765	1.78E-05
431	1.28E-04	498	2.79E-04	565	7.28E-04	632	7.93E-04	699	1.46E-04	766	1.72E-05
432	1.41E-04	499	2.90E-04	566	7.36E-04	633	7.80E-04	700	1.42E-04	767	1.69E-05
433	1.54E-04	500	3.03E-04	567	7.45E-04	634	7.71E-04	701	1.37E-04	768	1.62E-05
434	1.68E-04	501	3.14E-04	568	7.54E-04	635	7.58E-04	702	1.33E-04	769	1.58E-05
435	1.82E-04	502	3.27E-04	569	7.63E-04	636	7.44E-04	703	1.29E-04	770	1.52E-05
436	2.02E-04	503	3.39E-04	570	7.73E-04	637	7.29E-04	704	1.25E-04	771	1.47E-05
437	2.25E-04	504	3.49E-04	571	7.84E-04	638	7.18E-04	705	1.21E-04	772	1.42E-05
438	2.44E-04	505	3.58E-04	572	7.93E-04	639	7.04E-04	706	1.17E-04	773	1.40E-05
439	2.75E-04	506	3.72E-04	573	8.02E-04	640	6.91E-04	707	1.13E-04	774	1.33E-05
440	3.05E-04	507	3.81E-04	574	8.12E-04	641	6.73E-04	708	1.10E-04	775	1.30E-05
441	3.36E-04	508	3.93E-04	575	8.20E-04	642	6.64E-04	709	1.06E-04	776	1.27E-05
442	3.72E-04	509	4.01E-04	576	8.31E-04	643	6.50E-04	710	1.03E-04	777	1.23E-05
443	4.13E-04	510	4.13E-04	577	8.39E-04	644	6.37E-04	711	1.00E-04	778	1.19E-05
444	4.52E-04	511	4.23E-04	578	8.47E-04	645	6.27E-04	712	9.72E-05	779	1.19E-05
445	4.93E-04	512	4.31E-04	579	8.56E-04	646	6.13E-04	713	9.36E-05	780	1.19E-05
446	5.29E-04	513	4.39E-04	580	8.64E-04	647	5.99E-04	714	9.15E-05	N/A	N/A



## 4.0 LM-79 Measurement and Test Results

### 4.2 Goniophotometer Test

Model No.	BULLET2X20 @30W3000K	Sample ID	241216023-S1
Operate time (Min.)	30	Stabilization time (Min.)	60
Temperature (°C)	24.8	Humidity (%RH)	40.1

Test Method
<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

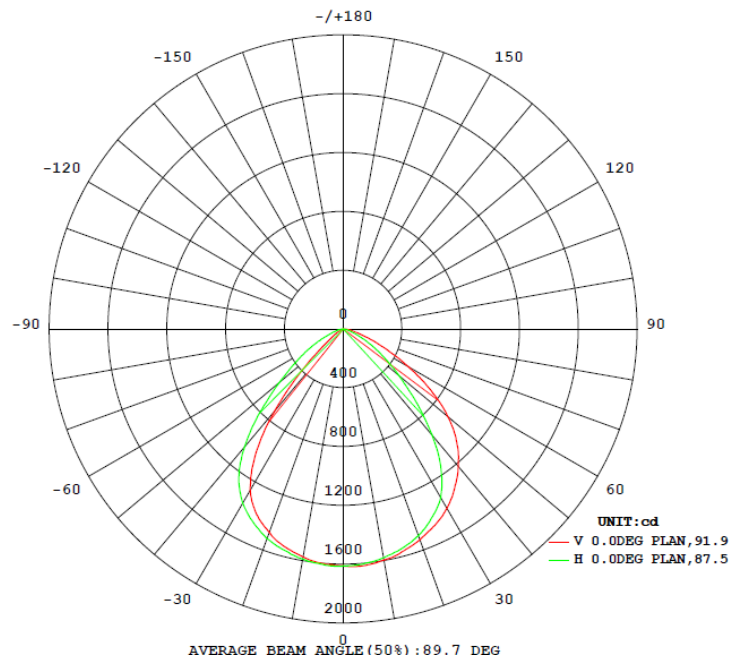
Condition	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
WORST CASE	120.0	60	0.256	30.4	0.989
NON-WORST CASE	N/A	N/A	N/A	N/A	N/A

#### Test Result

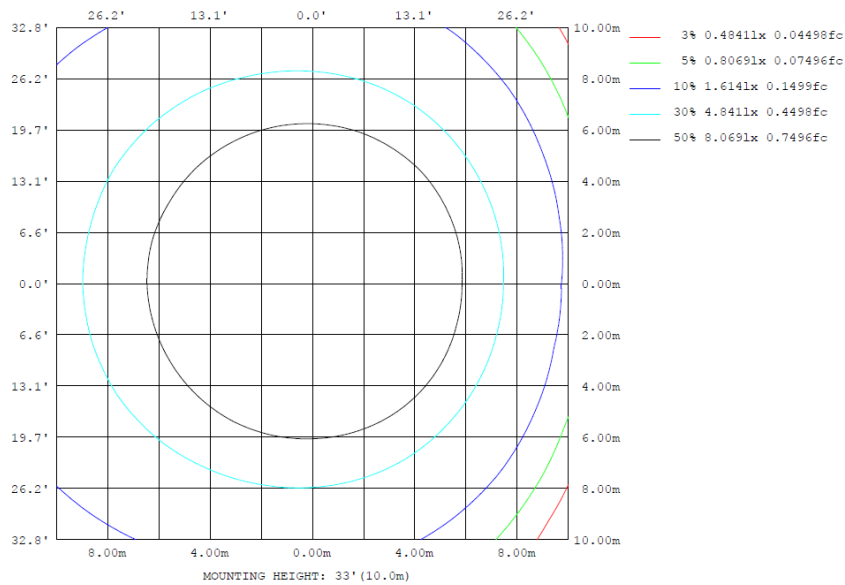
Flux (lm)	Field Angle (10%)		Beam Angle (50%)		Luminous Efficacy (lm/W)	Zonal Lumen Requirement	NEMA Type
	C0-180	C90-270	C0-180	C90-270		(0°-90°)	
3119	123.7	128.5	91.7	87.9	102.6	100.0%	6H x 6V

## 4.2 Goniophotometer Test

### Lighting Distribution Curve



### Isolux Plot



## 4.2 Goniophotometer Test

### Zonal Lumen Summary

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	zone	total	lum, lamp
10	1575	1570	1580	1589	1596	1593	1590	1584	0- 10	152.8	152.8	4.9,4.9
20	1473	1477	1496	1507	1525	1514	1517	1489	10- 20	437.5	590.2	18.9,18.9
30	1266	1300	1325	1368	1410	1395	1368	1328	20- 30	659.7	1250	40.1,40.1
40	723.5	816.0	938.6	1127	1219	1189	1046	898.3	30- 40	741.9	1992	63.9,63.9
50	171.1	301.5	498.1	728.4	932.9	828.8	569.7	382.7	40- 50	591.1	2583	82.8,82.8
60	41.32	77.25	223.4	316.8	509.0	378.4	266.7	109.1	50- 60	341.2	2924	93.8,93.8
70	1.514	15.50	68.32	108.2	178.6	126.2	87.16	21.72	60- 70	144.6	3069	98.4,98.4
80	0.0624	2.773	7.521	18.17	42.96	25.72	16.12	3.989	70- 80	42.85	3112	99.8,99.8
90	0	0	0	0	0	0	0	0	80- 90	6.873	3119	100,100
100	0	0	0	0	0	0	0	0	90-100	0	3119	100,100
110	0	0	0	0	0	0	0	0	100-110	0	3119	100,100
120	0	0	0	0	0	0	0	0	110-120	0	3119	100,100
130	0	0	0	0	0	0	0	0	120-130	0	3119	100,100
140	0	0	0	0	0	0	0	0	130-140	0	3119	100,100
150	0	0	0	0	0	0	0	0	140-150	0	3119	100,100
160	0	0	0	0	0	0	0	0	150-160	0	3119	100,100
170	0	0	0	0	0	0	0	0	160-170	0	3119	100,100
180	0	0	0	0	0	0	0	0	170-180	0	3119	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

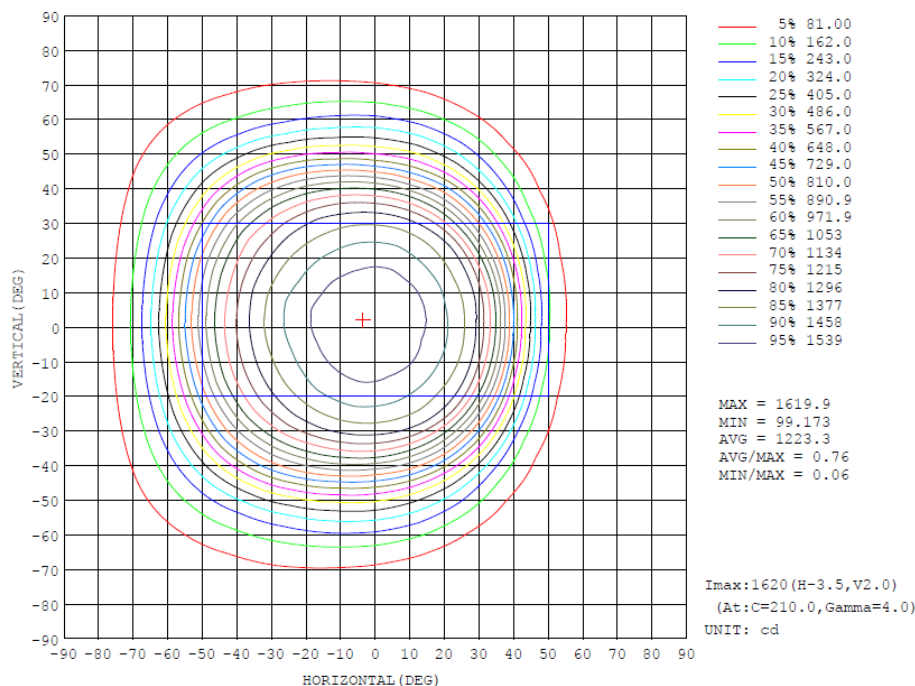
Zonal (lm)		Total (lm)		Percent
0-10	152.77	0-10	152.77	4.90%
10-20	437.46	0-20	590.23	18.93%
20-30	659.73	0-30	1249.96	40.08%
30-40	741.95	0-40	1991.91	63.87%
40-50	591.13	0-50	2583.04	82.83%
50-60	341.25	0-60	2924.29	93.77%
60-70	144.60	0-70	3068.89	98.41%
70-80	42.85	0-80	3111.74	99.78%
80-90	6.87	0-90	3118.61	100.00%
90-100	0.00	0-100	3118.61	100.00%
100-110	0.00	0-110	3118.61	100.00%
110-120	0.00	0-120	3118.61	100.00%
120-130	0.00	0-130	3118.61	100.00%
130-140	0.00	0-140	3118.61	100.00%
140-150	0.00	0-150	3118.61	100.00%
150-160	0.00	0-160	3118.61	100.00%
160-170	0.00	0-170	3118.61	100.00%
170-180	0.00	0-180	3118.61	100.00%

## 4.2 Goniophotometer Test

### Area Flux Diagram

VERTICAL (DEG)	AREA FLUX DIAGRAM																			UNIT: lm			Φ t	Φ a
	0.01	0.05	0.09	0.12	0.13	0.18	0.26	0.31	0.19	0.08	0.05	0.06	0.05	0.02	0.01	0.00	0.00	0.00	1.62	0.00				
90	0.02	0.11	0.24	0.42	0.67	1.05	1.39	1.56	1.53	1.30	0.91	0.52	0.26	0.10	0.03	0.01	0.00	0.00	10.1	0.00				
80	0.03	0.18	0.51	1.15	2.08	3.17	4.19	4.92	5.14	4.64	3.47	2.00	0.88	0.30	0.09	0.01	0.00	0.00	32.7	13.0				
70	0.04	0.28	0.98	2.47	4.75	7.52	10.0	11.8	12.4	11.6	9.25	5.81	2.56	0.79	0.19	0.03	0.00	0.00	80.6	73.2				
60	0.05	0.40	1.64	4.54	9.36	15.2	20.4	23.8	24.9	23.3	19.0	12.5	5.91	1.85	0.40	0.06	0.00	0.00	163	159				
50	0.05	0.53	2.46	7.18	15.1	23.4	30.4	35.2	37.3	36.4	31.4	22.4	11.3	3.46	0.76	0.09	0.00	0.00	257	254				
40	0.06	0.66	3.26	9.86	19.6	28.8	36.1	41.1	43.7	43.5	39.7	31.3	17.9	5.70	1.14	0.14	0.01	0.00	323	320				
30	0.07	0.76	3.91	11.8	22.3	31.6	39.0	44.2	46.9	46.8	43.2	36.3	23.1	7.88	1.46	0.20	0.01	0.00	359	357				
20	0.07	0.82	4.27	12.7	23.3	32.8	40.5	45.8	48.6	48.3	44.8	38.1	25.5	9.05	1.63	0.22	0.00	0.00	377	374				
10	0.07	0.81	4.21	12.5	23.2	32.6	40.1	45.6	48.5	48.1	44.6	37.9	25.1	8.71	1.56	0.21	0.00	0.00	374	371				
0	0.06	0.74	3.73	11.2	21.6	31.0	38.5	43.9	46.7	46.3	42.7	35.7	21.9	6.99	1.33	0.18	0.00	0.00	352	350				
-10	0.06	0.63	3.02	9.01	18.2	27.5	35.0	40.3	43.0	42.5	38.7	29.8	16.1	4.67	0.99	0.12	0.00	0.00	310	307				
-20	0.05	0.50	2.21	6.38	13.4	21.2	28.0	32.8	35.0	34.0	28.9	19.9	9.35	2.65	0.62	0.07	0.00	0.00	235	231				
-30	0.04	0.37	1.46	3.93	8.02	13.0	17.6	20.7	21.8	20.4	16.3	10.2	4.44	1.37	0.31	0.04	0.00	0.00	140	135				
-40	0.04	0.25	0.86	2.11	4.05	6.38	8.65	10.3	10.8	9.90	7.55	4.40	1.81	0.56	0.14	0.02	0.00	0.00	67.9	59.1				
-50	0.03	0.16	0.45	0.96	1.74	2.71	3.59	4.17	4.25	3.68	2.60	1.38	0.59	0.22	0.06	0.01	0.00	0.00	26.6	6.70				
-60	0.02	0.10	0.21	0.35	0.51	0.81	1.10	1.23	1.15	0.90	0.58	0.33	0.17	0.07	0.02	0.00	0.00	0.00	7.54	0.00				
-70	0.01	0.05	0.09	0.11	0.11	0.13	0.17	0.20	0.11	0.04	0.03	0.04	0.03	0.01	0.00	0.00	0.00	0.00	1.11	0.00				
-80																								
-90																								
	-90	-80	-70	-60	-50	-40	-30	-20	HORIZONTAL (DEG)	20	30	40	50	60	70	80	90							
Φ t	0.78	7.39	33.6	96.7	188	279	355	408	432	422	374	289	167	54.4	10.7	1.41	0.05	0.00	0.00	3118	---			
Φ a	0.00	0.27	25.7	89.9	181	272	348	400	425	415	367	282	159	44.1	0.16	0.00	0.00	0.00	0.00	---	3009			

### Isocandela



## 4.2 Goniophotometer Test

## Luminous Distribution Intensity Data

Table--1																			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	0.80	5.85	8.11	9.60	10.41	11.11	11.10	10.8	10.3	9.38	10.5	11.7	13.1	15.1	17.1	18.5	15.3	11.5	7.82										
-70	0.37	12.1	16.1	19.7	23.4	27.7	32.3	37.7	43.8	52.4	61.6	69.6	74.2	76.5	77.2	75.7	72.7	68.3	65.3										
-60	0.10	10.3	16.9	24.6	34.4	47.0	63.6	80.8	103	125	145	167	186	202	217	228	233	231	223										
-50	0.00	12.2	22.0	35.7	56.7	84.8	120	163	212	264	315	367	416	451	482	501	508	510	499										
-40	0.00	13.9	27.3	49.4	85.5	135	201	285	383	489	595	693	774	840	890	928	950	955	938										
-30	0.00	15.7	32.8	64.0	115	193	301	433	585	744	881	998	1094	1173	1231	1279	1310	1326	1325										
-20	0.00	17.1	37.7	77.8	144	250	397	574	766	940	1081	1194	1280	1347	1407	1449	1480	1498	1496										
-10	0.00	18.1	41.2	87.8	167	295	470	678	882	1053	1183	1284	1368	1433	1490	1531	1560	1581	1580										
0	0.00	18.5	43.0	92.4	179	319	509	729	933	1093	1219	1321	1410	1474	1525	1566	1596	1616	1612										
10	0.00	18.1	41.7	89.2	171	304	486	703	910	1072	1195	1306	1390	1453	1502	1540	1571	1589	1590										
20	0.00	17.1	38.5	80.2	151	266	424	620	824	989	1121	1221	1305	1373	1423	1461	1492	1509	1517										
30	0.00	15.8	33.7	67.5	123	213	333	482	652	821	964	1074	1160	1232	1289	1327	1352	1367	1368										
40	0.00	14.1	28.3	52.9	92.9	150	229	324	441	565	684	792	877	944	1001	1035	1054	1060	1046										
50	0.00	12.3	23.0	38.5	63.4	95.6	137	191	249	311	374	437	490	530	565	583	587	587	570										
60	0.00	10.4	17.3	26.7	38.4	53.9	73.0	95.7	121	145	168	194	217	233	250	261	268	271	267										
70	0.00	8.45	12.4	17.0	22.0	26.9	32.4	39.4	47.4	55.9	65.7	74.6	81.9	87.4	91.2	93.3	93.2	91.1	87.2										
80	0.00	5.91	8.28	10.0	11.0	11.7	12.1	12.5	12.8	12.8	15.1	18.1	21.1	23.1	24.6	25.5	26.2	19.5	16.1										
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	5.54	3.54	1.78	2.43	2.98	3.34	2.64	1.99	1.39	0.88	0.48	0.21	0.13	0.09	0.08	0.08	0.07	0.00	
-70	60.4	51.6	42.2	32.9	24.2	17.3	12.6	8.64	5.54	3.42	1.79	0.77	0.36	0.15	0.07	0.08	0.08	0.00	
-60	206	184	155	120	86.7	60.4	38.4	23.4	15.1	9.35	4.95	2.34	0.94	0.28	0.08	0.07	0.08	0.00	
-50	470	429	376	314	246	174	111	67.2	38.3	20.7	10.7	5.08	1.83	0.47	0.14	0.07	0.07	0.00	
-40	909	854	770	662	526	383	248	149	84.4	45.5	22.9	9.60	2.97	0.74	0.21	0.07	0.07	0.00	
-30	1309	1269	1196	1074	914	722	503	289	148	81.5	42.9	17.5	5.10	1.14	0.27	0.08	0.07	0.00	
-20	1485	1450	1403	1341	1236	1030	776	492	249	114	62.3	29.0	8.47	1.55	0.29	0.08	0.07	0.00	
-10	1563	1545	1501	1435	1359	1214	971	655	349	154	77.5	38.2	11.3	1.75	0.26	0.07	0.07	0.00	
0	1602	1575	1534	1473	1393	1266	1042	724	392	171	82.1	41.3	12.3	1.51	0.16	0.06	0.07	0.00	
10	1581	1554	1512	1449	1369	1239	1003	693	381	173	81.7	40.1	12.5	2.11	0.14	0.04	0.09	0.07	
20	1505	1473	1426	1364	1272	1080	839	556	295	135	68.2	32.4	9.97	2.15	0.43	0.11	0.07	0.00	
30	1354	1319	1258	1148	990	808	583	360	195	99.2	50.3	22.2	6.63	1.77	0.42	0.12	0.07	0.00	
40	1010	947	866	764	627	473	321	199	111	57.2	29.2	12.4	4.35	1.21	0.35	0.11	0.08	0.00	
50	547	511	454	384	311	232	155	93.7	53.1	28.2	13.9	6.86	2.73	0.78	0.25	0.10	0.08	0.00	
60	250	228	199	162	124	87.4	56.6	33.5	20.8	12.6	6.79	3.41	1.49	0.50	0.15	0.09	0.09	0.00	
70	79.7	70.9	60.8	48.3	36.3	26.0	18.5	12.2	7.64	4.87	2.71	1.27	0.60	0.25	0.11	0.10	0.10	0.00	
80	12.5	8.77	5.25	2.55	1.39	5.73	4.41	3.23	2.18	1.42	0.80	0.35	0.23	0.16	0.13	0.12	0.09	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>	BULLET2X20 @30W3000K	<b>Sample ID</b>	241216023-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 25±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 was calculated.</p>

### Test Results

<b>Voltage (Vac)</b>	<b>Frequency (Hz)</b>	<b>Current (A)</b>	<b>Power (W)</b>	<b>Power Factor</b>	<b>iTHD(%)</b>
120.0	60	0.256	30.4	0.989	14.31

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