

Photometric Test Report

Relevant Standards

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

Prepared For

RAB Lighting Inc.

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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		1878
Minimum Luminaire Efficacy (lm/W) (Goniophotometer – Section 4.2)	ANSI/IES LM-79:2019	Standard	Premium	98.3
		105	120	
Power (Input Wattage) (W) (Goniophotometer – Section 4.2)	ANSI/IES LM-79:2019	Worst Case		19.1
Total Harmonic Distortion (A%) (THD & PF – Section 4.3)	ANSI C82.77:2002 ANSI C82-77-10:2020	20.00%	1200V	15.58
Power Factor (THD & PF – Section 4.3)	ANSI C82.77:2002 ANSI C82-77-10:2020	0.9	120V	0.988
Allowable CCTs* (K) (Integrating Sphere – Section 4.1)	ANSI/IES LM-79:2019	7 steps	3045±175	3080
		4 steps	3045±100	
Minimum CRI (Integrating Sphere – Section 4.1)	ANSI/IES LM-79:2019 CIE13.3-1995	≥70		82.2
Minimum R9 (Integrating Sphere – Section 4.1)	ANSI/IES LM-79-2019 CIE13.3-1995	N/A		5
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		0.161
(Goniophotometer – Section 4.2)		Non-Worst Case		N/A
Power (Input Wattage – W)				
(Goniophotometer – Section 4.2)	ANSI/IES LM-79:2019	Worst Case		19.1
(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	BULLET20 @20W3000K	ES 1st ES #3-2	241216013-S1
2	Goniophotometer Test	2024-12-18	BULLET20 @20W3000K	ES 1st ES #3-2	241216013-S1
3	THD and PF Test	2024-12-18	BULLET20 @20W3000K	ES 1st ES #3-2	241216013-S1

Remark (If any):

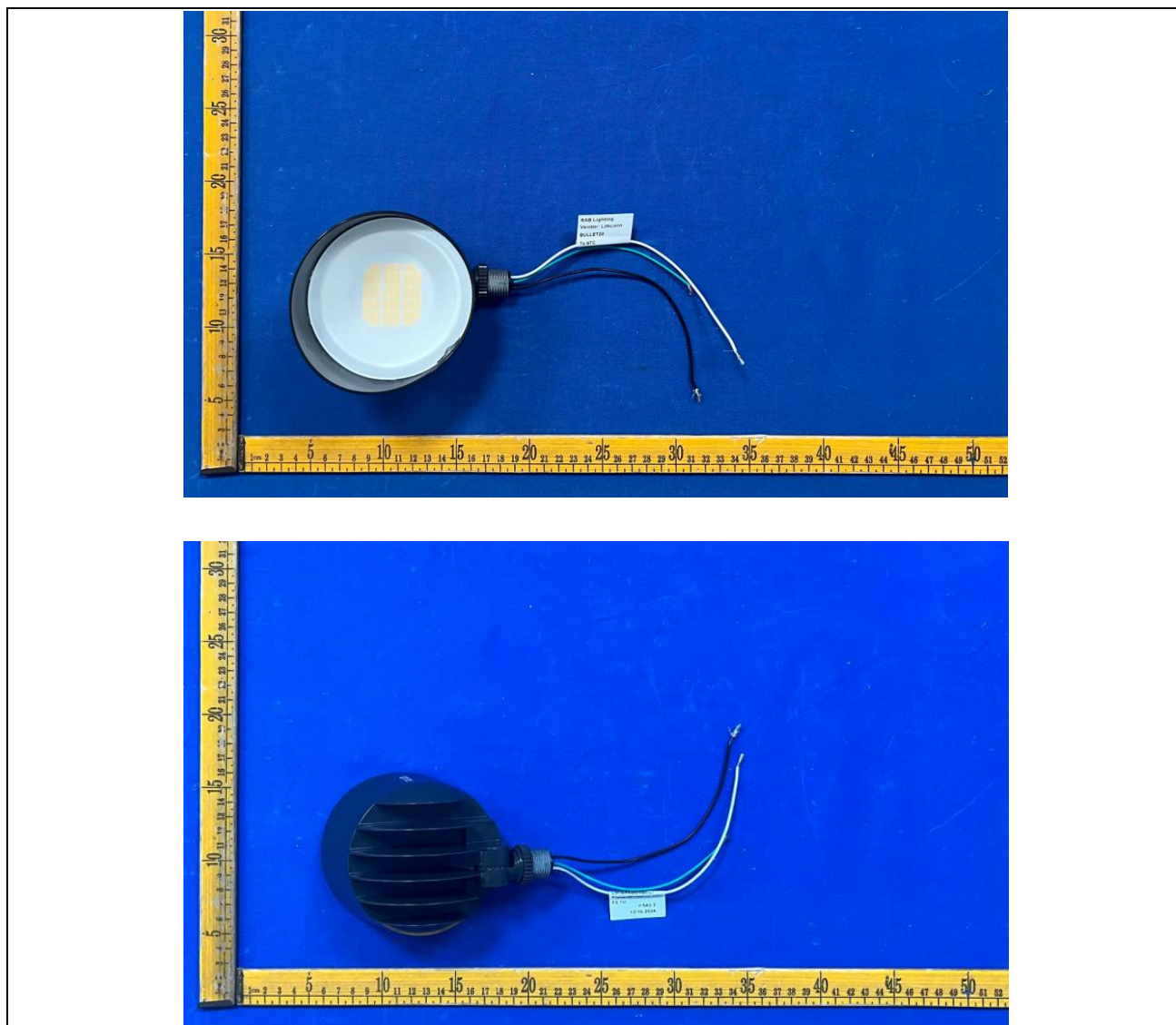
1. The results contained in this report pertain only to the tested samples.
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3. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the U.S. Government.

3.0 Product Description

Luminaire Description: Model No. BULLET20 @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

Model No.	BULLET20 @20W3000K	Sample ID	241216013-S1
Operate time (Min.)	10	Stabilization time (Min.)	60
Temperature (°C)	25.4	Humidity (%RH)	41.0

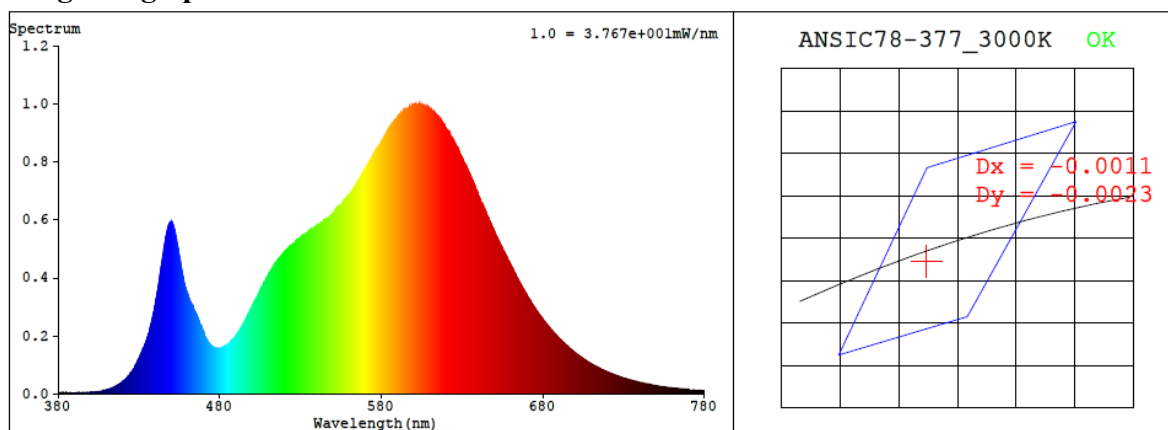
Test Method
<p>The Samples were tested according to the ANSI/IES LM-79:2019.</p> <p>Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25±1°C.</p> <p>The sample measurements were made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

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.0	60	0.161	19.1	0.988

CCT (K)	CRI	R9	Duv	Rf	Rg	IES Rcs,h1
3080	82.2	5	-0.0008	84	98	-11%

4.1 Integrating Sphere Test



Colorimetric Parameters

Chromaticity Coordinate: $x = 0.4302$ $y = 0.3998$ / $u' = 0.2481$ $v' = 0.5187$ ($duv = -7.83e-04$)

CCT= 3080K Prcp WL: $L_d = 582.8\text{nm}$ Purity=49.1%

Peak WL: $L_p = 604\text{nm}$ FWHM: $=133.1\text{nm}$ Ratio: $R=22.4\%$ $G=75.2\%$ $B=2.4\%$

Render Index: $R_a = 82.2$ AvgR = 76.1 TM30: $R_f = 83$ $R_g = 97$

EEL: 0.13966 A+

R1 =81 R2 =89 R3 =96 R4 =81 R5 =81 R6 =87 R7 =83

R8 =59 R9 =5 R10=75 R11=81 R12=69 R13=83 R14=98 R15=73

4.1 Integrating Sphere Test

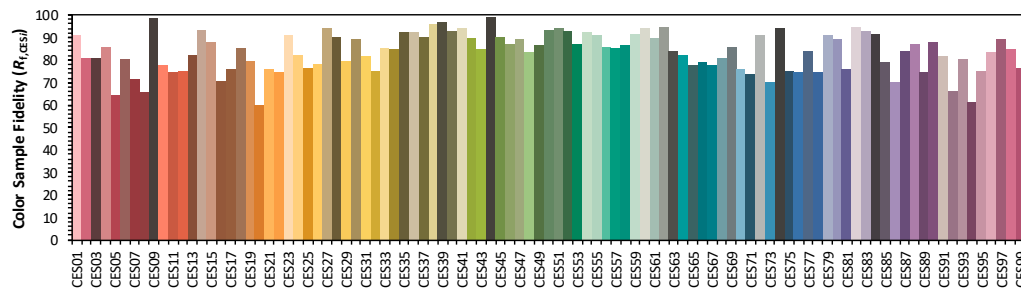
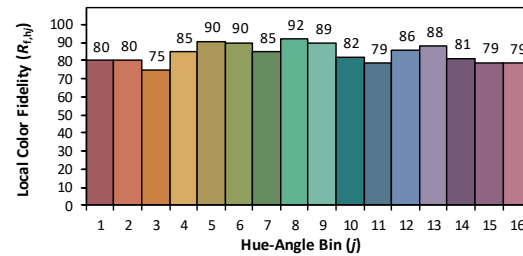
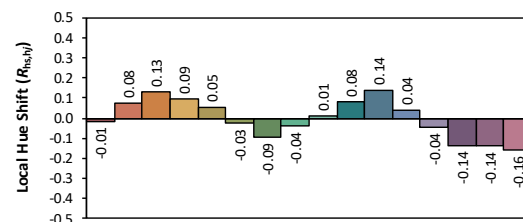
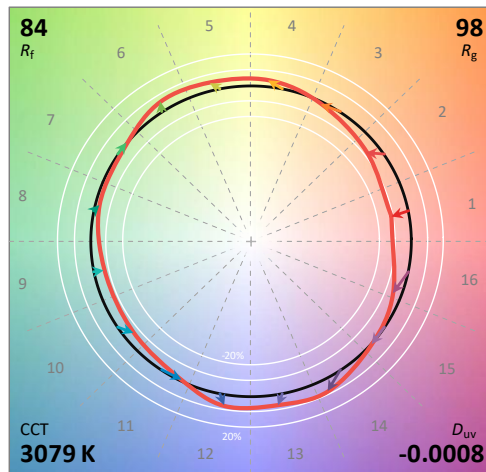
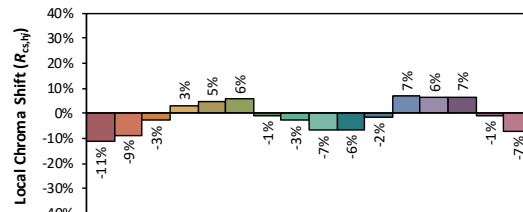
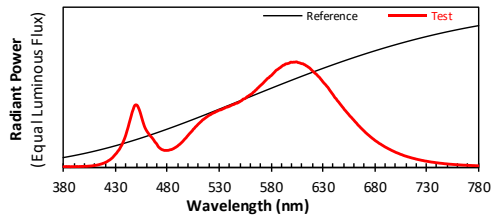
ANSI/IES TM-30-18 Color Rendition Report

Source: 1 CIE F1

Manufacturer: RAB Lighting Inc.

Date: 2024/12/20

Model: BULLET20 @20W3000K



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

x 0.4303
 y 0.3996
 u' 0.2482
 v' 0.5186

CIE 13.3-1995
(CRI)
 R_a 82
 R_g 5

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	3.10E-06	447	5.48E-04	514	4.47E-04	581	8.75E-04	648	5.84E-04	715	8.87E-05
381	2.90E-06	448	5.76E-04	515	4.53E-04	582	8.86E-04	649	5.71E-04	716	8.56E-05
382	3.70E-06	449	5.89E-04	516	4.61E-04	583	8.96E-04	650	5.60E-04	717	8.32E-05
383	4.10E-06	450	5.90E-04	517	4.68E-04	584	9.07E-04	651	5.45E-04	718	8.05E-05
384	2.00E-06	451	5.83E-04	518	4.75E-04	585	9.18E-04	652	5.35E-04	719	7.85E-05
385	4.50E-06	452	5.63E-04	519	4.82E-04	586	9.24E-04	653	5.23E-04	720	7.52E-05
386	1.50E-06	453	5.40E-04	520	4.89E-04	587	9.30E-04	654	5.12E-04	721	7.33E-05
387	3.10E-06	454	5.09E-04	521	4.94E-04	588	9.39E-04	655	5.01E-04	722	7.06E-05
388	2.90E-06	455	4.75E-04	522	4.99E-04	589	9.44E-04	656	4.88E-04	723	6.87E-05
389	2.90E-06	456	4.41E-04	523	5.06E-04	590	9.53E-04	657	4.78E-04	724	6.65E-05
390	2.70E-06	457	4.10E-04	524	5.11E-04	591	9.60E-04	658	4.68E-04	725	6.43E-05
391	3.20E-06	458	3.82E-04	525	5.15E-04	592	9.68E-04	659	4.56E-04	726	6.22E-05
392	4.00E-06	459	3.61E-04	526	5.19E-04	593	9.69E-04	660	4.46E-04	727	6.07E-05
393	4.40E-06	460	3.43E-04	527	5.26E-04	594	9.78E-04	661	4.34E-04	728	5.83E-05
394	2.90E-06	461	3.28E-04	528	5.29E-04	595	9.81E-04	662	4.24E-04	729	5.61E-05
395	4.40E-06	462	3.15E-04	529	5.34E-04	596	9.82E-04	663	4.13E-04	730	5.50E-05
396	4.20E-06	463	3.01E-04	530	5.40E-04	597	9.85E-04	664	4.00E-04	731	5.32E-05
397	4.80E-06	464	2.90E-04	531	5.42E-04	598	9.88E-04	665	3.91E-04	732	5.17E-05
398	5.10E-06	465	2.80E-04	532	5.44E-04	599	9.96E-04	666	3.81E-04	733	4.96E-05
399	4.70E-06	466	2.67E-04	533	5.49E-04	600	9.95E-04	667	3.70E-04	734	4.81E-05
400	6.60E-06	467	2.53E-04	534	5.54E-04	601	9.95E-04	668	3.61E-04	735	4.63E-05
401	6.30E-06	468	2.37E-04	535	5.58E-04	602	9.96E-04	669	3.51E-04	736	4.53E-05
402	6.00E-06	469	2.27E-04	536	5.63E-04	603	9.96E-04	670	3.42E-04	737	4.41E-05
403	7.00E-06	470	2.14E-04	537	5.68E-04	604	9.98E-04	671	3.31E-04	738	4.28E-05
404	7.80E-06	471	1.96E-04	538	5.69E-04	605	9.99E-04	672	3.22E-04	739	4.10E-05
405	8.50E-06	472	1.85E-04	539	5.73E-04	606	9.93E-04	673	3.13E-04	740	3.97E-05
406	9.10E-06	473	1.77E-04	540	5.77E-04	607	9.91E-04	674	3.05E-04	741	3.89E-05
407	9.90E-06	474	1.69E-04	541	5.82E-04	608	9.88E-04	675	2.97E-04	742	3.73E-05
408	1.17E-05	475	1.64E-04	542	5.87E-04	609	9.84E-04	676	2.88E-04	743	3.59E-05
409	1.29E-05	476	1.61E-04	543	5.91E-04	610	9.82E-04	677	2.80E-04	744	3.50E-05
410	1.43E-05	477	1.57E-04	544	5.93E-04	611	9.81E-04	678	2.72E-04	745	3.41E-05
411	1.58E-05	478	1.58E-04	545	5.98E-04	612	9.74E-04	679	2.65E-04	746	3.29E-05
412	1.74E-05	479	1.57E-04	546	6.05E-04	613	9.70E-04	680	2.57E-04	747	3.17E-05
413	1.99E-05	480	1.58E-04	547	6.05E-04	614	9.62E-04	681	2.49E-04	748	3.04E-05
414	2.20E-05	481	1.58E-04	548	6.09E-04	615	9.58E-04	682	2.43E-04	749	2.98E-05
415	2.51E-05	482	1.61E-04	549	6.15E-04	616	9.50E-04	683	2.36E-04	750	2.90E-05
416	2.78E-05	483	1.64E-04	550	6.21E-04	617	9.44E-04	684	2.29E-04	751	2.78E-05
417	3.07E-05	484	1.65E-04	551	6.27E-04	618	9.35E-04	685	2.22E-04	752	2.69E-05
418	3.47E-05	485	1.70E-04	552	6.33E-04	619	9.25E-04	686	2.17E-04	753	2.59E-05
419	3.77E-05	486	1.74E-04	553	6.44E-04	620	9.15E-04	687	2.10E-04	754	2.56E-05
420	4.27E-05	487	1.81E-04	554	6.47E-04	621	9.05E-04	688	2.04E-04	755	2.47E-05
421	4.69E-05	488	1.86E-04	555	6.50E-04	622	8.97E-04	689	1.98E-04	756	2.38E-05
422	5.23E-05	489	1.93E-04	556	6.59E-04	623	8.88E-04	690	1.92E-04	757	2.32E-05
423	5.96E-05	490	2.00E-04	557	6.68E-04	624	8.81E-04	691	1.86E-04	758	2.24E-05
424	6.47E-05	491	2.09E-04	558	6.73E-04	625	8.69E-04	692	1.81E-04	759	2.16E-05
425	7.19E-05	492	2.16E-04	559	6.80E-04	626	8.59E-04	693	1.76E-04	760	2.10E-05
426	8.01E-05	493	2.26E-04	560	6.86E-04	627	8.50E-04	694	1.71E-04	761	2.01E-05
427	8.84E-05	494	2.35E-04	561	6.93E-04	628	8.37E-04	695	1.66E-04	762	1.98E-05
428	9.98E-05	495	2.45E-04	562	6.99E-04	629	8.25E-04	696	1.60E-04	763	1.91E-05
429	1.11E-04	496	2.56E-04	563	7.10E-04	630	8.12E-04	697	1.55E-04	764	1.86E-05
430	1.22E-04	497	2.67E-04	564	7.17E-04	631	8.00E-04	698	1.51E-04	765	1.79E-05
431	1.33E-04	498	2.77E-04	565	7.28E-04	632	7.90E-04	699	1.46E-04	766	1.71E-05
432	1.48E-04	499	2.90E-04	566	7.36E-04	633	7.80E-04	700	1.42E-04	767	1.71E-05
433	1.59E-04	500	3.01E-04	567	7.47E-04	634	7.67E-04	701	1.37E-04	768	1.65E-05
434	1.74E-04	501	3.13E-04	568	7.56E-04	635	7.57E-04	702	1.34E-04	769	1.58E-05
435	1.93E-04	502	3.23E-04	569	7.66E-04	636	7.42E-04	703	1.30E-04	770	1.54E-05
436	2.09E-04	503	3.34E-04	570	7.75E-04	637	7.27E-04	704	1.26E-04	771	1.47E-05
437	2.32E-04	504	3.44E-04	571	7.84E-04	638	7.14E-04	705	1.21E-04	772	1.44E-05
438	2.55E-04	505	3.58E-04	572	7.92E-04	639	7.00E-04	706	1.18E-04	773	1.42E-05
439	2.80E-04	506	3.67E-04	573	8.03E-04	640	6.87E-04	707	1.14E-04	774	1.36E-05
440	3.09E-04	507	3.79E-04	574	8.14E-04	641	6.72E-04	708	1.10E-04	775	1.31E-05
441	3.43E-04	508	3.88E-04	575	8.23E-04	642	6.57E-04	709	1.07E-04	776	1.31E-05
442	3.75E-04	509	3.99E-04	576	8.34E-04	643	6.48E-04	710	1.03E-04	777	1.26E-05
443	4.13E-04	510	4.09E-04	577	8.44E-04	644	6.33E-04	711	1.01E-04	778	1.17E-05
444	4.48E-04	511	4.18E-04	578	8.48E-04	645	6.22E-04	712	9.68E-05	779	1.16E-05
445	4.84E-04	512	4.27E-04	579	8.60E-04	646	6.10E-04	713	9.45E-05	780	1.16E-05
446	5.20E-04	513	4.36E-04	580	8.66E-04	647	5.97E-04	714	9.14E-05	N/A	N/A

4.0 LM-79 Measurement and Test Results

4.2 Goniophotometer Test

Model No.	BULLET20 @20W3000K	Sample ID	241216013-S1
Operate time (Min.)	30	Stabilization time (Min.)	60
Temperature (°C)	24.8	Humidity (%RH)	41.3

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 $25\pm1^{\circ}\text{C}$, 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 ± 0.2 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 1.0° vertical intervals and 15° horizontal intervals.</p>

Test Conditions

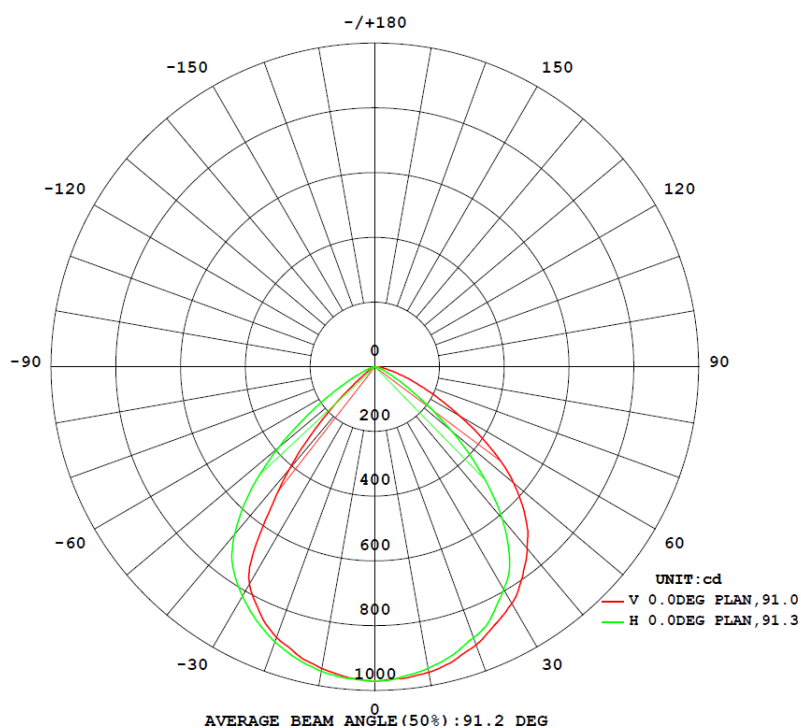
Condition	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
WORST CASE	120.0	60	0.161	19.1	0.988
NON-WORST CASE	N/A	N/A	N/A	N/A	N/A

Test Result

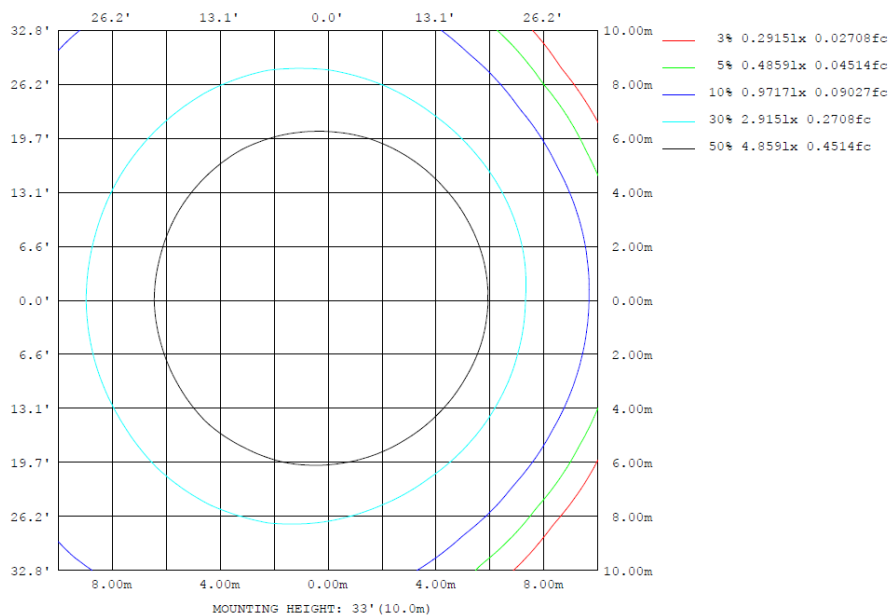
Flux (lm)	Field Angle (10%)		Beam Angle (50%)		Luminous Efficacy (lm/W)	Zonal Lumen Requirement	NEMA Type
	C0-180	C90-270	C0-180	C90-270		(0°-90°)	
1878	123.4	123.5	90.8	91.3	98.3	100.0%	6H x 6V

4.2 Goniophotometer Test

Lighting Distribution Curve



Isolux Plot



4.2 Goniophotometer Test

Zonal Lumen Summary

ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%lum, lamp
10	946.2	947.1	945.9	957.6	958.1	957.3	954.9	951.6	0- 10	91.72	91.72	4.88,4.88
20	889.8	886.8	890.4	912.0	914.4	913.9	904.1	893.9	10- 20	262.7	354.4	18.9,18.9
30	776.2	763.9	795.4	836.3	844.6	852.6	818.6	787.3	20- 30	396.3	750.7	40,40
40	409.8	430.7	611.0	718.7	732.1	733.0	674.5	492.9	30- 40	446.4	1197	63.7,63.7
50	89.34	101.1	311.7	536.3	559.8	561.8	390.8	127.4	40- 50	357.4	1555	82.8,82.8
60	18.29	24.79	84.62	270.8	302.7	303.2	122.4	30.28	50- 60	206.7	1761	93.8,93.8
70	0.0179	0.6278	20.10	87.07	114.0	105.7	27.24	1.505	60- 70	86.29	1848	98.4,98.4
80	0.0192	0.0179	3.469	18.76	30.97	25.00	4.942	0.0358	70- 80	25.34	1873	99.7,99.7
90	0	0	0	0	0	0	0	0	80- 90	5.147	1878	100,100
100	0	0	0	0	0	0	0	0	90-100	0	1878	100,100
110	0	0	0	0	0	0	0	0	100-110	0	1878	100,100
120	0	0	0	0	0	0	0	0	110-120	0	1878	100,100
130	0	0	0	0	0	0	0	0	120-130	0	1878	100,100
140	0	0	0	0	0	0	0	0	130-140	0	1878	100,100
150	0	0	0	0	0	0	0	0	140-150	0	1878	100,100
160	0	0	0	0	0	0	0	0	150-160	0	1878	100,100
170	0	0	0	0	0	0	0	0	160-170	0	1878	100,100
180	0	0	0	0	0	0	0	0	170-180	0	1878	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

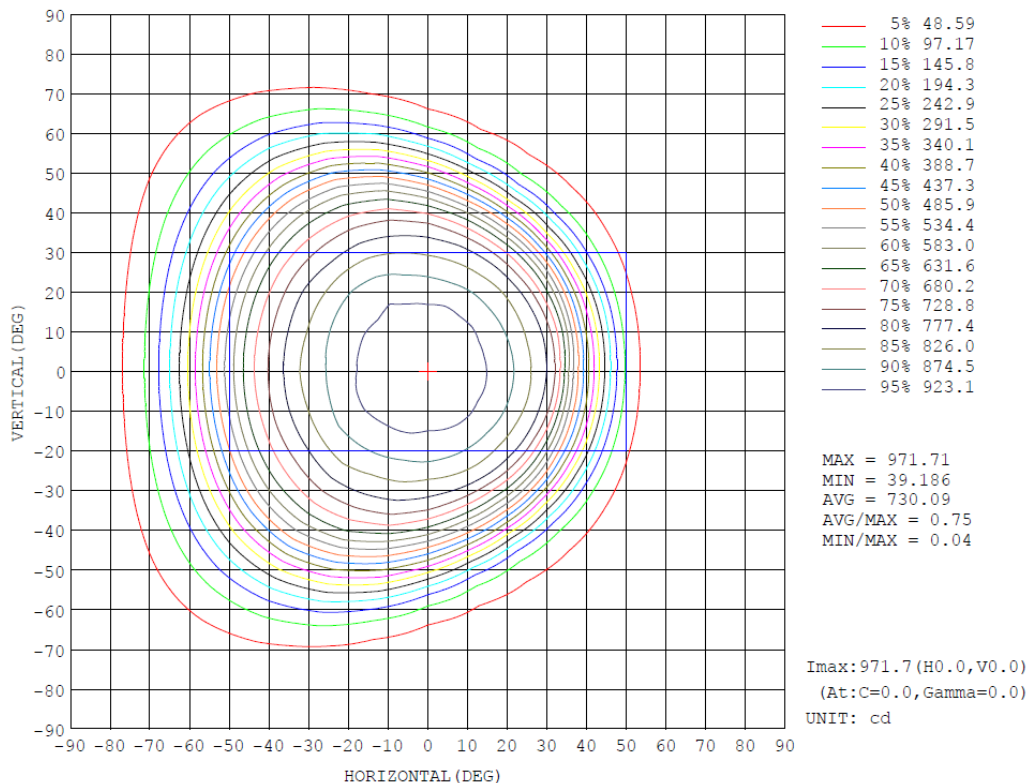
Zonal (lm)		Total (lm) Percent	
0-10	91.72	0-10	91.72 4.88%
10-20	262.71	0-20	354.43 18.87%
20-30	396.30	0-30	750.73 39.97%
30-40	446.41	0-40	1197.14 63.74%
40-50	357.44	0-50	1554.58 82.77%
50-60	206.75	0-60	1761.33 93.78%
60-70	86.29	0-70	1847.62 98.38%
70-80	25.34	0-80	1872.96 99.73%
80-90	5.15	0-90	1878.11 100.00%
90-100	0.00	0-100	1878.11 100.00%
100-110	0.00	0-110	1878.11 100.00%
110-120	0.00	0-120	1878.11 100.00%
120-130	0.00	0-130	1878.11 100.00%
130-140	0.00	0-140	1878.11 100.00%
140-150	0.00	0-150	1878.11 100.00%
150-160	0.00	0-160	1878.11 100.00%
160-170	0.00	0-170	1878.11 100.00%
170-180	0.00	0-180	1878.11 100.00%

4.2 Goniophotometer Test

Area Flux Diagram

		AREA FLUX DIAGRAM																UNIT: lm				Φ t	Φ a
VERTICAL (DEG)	90	0.01	0.04	0.09	0.14	0.17	0.17	0.15	0.12	0.08	0.04	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	1.04	0.00		
	80	0.02	0.10	0.23	0.41	0.62	0.79	0.85	0.73	0.54	0.33	0.17	0.06	0.01	0.00	0.00	0.00	0.00	0.00	4.87	0.00		
	70	0.03	0.15	0.42	0.94	1.70	2.56	3.19	3.16	2.48	1.57	0.85	0.42	0.13	0.01	0.00	0.00	0.00	0.00	17.6	8.09		
	60	0.03	0.21	0.73	1.85	3.76	6.20	8.39	9.36	8.48	6.07	3.25	1.47	0.64	0.16	0.01	0.00	0.00	0.00	50.6	45.8		
	50	0.04	0.29	1.14	3.14	6.64	11.0	14.9	17.1	17.2	14.8	10.1	4.80	1.70	0.58	0.08	0.00	0.00	0.00	103	100		
	40	0.04	0.38	1.60	4.62	9.65	15.0	19.3	22.1	23.1	22.2	18.5	11.8	4.64	1.21	0.27	0.01	0.00	0.00	154	152		
	30	0.05	0.45	2.05	6.01	12.0	17.5	21.9	25.1	26.3	25.8	23.6	18.3	9.32	2.48	0.48	0.03	0.00	0.00	191	190		
	20	0.05	0.51	2.40	7.06	13.4	19.0	23.6	26.8	28.3	28.0	25.9	21.7	13.2	4.09	0.66	0.06	0.00	0.00	215	213		
	10	0.05	0.55	2.59	7.59	14.0	19.7	24.2	27.4	29.2	29.0	26.9	22.9	15.0	5.05	0.78	0.08	0.00	0.00	225	224		
	0	0.05	0.54	2.58	7.54	14.0	19.6	24.1	27.4	29.1	28.9	26.9	22.9	14.7	4.93	0.77	0.08	0.00	0.00	224	223		
	-10	0.05	0.50	2.35	6.91	13.2	18.8	23.4	26.5	27.9	27.8	25.7	21.3	12.4	3.77	0.63	0.06	0.00	0.00	211	210		
	-20	0.05	0.44	1.97	5.81	11.7	17.2	21.6	24.4	25.8	25.4	22.9	17.0	8.28	2.17	0.44	0.03	0.00	0.00	185	183		
-30	0.04	0.35	1.51	4.39	9.27	14.5	18.7	21.3	22.2	20.7	16.6	10.0	3.84	1.06	0.24	0.01	0.00	0.00	145	142			
-40	0.04	0.27	1.04	2.90	6.15	10.2	13.6	15.4	15.1	12.4	8.02	3.69	1.41	0.49	0.07	0.00	0.00	0.00	90.9	87.3			
-50	0.03	0.19	0.65	1.63	3.29	5.37	7.11	7.62	6.56	4.45	2.38	1.17	0.51	0.12	0.00	0.00	0.00	0.00	41.1	35.5			
-60	0.02	0.13	0.36	0.79	1.40	2.05	2.47	2.31	1.77	1.13	0.65	0.31	0.09	0.01	0.00	0.00	0.00	0.00	13.5	3.73			
-70	0.02	0.08	0.19	0.32	0.48	0.59	0.61	0.52	0.39	0.24	0.12	0.04	0.01	0.00	0.00	0.00	0.00	0.00	3.60	0.00			
-80	0.01	0.04	0.07	0.10	0.12	0.12	0.11	0.08	0.05	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.00			
-90	0.01	0.04	0.09	0.14	0.17	0.17	0.15	0.12	0.08	0.04	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	1.04	0.00			
		-90	-80	-70	-60	-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90			
		Φ t	0.62	5.24	22.0	62.2	121	180	228	257	264	249	213	158	85.9	26.1	4.45	0.35	0.00	0.00	1878	---	
		Φ a	0.00	0.35	17.1	58.0	118	177	224	254	260	245	208	153	81.4	20.4	0.00	0.00	0.00	0.00	---	1817	

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	0.00	0.00	0.00	0.00	0.00	0.00	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	4.46	6.38	7.70	8.79	9.70	10.4	10.9	11.2	11.3	11.2	10.7	9.81	8.93	7.99	6.80	5.82	4.70	3.47
	-70	0.00	6.73	9.88	13.0	16.1	19.7	24.0	28.4	32.9	37.4	41.1	43.2	44.1	43.1	40.0	34.9	30.7	25.8	20.1
	-60	0.00	8.46	13.4	19.2	26.6	36.6	49.2	64.7	81.2	99.5	119	135	149	157	154	145	131	111	84.6
	-50	0.00	10.0	17.3	26.9	41.5	62.2	88.6	123	165	212	262	308	346	378	392	394	381	352	312
	-40	0.00	11.4	21.2	36.0	59.7	93.6	141	203	278	358	438	511	563	604	636	644	652	637	611
	-30	0.00	12.6	24.6	45.3	79.1	129	199	288	391	495	581	647	699	740	769	788	800	802	795
	-20	0.00	13.5	27.7	53.6	96.0	161	251	363	482	586	665	728	776	812	854	873	885	892	890
	-10	0.00	14.1	30.0	59.6	109	184	287	414	539	639	716	775	826	867	903	924	940	948	946
	0	0.00	14.4	31.0	62.3	114	194	303	435	560	658	732	794	845	878	914	940	958	967	972
	10	0.00	14.2	30.3	60.6	110	187	291	420	545	644	718	780	830	872	903	925	942	955	955
	20	0.00	13.7	28.4	55.5	99.3	166	257	373	495	596	678	740	792	832	870	924	948	903	904
	30	0.00	12.9	25.6	47.7	83.2	136	209	300	406	510	595	663	714	752	785	811	822	824	819
	40	0.00	11.8	22.4	38.6	64.7	101	151	218	295	378	462	536	592	635	667	685	697	690	674
	50	0.00	10.4	18.7	29.4	46.3	68.9	98.6	137	183	235	292	343	388	431	452	460	454	428	391
	60	0.00	8.88	14.5	21.7	30.3	42.2	57.2	75.0	94.6	117	142	162	182	195	195	193	179	154	122
	70	0.00	7.10	10.9	14.9	19.9	23.8	29.1	35.0	41.1	47.5	52.8	56.5	59.4	58.9	55.2	49.3	43.3	35.9	27.2
	80	0.00	4.73	7.16	9.14	10.7	12.1	13.5	14.3	15.0	15.5	15.4	14.8	13.7	12.6	11.2	9.26	7.95	6.51	4.94
	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	2.64	1.79	0.97	0.64	0.34	0.11	0.06	0.04	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.00	
-70	16.7	13.0	9.29	6.36	3.62	1.60	0.76	0.25	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.00	
-60	69.3	52.7	39.2	30.7	22.3	15.0	8.65	3.15	0.82	0.13	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.00	
-50	259	197	144	99.0	67.5	47.9	33.9	21.9	11.6	3.88	0.39	0.02	0.02	0.02	0.02	0.02	0.03	0.00	
-40	566	505	425	323	226	141	82.7	51.3	32.8	17.8	6.80	0.86	0.02	0.02	0.02	0.02	0.03	0.00	
-30	783	753	696	617	506	365	230	122	63.3	35.6	18.0	5.41	0.26	0.02	0.02	0.02	0.03	0.00	
-20	888	870	840	797	722	587	420	256	123	54.6	29.1	11.4	1.48	0.02	0.02	0.02	0.03	0.00	
-10	942	928	906	866	815	736	550	370	195	80.1	37.0	16.5	3.04	0.02	0.02	0.02	0.03	0.00	
0	963	946	922	890	840	776	606	410	228	89.3	39.7	18.3	3.70	0.02	0.02	0.02	0.03	0.00	
10	950	933	909	868	820	750	586	382	209	82.7	38.1	17.2	3.19	0.02	0.02	0.02	0.03	0.00	
20	898	879	850	816	752	636	461	283	140	57.9	31.1	12.3	1.64	0.02	0.02	0.02	0.03	0.00	
30	808	787	744	675	568	422	268	146	69.9	39.2	20.5	5.90	0.36	0.02	0.02	0.03	0.03	0.00	
40	637	582	501	396	284	181	102	58.8	37.7	21.2	7.83	1.13	0.02	0.02	0.03	0.03	0.03	0.00	
50	334	266	198	135	84.0	57.9	40.7	26.9	14.8	5.08	0.69	0.03	0.02	0.03	0.03	0.04	0.04	0.00	
60	98.0	72.0	51.2	39.3	28.5	19.8	11.5	4.74	1.54	0.37	0.05	0.02	0.03	0.03	0.04	0.04	0.04	0.00	
70	22.5	17.5	12.6	8.96	5.48	2.79	1.39	0.48	0.08	0.04	0.03	0.03	0.04	0.04	0.05	0.05	0.04	0.00	
80	3.82	2.66	1.54	1.03	0.58	0.22	0.13	0.07	0.04	0.04	0.04	0.05	0.05	0.06	0.06	0.06	0.04	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

Model No.	BULLET20 @20W3000K	Sample ID	241216013-S1
Temperature (°C)	25.4	Humidity (%RH)	41.0

Test Method
<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 $25 \pm 1^\circ\text{C}$. 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

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	iTHD(%)
120.0	60	0.161	19.1	0.988	15.58

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*******