

## 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		2319
Minimum Luminaire Efficacy (lm/W) (Goniophotometer – Section 4.2)	ANSI/IES LM-79:2019	Standard	Premium	107.4
		105	120	
Power (Input Wattage) (W) (Goniophotometer – Section 4.2)	ANSI/IES LM-79:2019	Worst Case		21.6
Total Harmonic Distortion (A%) (THD & PF – Section 4.3)	ANSI C82.77:2002 ANSI C82-77-10:2020	20.00%	120V	13.48
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	3081
		4 steps	3045±100	
Minimum CRI (Integrating Sphere – Section 4.1)	ANSI/IES LM-79:2019 CIE13.3-1995	≥70		82.7
Minimum R9 (Integrating Sphere – Section 4.1)	ANSI/IES LM-79-2019 CIE13.3-1995	N/A		7
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		0.182
(Goniophotometer – Section 4.2)		Non-Worst Case		N/A
Power (Input Wattage – W)				
(Goniophotometer – Section 4.2)	ANSI/IES LM-79:2019	Worst Case		21.6
(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 @20W3000K	ES 1st ES #3-4	241216023-S1
2	Goniophotometer Test	2025-02-20	BULLET2X20 @20W3000K	ES 1st ES #3-4	241216023-S1
3	THD and PF Test	2025-02-20	BULLET2X20 @20W3000K	ES 1st ES #3-4	241216023-S1

### Remark (If any):

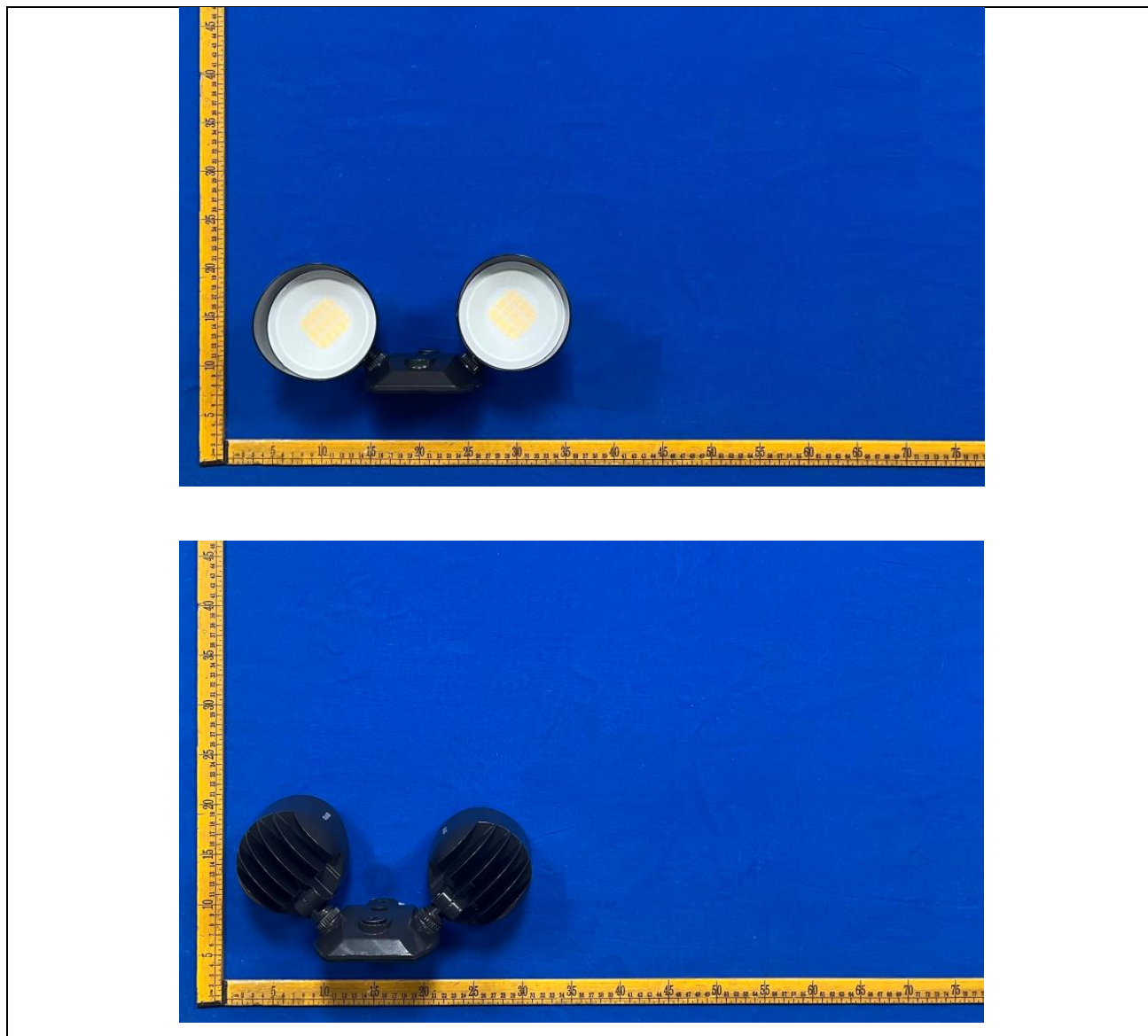
1. The results contained in this report pertain only to the tested samples.
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3. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the U.S. Government.

### 3.0 Product Description

Luminaire Description: Model No. BULLET2X20 @20W3000K, 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 @20W3000K	<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

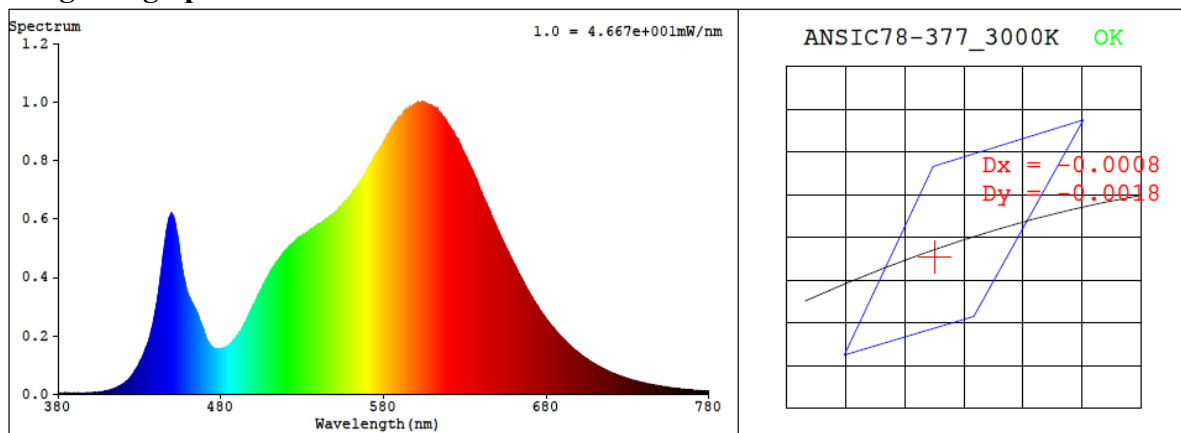
<b>Test Method</b>
<p>The Samples were tested according to the ANSI/IES LM-79:2019.</p> <p>Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25±1°C.</p> <p>The sample measurements were 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 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	0.182	21.6	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>
3081	82.7	7	-0.0006	1.7	84	98	-11%

#### 4.1 Integrating Sphere Test



#### Colorimetric Parameters

Chromaticity Coordinate:  $x = 0.4305$   $y = 0.4003$  /  $u' = 0.2480$   $v' = 0.5189$  ( $duv = -5.95e-04$ )

CCT= 3081K Prcp WL:  $L_d = 582.7\text{nm}$  Purity=49.4%

Peak WL:  $L_p = 603\text{nm}$  FWHM:  $= 134.7\text{nm}$  Ratio: R=22.5% G=75.1% B=2.4%

Render Index:  $R_a = 82.7$  AvgR = 76.7 TM30:  $R_f = 83$   $R_g = 97$

EEL: 0.12698 A+

R1 =81	R2 =90	R3 =96	R4 =82	R5 =81	R6 =87	R7 =84
R8 =60	R9 =7	R10=76	R11=82	R12=69	R13=83	R14=98 R15=74

## 4.1 Integrating Sphere Test

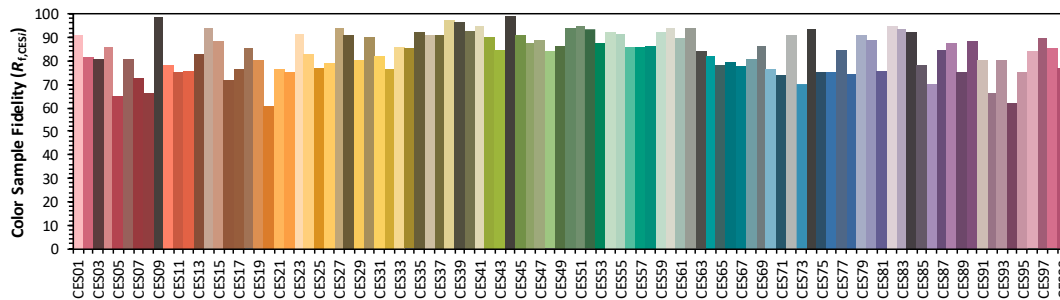
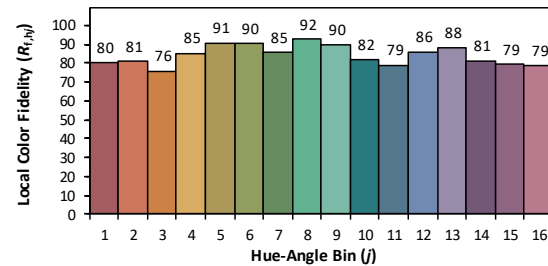
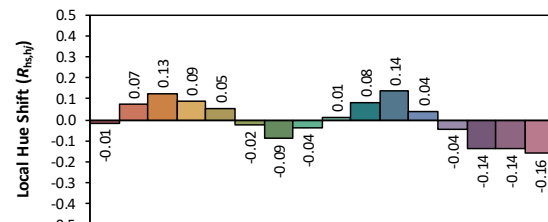
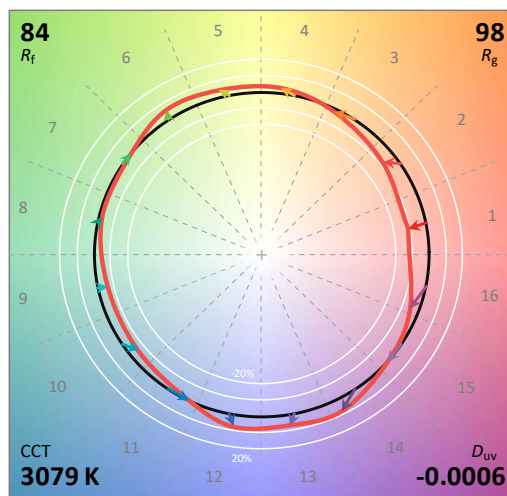
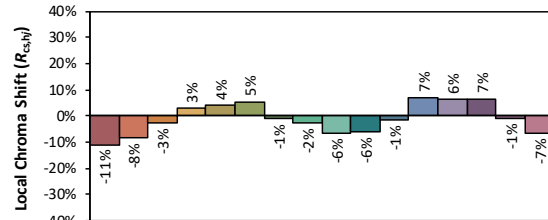
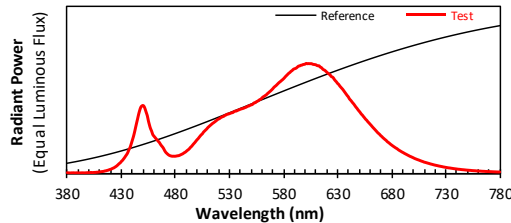
### ANSI/IES TM-30-18 Color Rendition Report

Source: 1 CIE F1

Manufacturer: RAB Lighting Inc.

Date: 2025/2/21

Model: BULLET2X20 @20W3000K



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

$x$  0.4305  
 $y$  0.4002  
 $u'$  0.2481  
 $v'$  0.5189

CIE 13.3-1995  
(CRI)

$R_a$  83  
 $R_g$  7



## 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	5.10E-06	447	5.73E-04	514	4.50E-04	581	8.69E-04	648	5.90E-04	715	8.78E-05
381	3.40E-06	448	6.00E-04	515	4.57E-04	582	8.81E-04	649	5.76E-04	716	8.44E-05
382	2.80E-06	449	6.12E-04	516	4.64E-04	583	8.90E-04	650	5.65E-04	717	8.20E-05
383	2.60E-06	450	6.16E-04	517	4.72E-04	584	9.01E-04	651	5.52E-04	718	7.93E-05
384	3.50E-06	451	6.07E-04	518	4.80E-04	585	9.10E-04	652	5.38E-04	719	7.67E-05
385	3.40E-06	452	5.84E-04	519	4.88E-04	586	9.17E-04	653	5.29E-04	720	7.41E-05
386	4.00E-06	453	5.53E-04	520	4.93E-04	587	9.27E-04	654	5.16E-04	721	7.20E-05
387	2.60E-06	454	5.23E-04	521	4.98E-04	588	9.34E-04	655	5.04E-04	722	6.98E-05
388	3.40E-06	455	4.77E-04	522	5.06E-04	589	9.44E-04	656	4.91E-04	723	6.76E-05
389	3.70E-06	456	4.39E-04	523	5.11E-04	590	9.49E-04	657	4.82E-04	724	6.52E-05
390	2.90E-06	457	4.06E-04	524	5.15E-04	591	9.53E-04	658	4.69E-04	725	6.34E-05
391	3.00E-06	458	3.83E-04	525	5.20E-04	592	9.58E-04	659	4.59E-04	726	6.13E-05
392	2.90E-06	459	3.53E-04	526	5.27E-04	593	9.67E-04	660	4.48E-04	727	5.94E-05
393	3.50E-06	460	3.39E-04	527	5.31E-04	594	9.74E-04	661	4.37E-04	728	5.70E-05
394	3.80E-06	461	3.27E-04	528	5.37E-04	595	9.76E-04	662	4.25E-04	729	5.54E-05
395	3.30E-06	462	3.15E-04	529	5.38E-04	596	9.82E-04	663	4.14E-04	730	5.33E-05
396	3.20E-06	463	3.04E-04	530	5.42E-04	597	9.83E-04	664	4.04E-04	731	5.18E-05
397	3.80E-06	464	2.92E-04	531	5.45E-04	598	9.88E-04	665	3.93E-04	732	4.99E-05
398	4.50E-06	465	2.82E-04	532	5.50E-04	599	9.90E-04	666	3.82E-04	733	4.85E-05
399	5.10E-06	466	2.66E-04	533	5.51E-04	600	9.93E-04	667	3.71E-04	734	4.75E-05
400	4.80E-06	467	2.52E-04	534	5.58E-04	601	9.99E-04	668	3.62E-04	735	4.58E-05
401	5.60E-06	468	2.40E-04	535	5.64E-04	602	9.96E-04	669	3.53E-04	736	4.43E-05
402	7.00E-06	469	2.26E-04	536	5.65E-04	603	9.97E-04	670	3.42E-04	737	4.28E-05
403	5.80E-06	470	2.07E-04	537	5.69E-04	604	9.97E-04	671	3.34E-04	738	4.12E-05
404	6.30E-06	471	1.92E-04	538	5.74E-04	605	9.97E-04	672	3.23E-04	739	4.00E-05
405	7.10E-06	472	1.81E-04	539	5.77E-04	606	9.96E-04	673	3.15E-04	740	3.88E-05
406	7.40E-06	473	1.72E-04	540	5.82E-04	607	9.92E-04	674	3.06E-04	741	3.73E-05
407	8.90E-06	474	1.65E-04	541	5.85E-04	608	9.89E-04	675	2.99E-04	742	3.61E-05
408	9.30E-06	475	1.60E-04	542	5.88E-04	609	9.88E-04	676	2.88E-04	743	3.53E-05
409	1.09E-05	476	1.57E-04	543	5.91E-04	610	9.86E-04	677	2.80E-04	744	3.40E-05
410	1.20E-05	477	1.55E-04	544	5.96E-04	611	9.80E-04	678	2.73E-04	745	3.28E-05
411	1.38E-05	478	1.55E-04	545	5.99E-04	612	9.78E-04	679	2.64E-04	746	3.20E-05
412	1.48E-05	479	1.54E-04	546	6.04E-04	613	9.77E-04	680	2.57E-04	747	3.11E-05
413	1.62E-05	480	1.55E-04	547	6.10E-04	614	9.66E-04	681	2.49E-04	748	3.00E-05
414	1.81E-05	481	1.57E-04	548	6.12E-04	615	9.61E-04	682	2.42E-04	749	2.89E-05
415	2.12E-05	482	1.59E-04	549	6.17E-04	616	9.51E-04	683	2.36E-04	750	2.80E-05
416	2.26E-05	483	1.60E-04	550	6.21E-04	617	9.42E-04	684	2.29E-04	751	2.73E-05
417	2.60E-05	484	1.64E-04	551	6.24E-04	618	9.38E-04	685	2.24E-04	752	2.63E-05
418	2.84E-05	485	1.68E-04	552	6.32E-04	619	9.29E-04	686	2.16E-04	753	2.59E-05
419	3.27E-05	486	1.73E-04	553	6.41E-04	620	9.20E-04	687	2.09E-04	754	2.46E-05
420	3.53E-05	487	1.78E-04	554	6.42E-04	621	9.11E-04	688	2.03E-04	755	2.38E-05
421	3.95E-05	488	1.86E-04	555	6.51E-04	622	9.02E-04	689	1.97E-04	756	2.32E-05
422	4.47E-05	489	1.91E-04	556	6.55E-04	623	8.97E-04	690	1.91E-04	757	2.26E-05
423	4.85E-05	490	1.99E-04	557	6.62E-04	624	8.82E-04	691	1.86E-04	758	2.18E-05
424	5.50E-05	491	2.07E-04	558	6.69E-04	625	8.76E-04	692	1.80E-04	759	2.07E-05
425	6.12E-05	492	2.15E-04	559	6.74E-04	626	8.69E-04	693	1.75E-04	760	2.01E-05
426	6.89E-05	493	2.24E-04	560	6.84E-04	627	8.54E-04	694	1.70E-04	761	1.97E-05
427	7.81E-05	494	2.36E-04	561	6.93E-04	628	8.41E-04	695	1.64E-04	762	1.94E-05
428	8.77E-05	495	2.45E-04	562	6.99E-04	629	8.31E-04	696	1.59E-04	763	1.85E-05
429	9.50E-05	496	2.57E-04	563	7.06E-04	630	8.17E-04	697	1.54E-04	764	1.78E-05
430	1.07E-04	497	2.69E-04	564	7.12E-04	631	8.09E-04	698	1.50E-04	765	1.74E-05
431	1.16E-04	498	2.80E-04	565	7.22E-04	632	7.95E-04	699	1.46E-04	766	1.71E-05
432	1.29E-04	499	2.92E-04	566	7.31E-04	633	7.83E-04	700	1.41E-04	767	1.62E-05
433	1.42E-04	500	3.04E-04	567	7.40E-04	634	7.72E-04	701	1.36E-04	768	1.60E-05
434	1.58E-04	501	3.14E-04	568	7.48E-04	635	7.61E-04	702	1.32E-04	769	1.51E-05
435	1.71E-04	502	3.27E-04	569	7.58E-04	636	7.47E-04	703	1.28E-04	770	1.51E-05
436	1.89E-04	503	3.39E-04	570	7.67E-04	637	7.33E-04	704	1.24E-04	771	1.43E-05
437	2.14E-04	504	3.50E-04	571	7.79E-04	638	7.20E-04	705	1.21E-04	772	1.41E-05
438	2.33E-04	505	3.59E-04	572	7.89E-04	639	7.06E-04	706	1.17E-04	773	1.37E-05
439	2.63E-04	506	3.74E-04	573	7.96E-04	640	6.94E-04	707	1.13E-04	774	1.31E-05
440	2.95E-04	507	3.84E-04	574	8.06E-04	641	6.77E-04	708	1.09E-04	775	1.27E-05
441	3.28E-04	508	3.94E-04	575	8.16E-04	642	6.66E-04	709	1.06E-04	776	1.23E-05
442	3.65E-04	509	4.03E-04	576	8.25E-04	643	6.54E-04	710	1.01E-04	777	1.19E-05
443	4.09E-04	510	4.15E-04	577	8.33E-04	644	6.41E-04	711	9.91E-05	778	1.15E-05
444	4.52E-04	511	4.24E-04	578	8.42E-04	645	6.30E-04	712	9.62E-05	779	1.14E-05
445	4.94E-04	512	4.33E-04	579	8.50E-04	646	6.16E-04	713	9.34E-05	780	1.15E-05
446	5.37E-04	513	4.41E-04	580	8.59E-04	647	6.02E-04	714	9.03E-05	N/A	N/A



## 4.0 LM-79 Measurement and Test Results

### 4.2 Goniophotometer Test

Model No.	BULLET2X20 @20W3000K	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

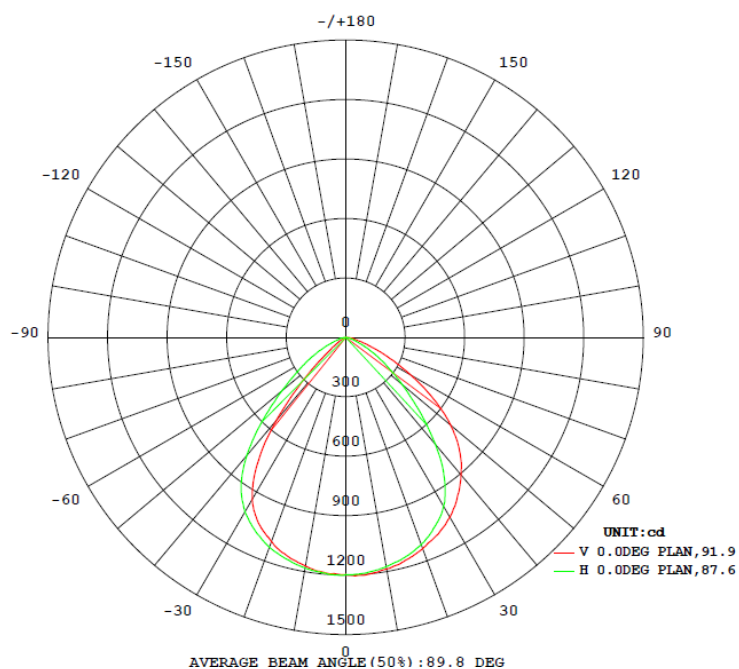
Condition	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
WORST CASE	120.0	60	0.182	21.6	0.991
NON-WORST CASE	N/A	N/A	N/A	N/A	N/A

#### Test Result

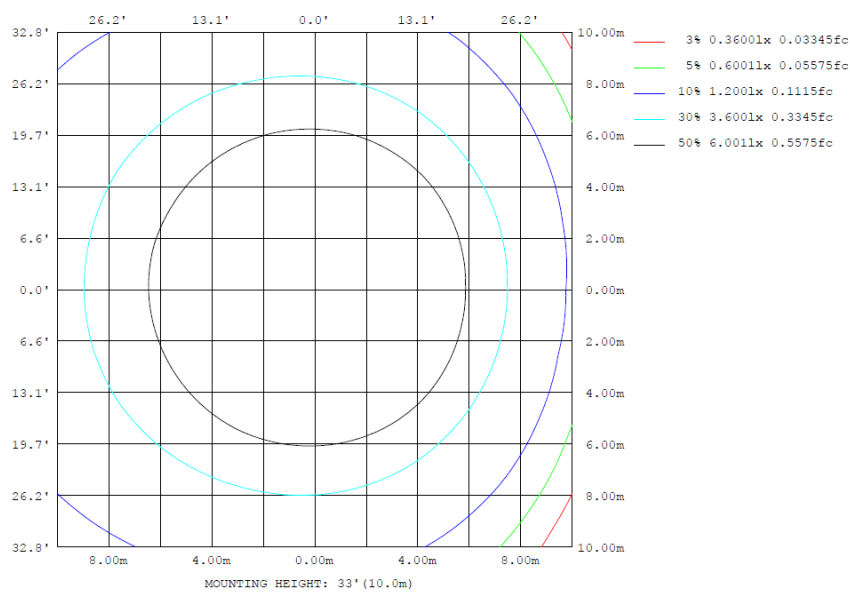
Flux (lm)	Field Angle (10%)		Beam Angle (50%)		Luminous Efficacy (lm/W)	Zonal Lumen Requirement	NEMA Type
	C0-180	C90-270	C0-180	C90-270		(0°-90°)	
2319	123.7	128.5	91.7	87.9	107.4	100.0%	6H x 6V

## 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	φ zone	φ total	%lum, lamp
10	1171	1169	1175	1182	1186	1185	1182	1178	0- 10	113.6	113.6	4.9,4.9
20	1096	1100	1113	1120	1134	1125	1127	1106	10- 20	325.3	438.9	18.9,18.9
30	943.2	968.4	985.9	1018	1048	1036	1016	986.2	20- 30	490.6	929.5	40.1,40.1
40	542.4	611.5	701.7	839.5	904.7	885.2	775.7	665.5	30- 40	552.0	1481	63.9,63.9
50	129.3	226.6	372.8	544.0	691.1	615.3	421.1	282.6	40- 50	440.0	1921	82.8,82.8
60	31.09	57.05	167.3	237.6	376.6	279.8	196.7	80.39	50- 60	253.7	2175	93.8,93.8
70	1.155	11.65	50.37	82.03	131.9	93.05	63.94	15.58	60- 70	107.3	2282	98.4,98.4
80	0.0462	2.092	6.081	13.77	31.74	18.77	11.29	2.916	70- 80	31.77	2314	99.8,99.8
90	0	0	0	0	0	0	0	0	80- 90	5.084	2319	100,100
100	0	0	0	0	0	0	0	0	90-100	0	2319	100,100
110	0	0	0	0	0	0	0	0	100-110	0	2319	100,100
120	0	0	0	0	0	0	0	0	110-120	0	2319	100,100
130	0	0	0	0	0	0	0	0	120-130	0	2319	100,100
140	0	0	0	0	0	0	0	0	130-140	0	2319	100,100
150	0	0	0	0	0	0	0	0	140-150	0	2319	100,100
160	0	0	0	0	0	0	0	0	150-160	0	2319	100,100
170	0	0	0	0	0	0	0	0	160-170	0	2319	100,100
180	0	0	0	0	0	0	0	0	170-180	0	2319	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

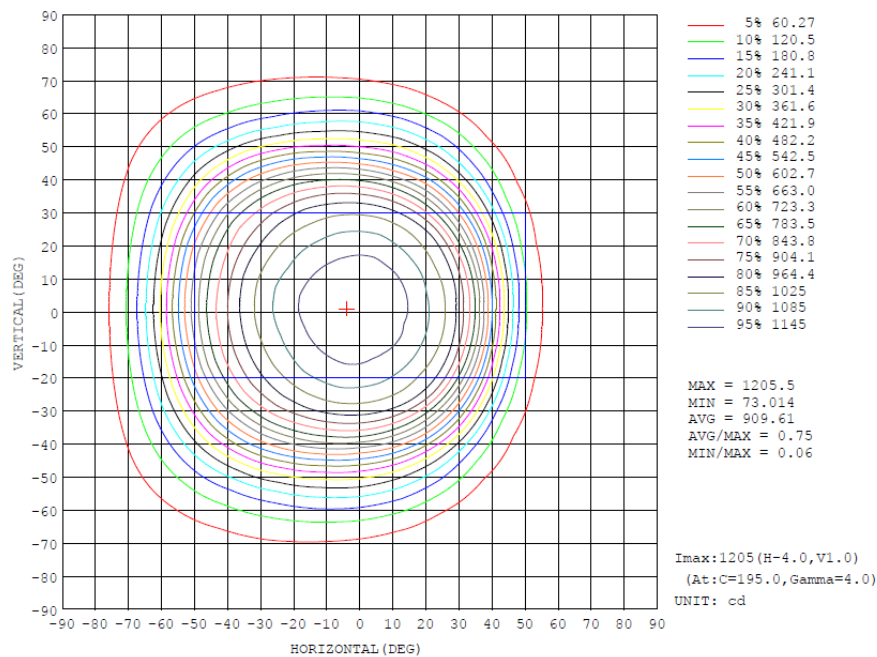
Zonal (lm)	Total (lm)	Percent
0-10	113.58	4.90%
10-20	325.28	18.92%
20-30	490.59	40.07%
30-40	551.98	63.87%
40-50	440.03	82.85%
50-60	253.68	93.78%
60-70	107.30	98.41%
70-80	31.77	99.78%
80-90	5.08	100.00%
90-100	0.00	100.00%
100-110	0.00	100.00%
110-120	0.00	100.00%
120-130	0.00	100.00%
130-140	0.00	100.00%
140-150	0.00	100.00%
150-160	0.00	100.00%
160-170	0.00	100.00%
170-180	0.00	100.00%

## 4.2 Goniophotometer Test

### Area Flux Diagram

VERTICAL (DEG)	AREA FLUX DIAGRAM																		UNIT: lm		Φ t	Φ a
	90	80	70	60	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60	-70	-80	-90	90	80	70
90	0.01	0.04	0.07	0.09	0.10	0.13	0.19	0.23	0.14	0.06	0.04	0.05	0.04	0.02	0.01	0.00	0.00	0.00	0.00	1.18	0.00	
80	0.02	0.08	0.18	0.31	0.49	0.77	1.02	1.14	1.12	0.94	0.66	0.38	0.19	0.07	0.02	0.00	0.00	0.00	0.00	7.40	0.00	
70	0.02	0.13	0.38	0.84	1.53	2.33	3.07	3.61	3.78	3.41	2.55	1.47	0.65	0.22	0.06	0.01	0.00	0.00	0.00	24.0	9.30	
60	0.03	0.20	0.72	1.81	3.50	5.55	7.43	8.73	9.18	8.57	6.82	4.28	1.88	0.58	0.14	0.02	0.00	0.00	0.00	59.4	53.9	
50	0.03	0.29	1.21	3.34	6.93	11.3	15.1	17.7	18.4	17.2	14.1	9.26	4.35	1.36	0.29	0.04	0.00	0.00	0.00	121	118	
40	0.04	0.39	1.81	5.31	11.2	17.4	22.6	26.1	27.7	27.0	23.3	16.6	8.39	2.54	0.56	0.07	0.00	0.00	0.00	191	188	
30	0.04	0.48	2.41	7.29	14.6	21.4	26.8	30.5	32.5	32.3	29.5	23.2	13.2	4.21	0.84	0.11	0.00	0.00	0.00	239	237	
20	0.05	0.56	2.88	8.71	16.5	23.4	29.0	32.8	34.9	34.8	32.1	27.0	17.1	5.83	1.08	0.15	0.00	0.00	0.00	267	265	
10	0.05	0.60	3.15	9.39	17.3	24.4	30.1	34.0	36.1	35.9	33.3	28.3	19.0	6.77	1.22	0.16	0.00	0.00	0.00	280	278	
0	0.05	0.60	3.11	9.25	17.2	24.2	29.8	33.9	36.0	35.7	33.2	28.2	18.8	6.56	1.18	0.16	0.00	0.00	0.00	278	276	
-10	0.05	0.55	2.77	8.31	16.1	23.1	28.6	32.6	34.7	34.4	31.8	26.6	16.4	5.27	1.00	0.13	0.00	0.00	0.00	262	260	
-20	0.04	0.47	2.25	6.73	13.6	20.5	26.1	30.0	32.0	31.6	28.8	22.2	12.1	3.52	0.75	0.09	0.00	0.00	0.00	231	228	
-30	0.04	0.37	1.66	4.78	9.99	15.8	20.9	24.4	26.1	25.4	21.6	14.9	7.03	2.00	0.47	0.05	0.00	0.00	0.00	175	173	
-40	0.03	0.27	1.10	2.95	6.01	9.76	13.2	15.5	16.3	15.3	12.2	7.65	3.34	1.04	0.23	0.03	0.00	0.00	0.00	105	101	
-50	0.03	0.19	0.65	1.59	3.04	4.78	6.48	7.71	8.10	7.41	5.65	3.31	1.36	0.42	0.11	0.02	0.00	0.00	0.00	50.8	44.4	
-60	0.02	0.12	0.34	0.72	1.31	2.04	2.70	3.13	3.19	2.76	1.95	1.03	0.45	0.16	0.05	0.01	0.00	0.00	0.00	20.0	5.27	
-70	0.02	0.08	0.16	0.26	0.39	0.61	0.83	0.92	0.86	0.68	0.43	0.24	0.12	0.05	0.01	0.00	0.00	0.00	0.00	5.68	0.00	
-80	0.01	0.04	0.06	0.08	0.08	0.10	0.13	0.15	0.08	0.03	0.02	0.03	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.84	0.00	
-90	0.01	0.04	0.07	0.09	0.10	0.13	0.19	0.23	0.14	0.06	0.04	0.05	0.04	0.02	0.01	0.00	0.00	0.00	0.00	1.18	0.00	
Φ t	0.57	5.47	24.9	71.8	140	208	264	303	321	313	278	215	124	40.6	8.01	1.05	0.04	0.00	0.00	2319	---	
Φ a	0.00	0.17	19.0	66.7	135	202	259	298	316	308	273	209	119	32.9	0.09	0.00	0.00	0.00	0.00	---	2238	

### 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	4.25	6.03	7.33	7.99	8.41	8.57	8.13	7.78	7.48	37.39	30.24	10.1	11.5	12.9	14.0	11.6	8.91	6.08
-70	0.00	6.16	9.08	10.22	14.9	17.7	20.9	24.4	28.5	33.1	39.6	46.2	51.6	55.0	56.8	57.4	56.4	54.0	50.4
-60	0.00	7.61	12.4	18.6	25.9	35.4	47.0	61.4	77.5	93.9	109	125	140	152	163	171	174	173	167
-50	0.00	9.00	16.4	26.8	42.6	64.1	90.5	123	159	198	236	275	311	338	361	375	380	382	373
-40	0.00	10.30	20.6	36.9	63.6	101	151	214	287	367	445	518	578	627	665	693	710	714	702
-30	0.00	11.5	24.4	47.5	86.5	144	225	324	438	555	657	744	815	874	917	952	975	987	986
-20	0.00	12.4	27.9	57.3	107	187	296	429	572	701	805	885	953	1002	1046	1078	1101	1114	1113
-10	0.00	13.0	30.5	64.6	124	219	349	504	656	783	881	956	1018	1066	1109	1139	1160	1176	1175
0	0.00	13.3	31.7	68.0	132	235	377	540	691	812	905	981	1048	1097	1134	1165	1186	1202	1197
10	0.00	13.0	30.8	65.5	126	225	359	520	675	795	888	971	1032	1080	1116	1146	1167	1181	1182
20	0.00	12.4	28.4	59.0	111	197	313	459	610	734	833	907	970	1021	1058	1086	1109	1123	1127
30	0.00	11.5	25.0	49.6	90	158	266	356	483	608	715	797	862	915	957	986	1005	1016	1016
40	0.00	10.3	21.3	38.9	68	110	168	240	326	418	507	587	651	701	742	768	782	786	776
50	0.00	9.01	16.8	28.4	46.5	70.2	101	139	183	230	276	323	363	392	418	431	435	434	421
60	0.00	7.61	12.6	19.9	28.4	39.5	53.6	70.5	88.9	107	124	142	159	171	185	193	198	200	197
70	0.00	6.17	9.12	12.4	16.0	19.8	24.4	29.0	34.7	41.0	48.1	54.9	60.1	64.1	67.0	68.5	68.5	66.9	63.9
80	0.00	4.29	6.04	7.32	8.10	8.61	8.86	9.32	9.31	9.33	11.0	12.2	13.9	14.9	15.6	17.8	18.7	16.5	14.0
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: cd				
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	4.42	2.75	1.35	1.84	2.24	2.52	1.99	1.50	1.06	0.67	0.37	0.16	0.10	0.07	0.06	0.06	0.05	0.00		
-70	44.8	38.5	31.7	24.7	18.2	13.0	9.46	6.41	4.18	2.58	1.35	0.59	0.27	0.11	0.05	0.06	0.06	0.00		
-60	154	137	116	90.8	66.1	44.5	28.9	17.6	11.4	7.00	3.74	1.77	0.77	0.21	0.12	0.06	0.05	0.06	0.00	
-50	352	322	282	235	184	130	84.2	49.7	28.9	15.6	8.03	3.77	1.38	0.35	0.10	0.05	0.05	0.00	0.00	
-40	679	639	576	495	395	288	186	112	63.2	34.3	17.2	7.12	2.23	0.56	0.16	0.05	0.05	0.00	0.00	
-30	975	945	891	802	683	541	378	217	112	61.4	32.3	13.2	3.68	0.87	0.20	0.06	0.05	0.00	0.00	
-20	1104	1079	1045	998	922	769	581	370	188	85.7	46.6	21.9	6.54	1.18	0.22	0.06	0.05	0.00	0.00	
-10	1162	1147	1118	1069	1011	906	726	492	263	116	58.0	28.8	8.77	1.33	0.19	0.06	0.05	0.00	0.00	
0	1192	1171	1142	1096	1037	943	777	542	295	129	61.4	31.1	9.32	1.16	0.13	0.05	0.05	0.00	0.00	
10	1175	1155	1124	1077	1017	919	744	514	283	126	60.6	29.9	9.33	1.57	0.25	0.07	0.05	0.00	0.00	
20	1119	1095	1060	1014	944	800	621	412	221	99.6	50.3	24.3	7.32	1.57	0.31	0.08	0.05	0.00	0.00	
30	1005	979	933	851	734	599	432	266	141	73.0	36.9	16.1	4.82	1.29	0.31	0.09	0.06	0.00	0.00	
40	749	702	642	566	464	349	237	146	82.1	42.0	21.7	8.94	3.15	0.88	0.25	0.08	0.06	0.00	0.00	
50	405	378	335	284	230	171	114	69.0	38.9	20.5	10.2	5.01	1.99	0.56	0.18	0.07	0.06	0.00	0.00	
60	184	167	145	118	91.0	64.3	41.6	24.9	15.5	9.17	4.97	2.48	1.08	0.36	0.11	0.07	0.07	0.00	0.00	
70	58.5	52.1	44.7	35.5	26.9	19.4	13.5	8.86	5.60	3.56	1.98	0.92	0.43	0.18	0.08	0.07	0.08	0.00	0.00	
80	8.81	6.19	3.72	3.77	3.92	4.19	3.23	2.26	1.60	1.04	0.58	0.25	0.17	0.11	0.10	0.09	0.07	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	
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	

## 4.0 LM-79 Measurement and Test Results

### 4.3 THD and PF Test

<b>Model No.</b>	BULLET2X20 @20W3000K	<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 <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	0.182	21.6	0.991	13.48

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