

Photometric Test Report

Relevant Standards

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

Prepared For

RAB Lighting Inc.

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Date: 2024-12-25

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Issue Date: 2024-12-25

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		1553
Minimum Luminaire Efficacy (lm/W) (Goniophotometer – Section 4.2)	ANSI/IES LM-79:2019	Standard	Premium	103.6
		105	120	
Power (Input Wattage) (W) (Goniophotometer – Section 4.2)	ANSI/IES LM-79:2019	Worst Case		15.0
Total Harmonic Distortion (A%) (THD & PF – Section 4.3)	ANSI C82.77:2002 ANSI C82-77-10:2020	20.00%	1200V	14.39
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	3045±175	3073
		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		0.126
(Goniophotometer – Section 4.2)		Non-Worst Case		N/A
Power (Input Wattage – W)				
(Goniophotometer – Section 4.2)	ANSI/IES LM-79:2019	Worst Case		15.0
(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	2024-12-24	BULLET20 @15W3000K	ES 1st ES #3-2	241216013-S1
2	Goniophotometer Test	2024-12-24	BULLET20 @15W3000K	ES 1st ES #3-2	241216013-S1
3	THD and PF Test	2024-12-24	BULLET20 @15W3000K	ES 1st ES #3-2	241216013-S1

Remark (If any):

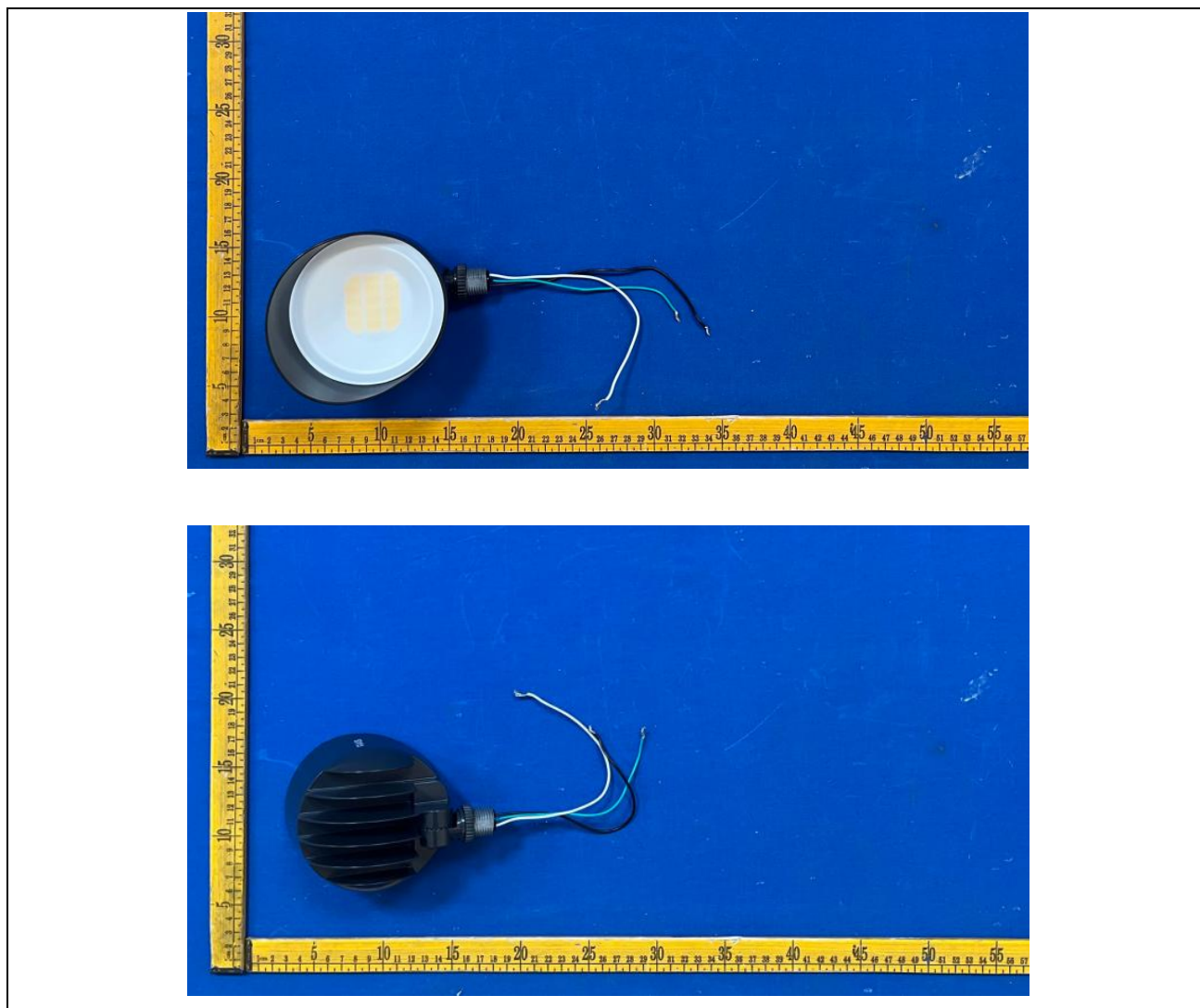
1. The results contained in this report pertain only to the tested samples.
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3. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the U.S. Government.

3.0 Product Description

Luminaire Description: Model No. BULLET20 @15W3000K, 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 @15W3000K	Sample ID	241216013-S1
Operate time (Min.)	10	Stabilization time (Min.)	60
Temperature (°C)	25.4	Humidity (%RH)	41.0

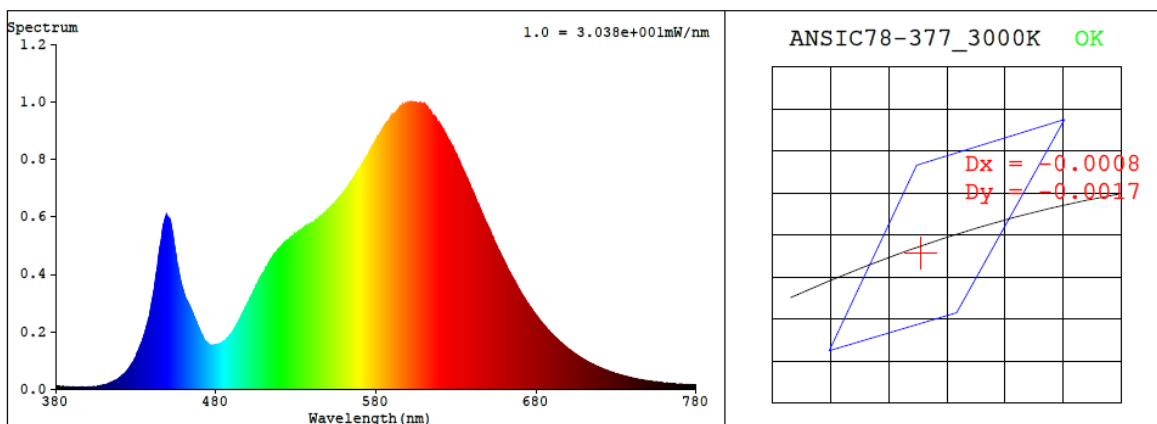
Test Method
<p>The Samples were tested according to the ANSI/IES LM-79:2019.</p> <p>Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25±1°C.</p> <p>The sample measurements were made 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	0.126	15.0	0.990

CCT (K)	CRI	R9	Duv	Rf	Rg	IES Rcs,h1
3073	82.4	6	-0.0006	84	98	-11%

4.1 Integrating Sphere Test



Colorimetric Parameters

Chromaticity Coordinate: $x = 0.4310$ $y = 0.4005$ / $u' = 0.2483$ $v' = 0.5191$ ($duv = -5.77e-04$)

CCT= 3073K Prcp WL: $L_d = 582.7nm$ Purity=49.6%

Peak WL: $L_p = 602nm$ FWHM: $=134.0nm$ Ratio: R=22.5% G=75.2% B=2.3%

Render Index: $R_a = 82.4$ AvgR = 76.4 TM30: $R_f = 83$ $R_g = 97$

EEI: 0.13578 A+

R1 =81 R2 =89 R3 =96 R4 =82 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

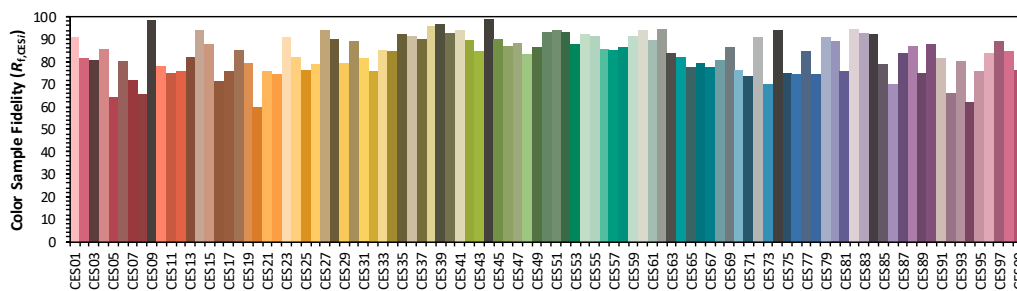
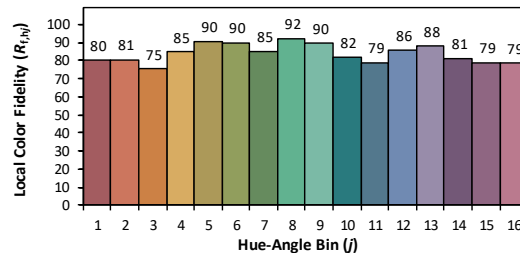
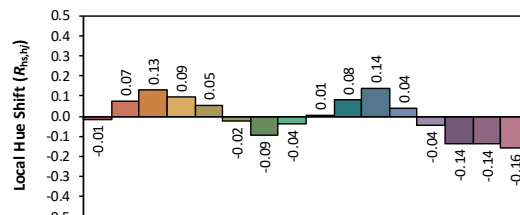
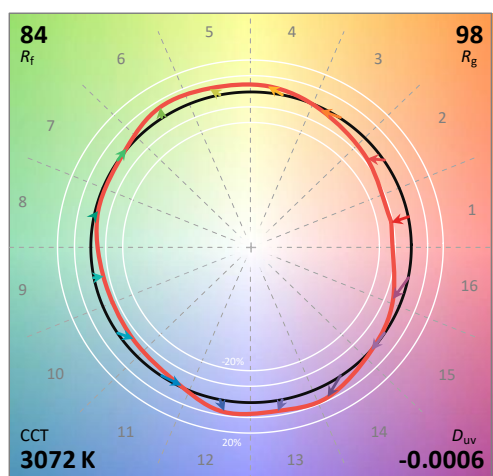
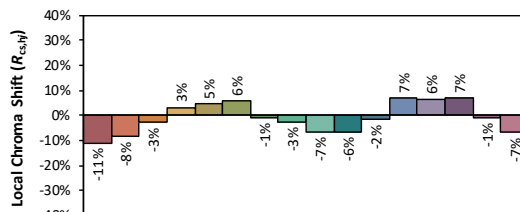
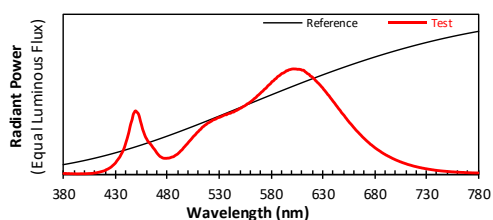
ANSI/IES TM-30-18 Color Rendition Report

Source: 1 CIE F1

Manufacturer: RAB Lighting Inc.

Date: 2024/12/25

Model: BULLET20 @15W3000K



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

x 0.4310
 y 0.4004
 u' 0.2483
 v' 0.5191

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	9.90E-06	447	5.68E-04	514	4.50E-04	581	8.78E-04	648	5.89E-04	715	8.84E-05
381	9.90E-06	448	5.86E-04	515	4.55E-04	582	8.83E-04	649	5.77E-04	716	8.52E-05
382	1.06E-05	449	6.02E-04	516	4.65E-04	583	8.92E-04	650	5.66E-04	717	8.23E-05
383	8.40E-06	450	5.96E-04	517	4.71E-04	584	9.03E-04	651	5.55E-04	718	7.96E-05
384	8.90E-06	451	5.86E-04	518	4.78E-04	585	9.08E-04	652	5.40E-04	719	7.71E-05
385	9.50E-06	452	5.74E-04	519	4.87E-04	586	9.21E-04	653	5.29E-04	720	7.50E-05
386	7.70E-06	453	5.44E-04	520	4.91E-04	587	9.29E-04	654	5.15E-04	721	7.24E-05
387	8.10E-06	454	5.04E-04	521	4.96E-04	588	9.34E-04	655	5.03E-04	722	7.02E-05
388	8.20E-06	455	4.70E-04	522	5.02E-04	589	9.42E-04	656	4.90E-04	723	6.80E-05
389	6.70E-06	456	4.32E-04	523	5.08E-04	590	9.51E-04	657	4.81E-04	724	6.56E-05
390	7.30E-06	457	4.04E-04	524	5.16E-04	591	9.58E-04	658	4.69E-04	725	6.41E-05
391	7.70E-06	458	3.77E-04	525	5.19E-04	592	9.60E-04	659	4.57E-04	726	6.14E-05
392	6.60E-06	459	3.53E-04	526	5.23E-04	593	9.66E-04	660	4.45E-04	727	6.01E-05
393	6.60E-06	460	3.37E-04	527	5.26E-04	594	9.73E-04	661	4.34E-04	728	5.81E-05
394	6.60E-06	461	3.18E-04	528	5.34E-04	595	9.82E-04	662	4.22E-04	729	5.60E-05
395	6.70E-06	462	3.07E-04	529	5.38E-04	596	9.82E-04	663	4.12E-04	730	5.46E-05
396	7.50E-06	463	2.95E-04	530	5.40E-04	597	9.89E-04	664	4.02E-04	731	5.29E-05
397	7.90E-06	464	2.84E-04	531	5.44E-04	598	9.92E-04	665	3.92E-04	732	5.11E-05
398	7.40E-06	465	2.71E-04	532	5.48E-04	599	9.94E-04	666	3.81E-04	733	4.95E-05
399	7.40E-06	466	2.56E-04	533	5.53E-04	600	9.97E-04	667	3.72E-04	734	4.82E-05
400	7.50E-06	467	2.44E-04	534	5.57E-04	601	9.98E-04	668	3.61E-04	735	4.64E-05
401	7.80E-06	468	2.32E-04	535	5.63E-04	602	9.99E-04	669	3.51E-04	736	4.49E-05
402	8.30E-06	469	2.17E-04	536	5.66E-04	603	9.98E-04	670	3.42E-04	737	4.37E-05
403	8.80E-06	470	2.02E-04	537	5.65E-04	604	9.98E-04	671	3.33E-04	738	4.19E-05
404	9.40E-06	471	1.91E-04	538	5.72E-04	605	9.97E-04	672	3.23E-04	739	4.06E-05
405	9.60E-06	472	1.80E-04	539	5.76E-04	606	9.95E-04	673	3.14E-04	740	3.95E-05
406	1.04E-05	473	1.70E-04	540	5.79E-04	607	9.96E-04	674	3.06E-04	741	3.80E-05
407	1.09E-05	474	1.66E-04	541	5.80E-04	608	9.94E-04	675	2.98E-04	742	3.72E-05
408	1.14E-05	475	1.59E-04	542	5.87E-04	609	9.93E-04	676	2.87E-04	743	3.60E-05
409	1.39E-05	476	1.55E-04	543	5.91E-04	610	9.87E-04	677	2.81E-04	744	3.49E-05
410	1.49E-05	477	1.54E-04	544	5.91E-04	611	9.87E-04	678	2.73E-04	745	3.39E-05
411	1.61E-05	478	1.54E-04	545	5.98E-04	612	9.84E-04	679	2.65E-04	746	3.30E-05
412	1.77E-05	479	1.53E-04	546	6.04E-04	613	9.72E-04	680	2.57E-04	747	3.21E-05
413	2.04E-05	480	1.55E-04	547	6.07E-04	614	9.67E-04	681	2.50E-04	748	3.14E-05
414	2.20E-05	481	1.55E-04	548	6.13E-04	615	9.57E-04	682	2.43E-04	749	3.05E-05
415	2.50E-05	482	1.57E-04	549	6.18E-04	616	9.52E-04	683	2.36E-04	750	2.95E-05
416	2.74E-05	483	1.60E-04	550	6.25E-04	617	9.46E-04	684	2.30E-04	751	2.84E-05
417	2.98E-05	484	1.64E-04	551	6.29E-04	618	9.33E-04	685	2.23E-04	752	2.80E-05
418	3.27E-05	485	1.67E-04	552	6.35E-04	619	9.28E-04	686	2.17E-04	753	2.72E-05
419	3.55E-05	486	1.69E-04	553	6.42E-04	620	9.21E-04	687	2.09E-04	754	2.64E-05
420	4.01E-05	487	1.77E-04	554	6.46E-04	621	9.12E-04	688	2.04E-04	755	2.53E-05
421	4.63E-05	488	1.83E-04	555	6.52E-04	622	9.04E-04	689	1.97E-04	756	2.54E-05
422	4.96E-05	489	1.89E-04	556	6.59E-04	623	8.91E-04	690	1.92E-04	757	2.44E-05
423	5.51E-05	490	1.95E-04	557	6.68E-04	624	8.81E-04	691	1.85E-04	758	2.39E-05
424	6.08E-05	491	2.05E-04	558	6.72E-04	625	8.71E-04	692	1.81E-04	759	2.34E-05
425	6.68E-05	492	2.14E-04	559	6.78E-04	626	8.62E-04	693	1.75E-04	760	2.25E-05
426	7.41E-05	493	2.25E-04	560	6.85E-04	627	8.52E-04	694	1.71E-04	761	2.21E-05
427	8.34E-05	494	2.33E-04	561	6.93E-04	628	8.41E-04	695	1.65E-04	762	2.15E-05
428	9.18E-05	495	2.45E-04	562	7.01E-04	629	8.29E-04	696	1.60E-04	763	2.10E-05
429	1.01E-04	496	2.57E-04	563	7.09E-04	630	8.19E-04	697	1.55E-04	764	2.06E-05
430	1.12E-04	497	2.67E-04	564	7.19E-04	631	8.05E-04	698	1.50E-04	765	2.00E-05
431	1.27E-04	498	2.79E-04	565	7.25E-04	632	7.95E-04	699	1.46E-04	766	2.01E-05
432	1.39E-04	499	2.88E-04	566	7.34E-04	633	7.82E-04	700	1.41E-04	767	1.91E-05
433	1.53E-04	500	3.01E-04	567	7.45E-04	634	7.70E-04	701	1.37E-04	768	1.84E-05
434	1.66E-04	501	3.13E-04	568	7.52E-04	635	7.56E-04	702	1.33E-04	769	1.81E-05
435	1.85E-04	502	3.23E-04	569	7.62E-04	636	7.47E-04	703	1.29E-04	770	1.78E-05
436	2.03E-04	503	3.34E-04	570	7.71E-04	637	7.33E-04	704	1.25E-04	771	1.72E-05
437	2.22E-04	504	3.46E-04	571	7.81E-04	638	7.19E-04	705	1.20E-04	772	1.70E-05
438	2.44E-04	505	3.58E-04	572	7.88E-04	639	7.07E-04	706	1.17E-04	773	1.67E-05
439	2.72E-04	506	3.68E-04	573	7.99E-04	640	6.93E-04	707	1.13E-04	774	1.63E-05
440	3.05E-04	507	3.77E-04	574	8.09E-04	641	6.82E-04	708	1.10E-04	775	1.57E-05
441	3.36E-04	508	3.89E-04	575	8.15E-04	642	6.69E-04	709	1.07E-04	776	1.58E-05
442	3.71E-04	509	4.00E-04	576	8.26E-04	643	6.55E-04	710	1.03E-04	777	1.52E-05
443	4.09E-04	510	4.08E-04	577	8.38E-04	644	6.43E-04	711	1.00E-04	778	1.53E-05
444	4.55E-04	511	4.20E-04	578	8.47E-04	645	6.29E-04	712	9.62E-05	779	1.52E-05
445	4.92E-04	512	4.27E-04	579	8.55E-04	646	6.16E-04	713	9.37E-05	780	1.52E-05
446	5.22E-04	513	4.38E-04	580	8.64E-04	647	6.05E-04	714	9.07E-05	N/A	N/A

4.0 LM-79 Measurement and Test Results

4.2 Goniophotometer Test

Model No.	BULLET20 @15W3000K	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 $25 \pm 1^\circ\text{C}$, 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

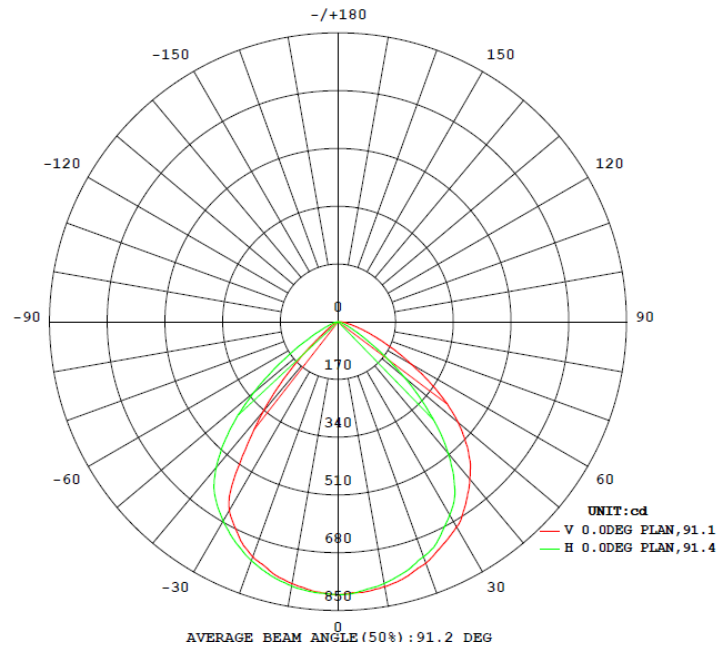
Condition	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
WORST CASE	120.0	60	0.126	15.0	0.990
NON-WORST CASE	N/A	N/A	N/A	N/A	N/A

Test Result

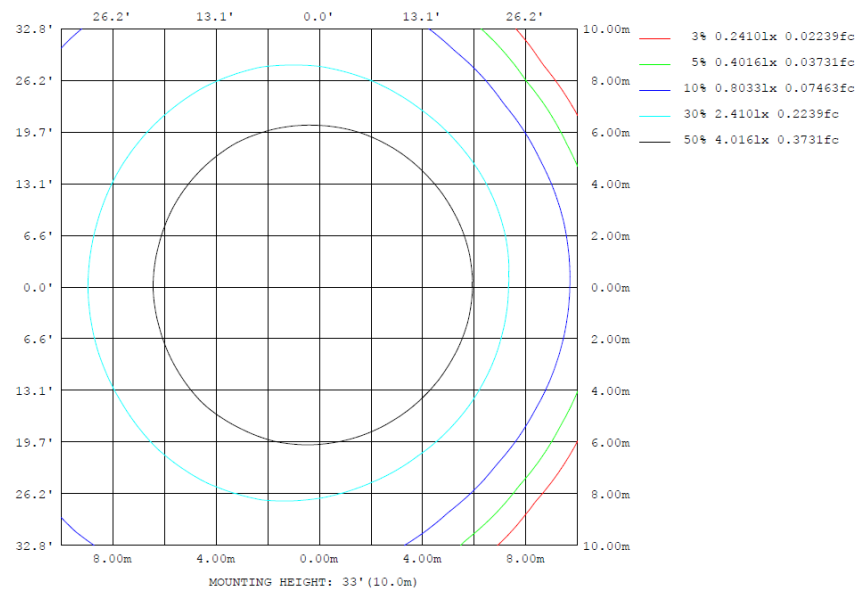
Flux (lm)	Field Angle (10%)		Beam Angle (50%)		Luminous Efficacy (lm/W)	Zonal Lumen Requirement	NEMA Type
	C0-180	C90-270	C0-180	C90-270		(0°-90°)	
1553	123.5	123.6	90.8	91.4	103.6	100.0%	6H x 6V

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	782.4	783.1	781.9	791.3	791.7	791.7	789.7	787.0	0- 10	75.83	75.83	4.88,4.88
20	735.9	732.8	735.8	753.8	755.8	755.6	747.8	739.4	10- 20	217.2	293.0	18.9,18.9
30	642.2	631.4	657.1	690.7	697.9	704.8	677.4	651.7	20- 30	327.6	620.6	40,40
40	342.5	356.8	504.8	593.6	604.2	605.8	558.6	410.2	30- 40	369.3	989.9	63.7,63.7
50	78.48	84.59	257.6	442.5	461.6	464.1	325.4	106.9	40- 50	296.1	1286	82.8,82.8
60	15.23	20.50	71.63	223.0	248.7	250.2	102.6	25.17	50- 60	170.9	1457	93.8,93.8
70	0.0130	0.5220	16.65	72.34	93.60	87.21	23.21	1.242	60- 70	71.16	1528	98.4,98.4
80	0.0157	0.0154	2.868	15.44	25.43	21.13	4.113	0.0285	70- 80	20.89	1549	99.7,99.7
90	0	0	0	0	0	0	0	0	80- 90	4.243	1553	100,100
100	0	0	0	0	0	0	0	0	90-100	0	1553	100,100
110	0	0	0	0	0	0	0	0	100-110	0	1553	100,100
120	0	0	0	0	0	0	0	0	110-120	0	1553	100,100
130	0	0	0	0	0	0	0	0	120-130	0	1553	100,100
140	0	0	0	0	0	0	0	0	130-140	0	1553	100,100
150	0	0	0	0	0	0	0	0	140-150	0	1553	100,100
160	0	0	0	0	0	0	0	0	150-160	0	1553	100,100
170	0	0	0	0	0	0	0	0	160-170	0	1553	100,100
180	0	0	0	0	0	0	0	0	170-180	0	1553	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

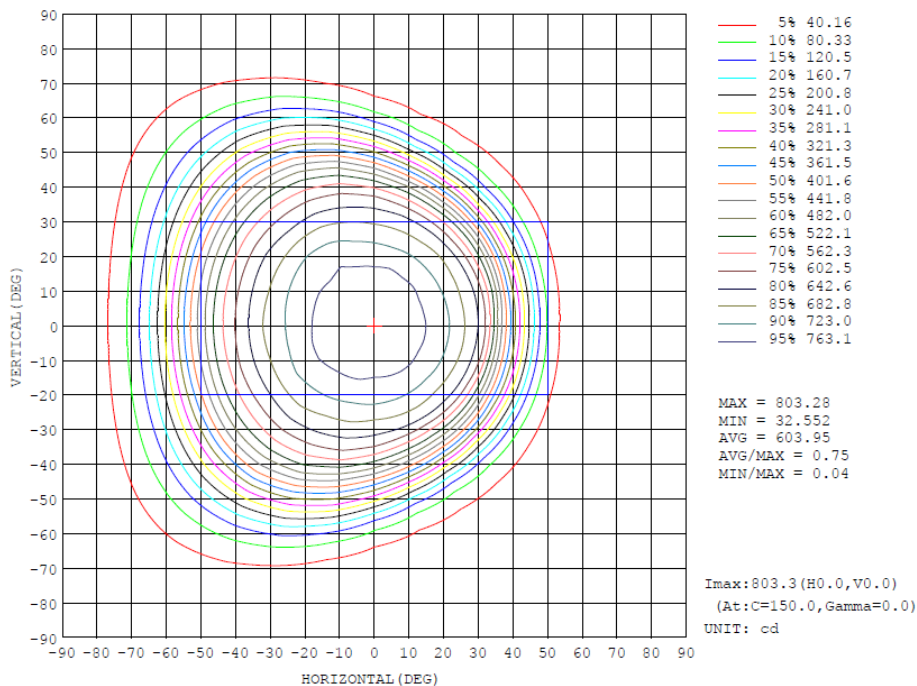
Zonal (lm)		Total (lm)		Percent
0-10	75.83	0-10	75.83	4.88%
10-20	217.17	0-20	293.00	18.86%
20-30	327.62	0-30	620.62	39.96%
30-40	369.32	0-40	989.94	63.73%
40-50	296.12	0-50	1286.06	82.80%
50-60	170.91	0-60	1456.97	93.80%
60-70	71.16	0-70	1528.13	98.38%
70-80	20.89	0-80	1549.02	99.73%
80-90	4.24	0-90	1553.26	100.00%
90-100	0.00	0-100	1553.26	100.00%
100-110	0.00	0-110	1553.26	100.00%
110-120	0.00	0-120	1553.26	100.00%
120-130	0.00	0-130	1553.26	100.00%
130-140	0.00	0-140	1553.26	100.00%
140-150	0.00	0-150	1553.26	100.00%
150-160	0.00	0-160	1553.26	100.00%
160-170	0.00	0-170	1553.26	100.00%
170-180	0.00	0-180	1553.26	100.00%

4.2 Goniophotometer Test

Area Flux Diagram

VERTICAL (DEG)	AREA FLUX DIAGRAM																		UNIT: lm	Φ t	Φ a
	0.01	0.04	0.08	0.11	0.14	0.14	0.13	0.10	0.06	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.86	0.00
90	0.02	0.08	0.19	0.34	0.52	0.66	0.70	0.61	0.45	0.28	0.14	0.05	0.01	0.00	0.00	0.00	0.00	0.00	0.00	4.04	0.00
80	0.02	0.12	0.35	0.77	1.40	2.11	2.64	2.63	2.07	1.31	0.71	0.35	0.11	0.01	0.00	0.00	0.00	0.00	0.00	14.6	6.75
70	0.03	0.18	0.60	1.52	3.09	5.12	6.95	7.76	7.05	5.06	2.71	1.23	0.53	0.13	0.01	0.00	0.00	0.00	0.00	42.0	38.0
60	0.03	0.24	0.94	2.58	5.47	9.10	12.3	14.2	14.2	12.3	8.39	4.01	1.42	0.48	0.07	0.00	0.00	0.00	0.00	85.7	83.1
50	0.03	0.31	1.32	3.80	7.96	12.4	15.9	18.3	19.1	18.4	15.4	9.82	3.89	1.01	0.22	0.01	0.00	0.00	0.00	128	126
40	0.04	0.37	1.68	4.96	9.88	14.5	18.1	20.8	21.7	21.4	19.5	15.2	7.78	2.07	0.40	0.03	0.00	0.00	0.00	158	157
30	0.04	0.42	1.97	5.82	11.0	15.7	19.5	22.1	23.4	23.2	21.4	18.0	11.0	3.43	0.55	0.05	0.00	0.00	0.00	178	176
20	0.04	0.45	2.13	6.25	11.6	16.2	20.0	22.7	24.1	24.0	22.2	18.9	12.5	4.24	0.65	0.07	0.00	0.00	0.00	186	185
10	0.04	0.45	2.12	6.21	11.5	16.2	19.9	22.7	24.0	23.9	22.2	18.9	12.2	4.13	0.64	0.06	0.00	0.00	0.00	185	184
0	0.04	0.41	1.93	5.70	10.9	15.5	19.3	21.9	23.1	23.0	21.2	17.6	10.3	3.16	0.52	0.05	0.00	0.00	0.00	175	173
-10	0.04	0.36	1.62	4.79	9.65	14.2	17.8	20.2	21.3	21.0	18.9	14.1	6.88	1.82	0.37	0.02	0.00	0.00	0.00	153	152
-20	0.03	0.29	1.24	3.61	7.64	12.0	15.4	17.6	18.3	17.1	13.8	8.32	3.20	0.89	0.20	0.01	0.00	0.00	0.00	120	118
-30	0.03	0.22	0.86	2.38	5.06	8.44	11.3	12.7	12.4	10.3	6.64	3.07	1.17	0.40	0.06	0.00	0.00	0.00	0.00	75.0	72.1
-40	0.02	0.16	0.53	1.34	2.70	4.42	5.86	6.29	5.42	3.69	1.97	0.97	0.42	0.10	0.00	0.00	0.00	0.00	0.00	33.9	29.3
-50	0.02	0.11	0.30	0.65	1.15	1.69	2.03	1.92	1.47	0.94	0.54	0.26	0.07	0.01	0.00	0.00	0.00	0.00	0.00	11.1	3.10
-60	0.01	0.07	0.15	0.27	0.39	0.48	0.50	0.43	0.32	0.20	0.10	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.00	2.97	0.00
-70	0.01	0.03	0.06	0.09	0.10	0.10	0.09	0.07	0.04	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.62	0.00
-80	0.01	0.03	0.06	0.09	0.10	0.10	0.09	0.07	0.04	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.62	0.00
-90	0.01	0.03	0.06	0.09	0.10	0.10	0.09	0.07	0.04	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.62	0.00
	0.50	4.30	18.1	51.2	100	149	188	213	219	206	176	131	71.4	21.9	3.69	0.29	0.00	0.00	0.00	1553	---
Φ a	0.00	0.28	14.0	47.7	97.0	146	185	210	215	203	173	127	67.7	17.3	0.00	0.00	0.00	0.00	0.00	---	1503

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	3.68	5.27	6.40	7.29	8.06	8.72	9.02	9.25	9.29	9.19	8.85	8.26	7.54	6.62	5.52	4.72	3.83	2.87
-70	0.00	5.54	8.18	10.7	13.3	16.3	19.7	23.4	27.1	30.8	33.8	35.5	36.2	35.5	33.1	28.9	25.4	21.4	16.6
-60	0.00	6.97	11.0	15.8	21.9	30.1	40.4	52.6	67.1	81.7	97.9	111	122	129	127	120	109	92.3	71.6
-50	0.00	8.26	14.0	22.2	34.2	50.7	73.5	101	136	174	216	254	285	312	323	325	315	290	258
-40	0.00	9.38	17.2	29.6	48.9	77.8	116	167	228	295	361	422	465	499	526	533	539	527	505
-30	0.00	10.4	20.4	37.2	64.6	106	164	237	322	408	480	534	578	612	636	652	661	663	657
-20	0.00	11.1	23.0	44.0	79.2	132	206	299	397	484	550	602	642	679	705	721	732	737	736
-10	0.00	11.6	24.7	49.0	89.3	151	237	341	445	528	591	640	682	716	746	764	777	783	782
0	0.00	11.8	25.4	51.1	93.6	158	249	358	462	543	604	656	698	726	756	777	792	799	803
10	0.00	11.7	25.0	49.8	90.7	153	240	346	450	532	593	644	686	721	746	765	779	789	790
20	0.00	11.3	23.6	45.5	81.6	136	212	308	409	492	560	612	654	688	720	739	751	746	748
30	0.00	10.6	21.4	39.2	68.4	111	170	247	335	421	492	548	591	622	649	671	680	682	677
40	0.00	9.68	18.3	31.7	53.2	83.4	124	178	243	312	381	443	489	525	551	567	577	571	559
50	0.00	8.59	15.0	24.4	38.1	56.7	81.2	113	150	194	241	284	321	357	374	381	376	355	325
60	0.00	7.30	12.0	17.8	25.0	34.7	47.1	61.7	78.0	96.9	117	134	149	160	163	159	147	128	103
70	0.00	5.84	9.00	12.3	15.6	19.8	24.0	28.8	33.9	39.3	43.6	46.8	49.3	48.9	46.0	41.1	36.3	30.3	23.2
80	0.00	3.90	5.90	7.53	8.80	9.96	11.1	11.8	12.3	12.7	12.6	12.1	11.4	10.4	9.22	7.69	6.62	5.42	4.11
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

Table--2										UNIT: cd									
H (DEG)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	
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	2.18	1.48	0.80	0.53	0.28	0.09	0.05	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.02	
-70	13.8	10.7	7.75	5.29	2.98	1.33	0.63	0.20	0.03	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.00	
-60	58.3	43.9	32.5	25.4	18.5	12.4	6.94	2.62	0.68	0.11	0.02	0.01	0.01	0.02	0.02	0.02	0.02	0.00	
-50	214	163	119	82.9	54.5	39.7	28.1	18.2	9.76	3.15	0.33	0.01	0.01	0.01	0.02	0.02	0.02	0.00	
-40	468	417	352	267	188	117	71.0	42.7	27.3	14.8	5.63	0.72	0.01	0.01	0.01	0.02	0.02	0.00	
-30	647	622	575	511	419	303	191	102	51.8	29.6	14.9	4.28	0.22	0.01	0.01	0.02	0.02	0.00	
-20	734	719	694	659	598	486	349	214	103	45.1	24.2	9.48	1.24	0.01	0.01	0.02	0.02	0.00	
-10	778	767	749	716	674	609	457	308	164	68.2	30.8	13.7	2.53	0.01	0.01	0.02	0.02	0.00	
0	797	782	763	736	695	642	503	342	192	78.5	33.0	15.2	3.09	0.01	0.01	0.02	0.02	0.00	
10	786	772	751	717	678	621	486	319	176	69.7	31.7	14.3	2.65	0.01	0.01	0.02	0.02	0.00	
20	742	727	703	676	622	527	384	237	118	48.2	25.9	10.2	1.36	0.01	0.02	0.02	0.02	0.00	
30	668	651	616	559	471	352	226	123	58.3	32.6	16.9	4.88	0.30	0.02	0.02	0.02	0.03	0.00	
40	528	483	417	331	239	150	85.6	48.9	31.3	17.4	6.49	0.94	0.02	0.02	0.02	0.02	0.03	0.00	
50	279	222	164	112	70.3	48.2	33.8	22.4	12.1	4.21	0.57	0.03	0.02	0.02	0.03	0.03	0.03	0.00	
60	82.1	60.2	42.7	32.7	23.9	16.3	9.56	3.94	1.28	0.30	0.04	0.02	0.02	0.03	0.03	0.03	0.03	0.00	
70	19.1	14.7	10.5	7.42	4.54	2.30	1.15	0.39	0.06	0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.00	
80	3.18	2.21	1.28	0.85	0.48	0.18	0.11	0.06	0.03	0.03	0.04	0.04	0.04	0.05	0.05	0.05	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

Model No.	BULLET20 @15W3000K	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	0.126	15.0	0.990	14.39

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*****