

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: 2024-12-25

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		1199
Minimum Luminaire Efficacy (lm/W) (Goniophotometer – Section 4.2)	ANSI/IES LM-79:2019	Standard	Premium	113.1
		105	120	
Power (Input Wattage) (W) (Goniophotometer – Section 4.2)	ANSI/IES LM-79:2019	Worst Case		10.6
Total Harmonic Distortion (A%) (THD & PF – Section 4.3)	ANSI C82.77:2002 ANSI C82-77-10:2020	20.00%	1200V	13.60
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	5029±283	5110
		4 steps	5029±220	
Minimum CRI (Integrating Sphere – Section 4.1)	ANSI/IES LM-79:2019 CIE13.3-1995	≥70		82.8
Minimum R9 (Integrating Sphere – Section 4.1)	ANSI/IES LM-79-2019 CIE13.3-1995	N/A		11
Minimum Rf (Integrating Sphere – Section 4.1)	ANSI/IES TM-30-18	≥70		83
Minimum Rg (Integrating Sphere – Section 4.1)	ANSI/IES TM-30-18	≥89		98
IES Rcs,h1 (Integrating Sphere – Section 4.1)	ANSI/IES TM-30-18	-18%≤IES Rcs,h1≤+23%		-12%
Zonal Lumen Requirement (0°-90°) (Goniophotometer – Section 4.2)	ANSI/IES LM-79:2019	≥85%		100.0%
Input Voltage (V)				
(Goniophotometer – Section 4.2)	ANSI/IES LM-79:2019	Worst Cast		120.0
(Goniophotometer – Section 4.2)		Non-Worst Case		N/A
Input Current (A)				
(Goniophotometer – Section 4.2)	ANSI/IES LM-79:2019	Worst Case		0.089
(Goniophotometer – Section 4.2)		Non-Worst Case		N/A
Power (Input Wattage – W)				
(Goniophotometer – Section 4.2)	ANSI/IES LM-79:2019	Worst Case		10.6
(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	2024-12-24	BULLET20 @10W5000K	ES 1st ES #3-2	241216013-S1
2	Goniophotometer Test	2024-12-24	BULLET20 @10W5000K	ES 1st ES #3-2	241216013-S1
3	THD and PF Test	2024-12-24	BULLET20 @10W5000K	ES 1st ES #3-2	241216013-S1

Remark (If any):

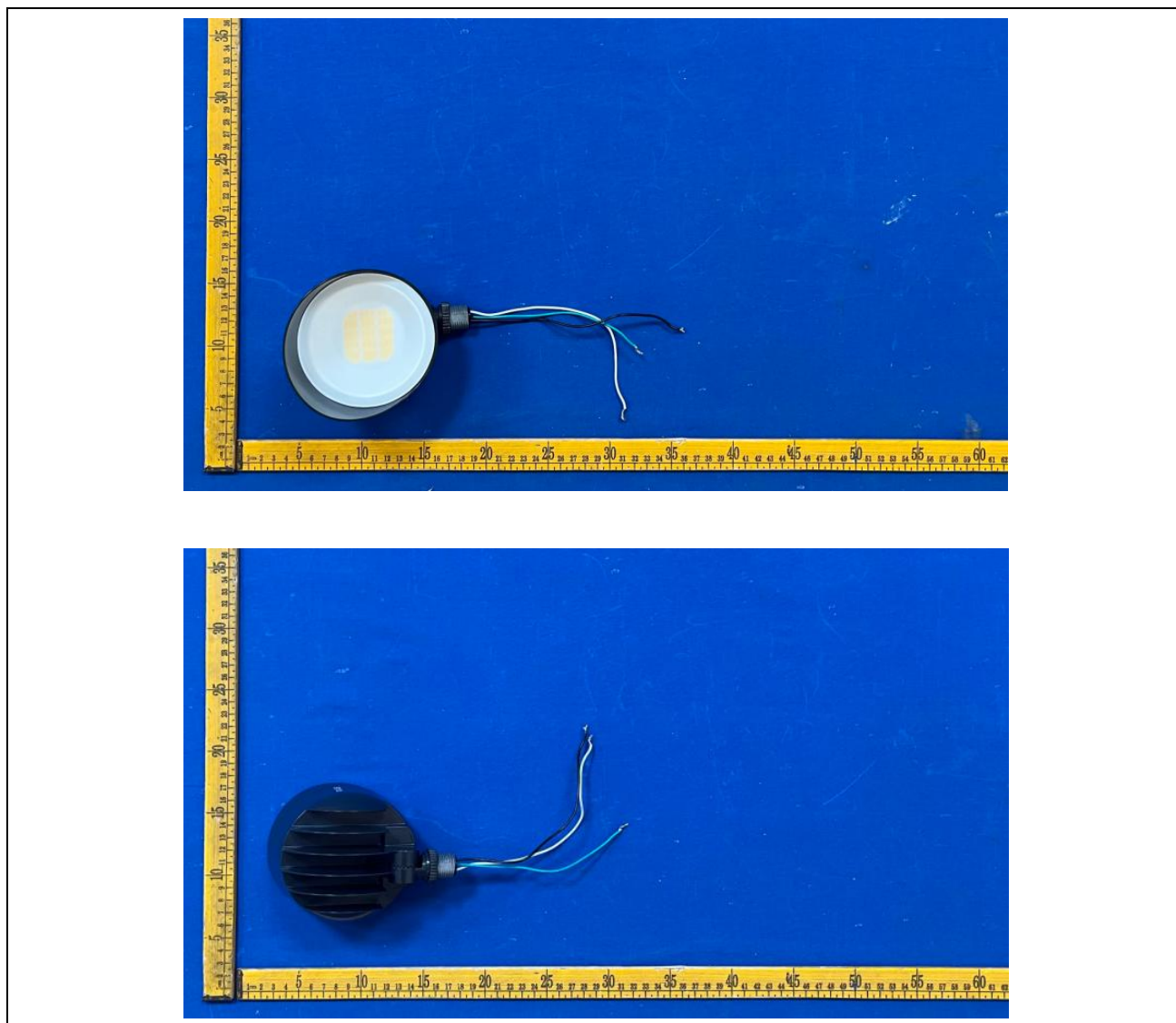
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3. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the U.S. Government.

3.0 Product Description

Luminaire Description: Model No. BULLET20 @10W5000K, 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 @10W5000K	Sample ID	241216013-S1
Operate time (Min.)	10	Stabilization time (Min.)	60
Temperature (°C)	25.4	Humidity (%RH)	41.0

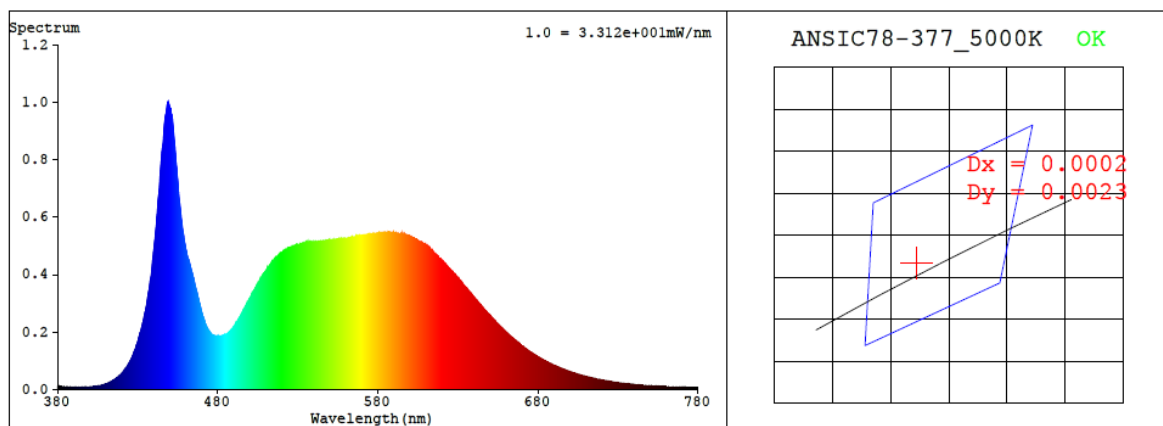
Test Method
<p>The Samples were tested according to the ANSI/IES LM-79:2019.</p> <p>Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25±1°C.</p> <p>The sample measurements were made 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	0.089	10.6	0.991

CCT (K)	CRI	R9	Duv	Rf	Rg	IES Rcs,h1
5110	82.8	11	0.0011	83	98	-12%

4.1 Integrating Sphere Test



Colorimetric Parameters

Chromaticity Coordinate: $x = 0.3423$ $y = 0.3515$ / $u' = 0.2096$ $v' = 0.4842$ ($duv=1.09e-03$)

CCT= 5110K Prcp WL: Ld=569.8nm Purity=8.2%

Peak WL: Lp=449nm FWHM: =19.5nm Ratio:R=15.7% G=80.1% B=4.2%

Render Index: Ra = 82.8 AvgR = 76.0 TM30:Rf=83 Rg=97

EEL: 0.12193 A+

R1 =82	R2 =86	R3 =89	R4 =84	R5 =83	R6 =82	R7 =87
R8 =69	R9 =11	R10=67	R11=84	R12=61	R13=83	R14=94 R15=77

4.1 Integrating Sphere Test

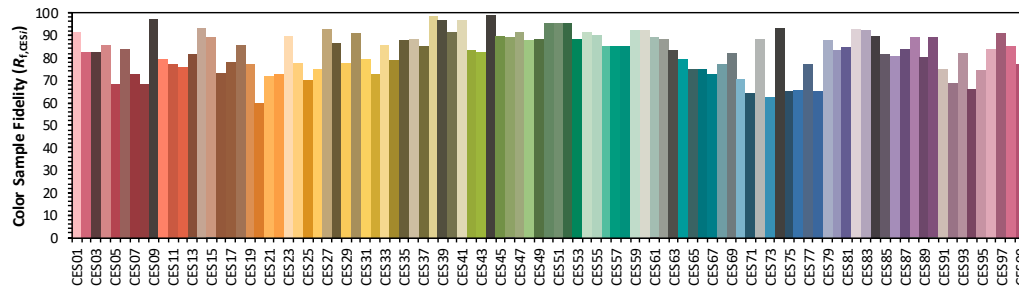
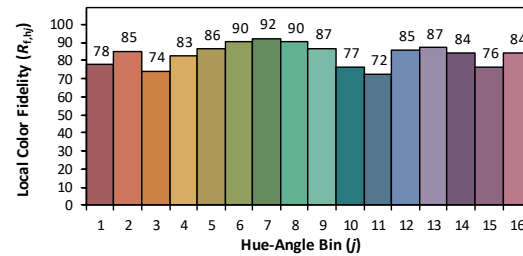
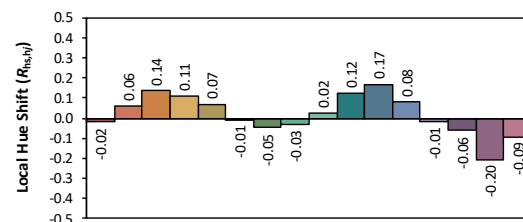
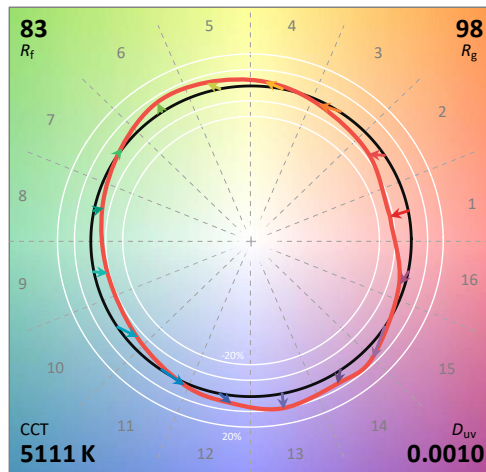
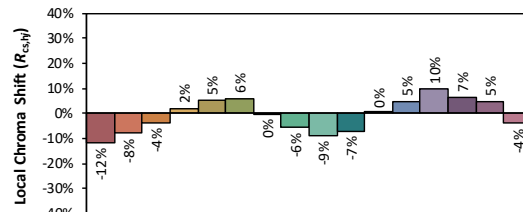
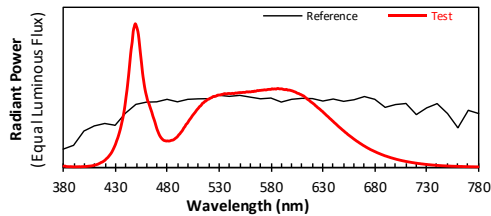
ANSI/IES TM-30-18 Color Rendition Report

Source: 1 CIE F1

Manufacturer: RAB Lighting Inc.

Date: 2024/12/25

Model: BULLET20 @10W5000K



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

x 0.3422
 y 0.3513
 u' 0.2096
 v' 0.4841

CIE 13.3-1995
(CRI)
 R_a 83
 R_g 11

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	1.16E-05	447	9.44E-04	514	4.47E-04	581	5.47E-04	648	2.70E-04	715	3.86E-05
381	1.27E-05	448	9.75E-04	515	4.51E-04	582	5.45E-04	649	2.63E-04	716	3.72E-05
382	1.00E-05	449	9.97E-04	516	4.58E-04	583	5.46E-04	650	2.58E-04	717	3.61E-05
383	8.60E-06	450	9.80E-04	517	4.62E-04	584	5.46E-04	651	2.51E-04	718	3.52E-05
384	8.80E-06	451	9.58E-04	518	4.68E-04	585	5.45E-04	652	2.45E-04	719	3.38E-05
385	7.70E-06	452	9.21E-04	519	4.73E-04	586	5.48E-04	653	2.40E-04	720	3.29E-05
386	8.70E-06	453	8.58E-04	520	4.75E-04	587	5.49E-04	654	2.33E-04	721	3.19E-05
387	8.10E-06	454	7.88E-04	521	4.80E-04	588	5.46E-04	655	2.27E-04	722	3.08E-05
388	8.10E-06	455	7.25E-04	522	4.84E-04	589	5.46E-04	656	2.22E-04	723	2.98E-05
389	7.00E-06	456	6.57E-04	523	4.87E-04	590	5.47E-04	657	2.17E-04	724	2.92E-05
390	7.40E-06	457	6.06E-04	524	4.93E-04	591	5.45E-04	658	2.11E-04	725	2.78E-05
391	7.40E-06	458	5.59E-04	525	4.94E-04	592	5.43E-04	659	2.06E-04	726	2.72E-05
392	7.50E-06	459	5.22E-04	526	4.95E-04	593	5.41E-04	660	2.00E-04	727	2.63E-05
393	7.80E-06	460	4.93E-04	527	4.96E-04	594	5.41E-04	661	1.95E-04	728	2.55E-05
394	7.70E-06	461	4.63E-04	528	5.01E-04	595	5.43E-04	662	1.90E-04	729	2.46E-05
395	8.40E-06	462	4.48E-04	529	5.03E-04	596	5.38E-04	663	1.84E-04	730	2.38E-05
396	7.30E-06	463	4.26E-04	530	5.04E-04	597	5.38E-04	664	1.80E-04	731	2.33E-05
397	8.30E-06	464	4.05E-04	531	5.04E-04	598	5.37E-04	665	1.75E-04	732	2.22E-05
398	8.40E-06	465	3.83E-04	532	5.07E-04	599	5.36E-04	666	1.70E-04	733	2.18E-05
399	8.70E-06	466	3.57E-04	533	5.08E-04	600	5.33E-04	667	1.66E-04	734	2.10E-05
400	9.10E-06	467	3.37E-04	534	5.10E-04	601	5.31E-04	668	1.61E-04	735	2.04E-05
401	9.40E-06	468	3.15E-04	535	5.13E-04	602	5.28E-04	669	1.56E-04	736	1.96E-05
402	1.01E-05	469	2.90E-04	536	5.13E-04	603	5.26E-04	670	1.52E-04	737	1.92E-05
403	1.08E-05	470	2.67E-04	537	5.11E-04	604	5.23E-04	671	1.48E-04	738	1.85E-05
404	1.17E-05	471	2.49E-04	538	5.13E-04	605	5.18E-04	672	1.43E-04	739	1.82E-05
405	1.23E-05	472	2.32E-04	539	5.14E-04	606	5.15E-04	673	1.39E-04	740	1.73E-05
406	1.31E-05	473	2.18E-04	540	5.14E-04	607	5.13E-04	674	1.35E-04	741	1.69E-05
407	1.40E-05	474	2.08E-04	541	5.13E-04	608	5.09E-04	675	1.32E-04	742	1.66E-05
408	1.57E-05	475	1.99E-04	542	5.14E-04	609	5.07E-04	676	1.27E-04	743	1.59E-05
409	1.69E-05	476	1.93E-04	543	5.16E-04	610	5.03E-04	677	1.24E-04	744	1.56E-05
410	1.92E-05	477	1.89E-04	544	5.13E-04	611	4.99E-04	678	1.21E-04	745	1.50E-05
411	2.09E-05	478	1.87E-04	545	5.16E-04	612	4.95E-04	679	1.17E-04	746	1.46E-05
412	2.35E-05	479	1.85E-04	546	5.18E-04	613	4.88E-04	680	1.14E-04	747	1.43E-05
413	2.60E-05	480	1.87E-04	547	5.16E-04	614	4.83E-04	681	1.11E-04	748	1.39E-05
414	2.95E-05	481	1.86E-04	548	5.19E-04	615	4.76E-04	682	1.07E-04	749	1.36E-05
415	3.32E-05	482	1.86E-04	549	5.20E-04	616	4.71E-04	683	1.04E-04	750	1.30E-05
416	3.73E-05	483	1.88E-04	550	5.21E-04	617	4.67E-04	684	1.01E-04	751	1.29E-05
417	4.01E-05	484	1.91E-04	551	5.21E-04	618	4.60E-04	685	9.81E-05	752	1.25E-05
418	4.42E-05	485	1.92E-04	552	5.21E-04	619	4.54E-04	686	9.51E-05	753	1.23E-05
419	4.93E-05	486	1.95E-04	553	5.22E-04	620	4.50E-04	687	9.21E-05	754	1.19E-05
420	5.50E-05	487	2.00E-04	554	5.22E-04	621	4.44E-04	688	8.95E-05	755	1.15E-05
421	6.28E-05	488	2.06E-04	555	5.22E-04	622	4.38E-04	689	8.66E-05	756	1.14E-05
422	6.88E-05	489	2.11E-04	556	5.25E-04	623	4.31E-04	690	8.38E-05	757	1.11E-05
423	7.66E-05	490	2.18E-04	557	5.26E-04	624	4.25E-04	691	8.16E-05	758	1.10E-05
424	8.56E-05	491	2.29E-04	558	5.24E-04	625	4.18E-04	692	7.94E-05	759	1.06E-05
425	9.49E-05	492	2.35E-04	559	5.26E-04	626	4.12E-04	693	7.68E-05	760	1.03E-05
426	1.05E-04	493	2.45E-04	560	5.25E-04	627	4.07E-04	694	7.47E-05	761	1.01E-05
427	1.18E-04	494	2.54E-04	561	5.26E-04	628	4.01E-04	695	7.22E-05	762	9.90E-06
428	1.33E-04	495	2.65E-04	562	5.29E-04	629	3.94E-04	696	6.99E-05	763	9.60E-06
429	1.49E-04	496	2.77E-04	563	5.27E-04	630	3.89E-04	697	6.79E-05	764	9.70E-06
430	1.66E-04	497	2.86E-04	564	5.31E-04	631	3.81E-04	698	6.59E-05	765	9.30E-06
431	1.87E-04	498	3.00E-04	565	5.30E-04	632	3.75E-04	699	6.38E-05	766	9.00E-06
432	2.06E-04	499	3.06E-04	566	5.32E-04	633	3.68E-04	700	6.19E-05	767	8.90E-06
433	2.29E-04	500	3.17E-04	567	5.35E-04	634	3.61E-04	701	5.97E-05	768	8.60E-06
434	2.54E-04	501	3.29E-04	568	5.34E-04	635	3.55E-04	702	5.79E-05	769	8.40E-06
435	2.81E-04	502	3.38E-04	569	5.36E-04	636	3.48E-04	703	5.62E-05	770	8.40E-06
436	3.14E-04	503	3.48E-04	570	5.36E-04	637	3.41E-04	704	5.44E-05	771	8.40E-06
437	3.45E-04	504	3.59E-04	571	5.37E-04	638	3.35E-04	705	5.26E-05	772	8.10E-06
438	3.85E-04	505	3.68E-04	572	5.38E-04	639	3.28E-04	706	5.12E-05	773	7.80E-06
439	4.30E-04	506	3.77E-04	573	5.39E-04	640	3.22E-04	707	4.94E-05	774	7.70E-06
440	4.87E-04	507	3.86E-04	574	5.40E-04	641	3.14E-04	708	4.80E-05	775	7.70E-06
441	5.40E-04	508	3.97E-04	575	5.39E-04	642	3.08E-04	709	4.66E-05	776	7.40E-06
442	6.04E-04	509	4.06E-04	576	5.40E-04	643	3.02E-04	710	4.48E-05	777	7.30E-06
443	6.73E-04	510	4.13E-04	577	5.42E-04	644	2.95E-04	711	4.38E-05	778	7.10E-06
444	7.50E-04	511	4.23E-04	578	5.43E-04	645	2.88E-04	712	4.24E-05	779	7.10E-06
445	8.20E-04	512	4.28E-04	579	5.43E-04	646	2.82E-04	713	4.10E-05	780	7.10E-06
446	8.70E-04	513	4.37E-04	580	5.43E-04	647	2.76E-04	714	3.98E-05	N/A	N/A

4.0 LM-79 Measurement and Test Results

4.2 Goniophotometer Test

Model No.	BULLET20 @10W5000K	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

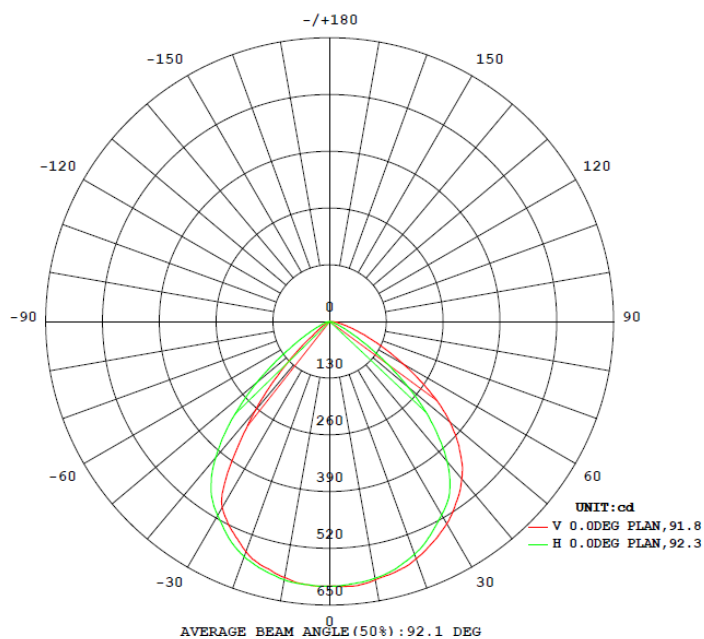
Condition	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
WORST CASE	120.0	60	0.089	10.6	0.991
NON-WORST CASE	N/A	N/A	N/A	N/A	N/A

Test Result

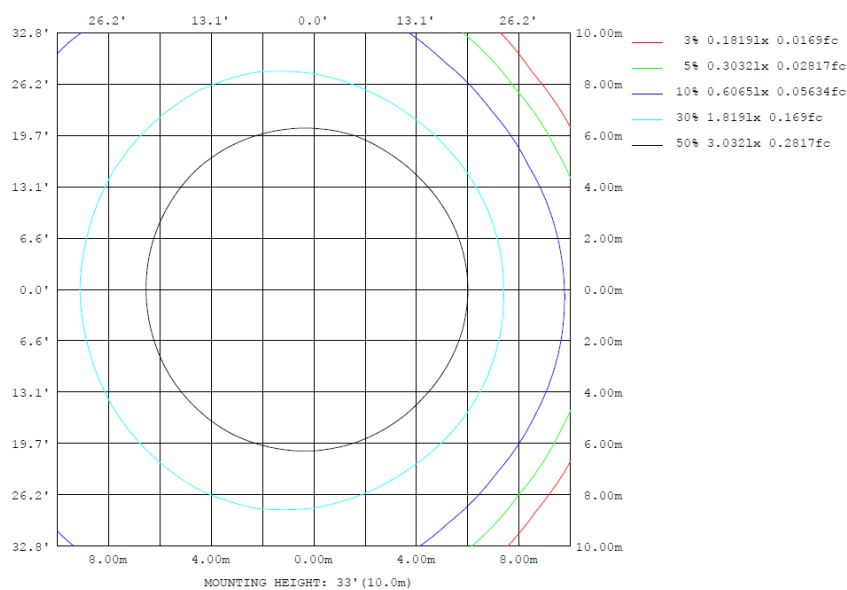
Flux (lm)	Field Angle (10%)		Beam Angle (50%)		Luminous Efficacy (lm/W)	Zonal Lumen Requirement	NEMA Type
	C0-180	C90-270	C0-180	C90-270		(0°-90°)	
1199	123.9	125.5	91.7	93.6	113.1	100.0%	6H x 6V

4.2 Goniophotometer Test

Lighting Distribution Curve



Isolux Plot



4.2 Goniophotometer Test

Zonal Lumen Summary

ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	Φlum, lamp
10	595.6	596.1	597.4	601.2	601.2	604.2	601.2	599.6	0- 10	57.64	57.64	4.81,4.81
20	561.3	561.0	567.6	577.7	578.6	579.2	573.3	564.6	10- 20	165.8	223.5	18.6,18.6
30	492.7	492.2	512.2	533.6	535.8	537.9	513.1	493.1	20- 30	251.2	474.7	39.6,39.6
40	263.9	312.7	418.1	463.7	470.5	463.4	406.3	283.3	30- 40	285.0	759.6	63.4,63.4
50	62.07	79.84	236.1	357.9	359.5	348.8	219.5	71.68	40- 50	230.3	989.9	82.6,82.6
60	12.09	17.13	69.12	192.3	194.4	178.1	65.62	18.89	50- 60	133.5	1123	93.7,93.7
70	0.0100	0.4346	14.63	64.90	72.68	60.42	15.85	0.9340	60- 70	55.59	1179	98.4,98.4
80	0.0127	0.0118	2.396	13.78	20.51	14.18	3.037	0.0232	70- 80	16.28	1195	99.7,99.7
90	0	0	0	0	0	0	0	0	80- 90	3.273	1199	100,100
100	0	0	0	0	0	0	0	0	90-100	0	1199	100,100
110	0	0	0	0	0	0	0	0	100-110	0	1199	100,100
120	0	0	0	0	0	0	0	0	110-120	0	1199	100,100
130	0	0	0	0	0	0	0	0	120-130	0	1199	100,100
140	0	0	0	0	0	0	0	0	130-140	0	1199	100,100
150	0	0	0	0	0	0	0	0	140-150	0	1199	100,100
160	0	0	0	0	0	0	0	0	150-160	0	1199	100,100
170	0	0	0	0	0	0	0	0	160-170	0	1199	100,100
180	0	0	0	0	0	0	0	0	170-180	0	1199	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

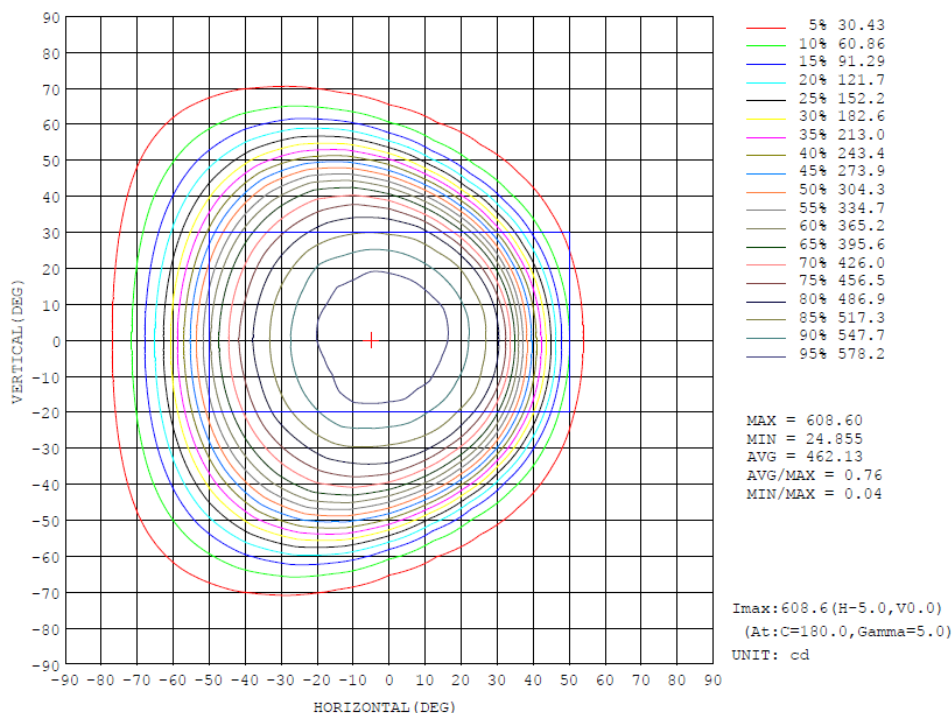
Zonal (lm)		Total (lm)		Percent
0-10	57.64	0-10	57.64	4.81%
10-20	165.83	0-20	223.47	18.64%
20-30	251.21	0-30	474.68	39.60%
30-40	284.95	0-40	759.63	63.38%
40-50	230.30	0-50	989.93	82.59%
50-60	133.52	0-60	1123.45	93.73%
60-70	55.59	0-70	1179.04	98.37%
70-80	16.28	0-80	1195.32	99.73%
80-90	3.27	0-90	1198.59	100.00%
90-100	0.00	0-100	1198.59	100.00%
100-110	0.00	0-110	1198.59	100.00%
110-120	0.00	0-120	1198.59	100.00%
120-130	0.00	0-130	1198.59	100.00%
130-140	0.00	0-140	1198.59	100.00%
140-150	0.00	0-150	1198.59	100.00%
150-160	0.00	0-160	1198.59	100.00%
160-170	0.00	0-170	1198.59	100.00%
170-180	0.00	0-180	1198.59	100.00%

4.2 Goniophotometer Test

Area Flux Diagram

	AREA FLUX DIAGRAM																			UNIT:lm					Φ t	Φ a
90	0.00	0.03	0.06	0.08	0.10	0.10	0.09	0.07	0.05	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.61	0.00					
80	0.01	0.06	0.14	0.24	0.36	0.44	0.46	0.40	0.31	0.20	0.11	0.04	0.01	0.00	0.00	0.00	0.00	0.00	0.00	2.78	0.00					
70	0.02	0.09	0.26	0.55	0.98	1.44	1.75	1.70	1.35	0.88	0.51	0.26	0.08	0.01	0.00	0.00	0.00	0.00	0.00	9.88	3.60					
60	0.02	0.13	0.44	1.10	2.19	3.58	4.79	5.26	4.68	3.28	1.79	0.87	0.39	0.10	0.00	0.00	0.00	0.00	0.00	28.6	25.4					
50	0.02	0.18	0.70	1.89	4.00	6.71	9.04	10.3	10.2	8.48	5.55	2.61	1.00	0.36	0.05	0.00	0.00	0.00	0.00	61.0	58.9					
40	0.03	0.24	0.99	2.83	5.99	9.42	12.1	13.8	14.4	13.6	11.0	6.67	2.60	0.74	0.17	0.01	0.00	0.00	0.00	94.6	93.1					
30	0.03	0.29	1.27	3.74	7.56	11.1	13.9	15.7	16.6	16.3	14.7	11.1	5.40	1.47	0.31	0.02	0.00	0.00	0.00	120	118					
VERTICAL (DEG)	0.03	0.33	1.51	4.45	8.52	12.1	14.9	16.9	17.8	17.7	16.4	13.7	8.07	2.49	0.43	0.04	0.00	0.00	0.00	135	134					
	0.03	0.35	1.65	4.85	8.98	12.5	15.3	17.3	18.3	18.3	17.0	14.5	9.48	3.23	0.51	0.05	0.00	0.00	0.00	142	142					
	0.03	0.35	1.66	4.87	8.99	12.5	15.3	17.2	18.3	18.2	16.9	14.5	9.57	3.30	0.51	0.05	0.00	0.00	0.00	142	141					
	0.03	0.33	1.53	4.53	8.55	12.1	14.9	16.8	17.7	17.5	16.2	13.7	8.38	2.66	0.42	0.04	0.00	0.00	0.00	135	134					
	0.03	0.28	1.30	3.87	7.65	11.1	13.9	15.7	16.5	16.2	14.8	11.5	5.98	1.58	0.30	0.02	0.00	0.00	0.00	121	120					
	0.03	0.23	1.01	2.97	6.21	9.56	12.2	13.9	14.5	13.8	11.5	7.42	2.96	0.76	0.16	0.00	0.00	0.00	0.00	97.2	95.8					
	0.02	0.18	0.71	2.00	4.26	7.04	9.38	10.6	10.6	9.05	6.14	2.93	1.05	0.34	0.05	0.00	0.00	0.00	0.00	64.4	62.4					
	0.02	0.13	0.44	1.15	2.35	3.87	5.18	5.68	5.05	3.53	1.86	0.85	0.35	0.08	0.00	0.00	0.00	0.00	0.00	30.5	27.5					
	0.02	0.09	0.25	0.55	1.02	1.54	1.91	1.85	1.40	0.86	0.46	0.21	0.06	0.00	0.00	0.00	0.00	0.00	0.00	10.2	4.40					
	0.01	0.06	0.13	0.23	0.35	0.44	0.47	0.40	0.29	0.17	0.08	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.00	2.66	0.00					
-90	0.00	0.02	0.05	0.07	0.09	0.09	0.08	0.06	0.04	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.53	0.00					
	-90	-80	-70	-60	-50	-40	-30	-20	HORIZONTAL (DEG)	20	30	40	50	60	70	80	90									
Φ t	0.39	3.35	14.1	40.0	78.1	116	146	164	168	158	135	101	55.4	17.1	2.91	0.23	0.00	0.00	0.00	1199	---					
Φ a	0.00	0.28	11.1	37.4	75.7	113	143	162	166	156	132	98.1	52.6	13.7	0.00	0.00	0.00	0.00	0.00	---	1161					

Isocandela



4.2 Goniophotometer Test

Luminous Distribution Intensity Data

H (DBG)	UNIT: cd																		
Y (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	2.84	4.16	5.14	5.92	6.62	7.33	7.74	8.02	8.26	8.12	7.81	7.40	6.78	5.92	4.86	4.12	3.29	2.40
-70	0.00	4.31	6.15	8.70	10.9	13.5	16.6	20.0	23.6	27.4	30.6	32.7	34.2	33.8	31.5	27.7	24.1	19.7	14.6
-60	0.00	5.44	8.78	12.7	17.9	25.0	34.1	45.1	57.6	73.0	87.4	99.7	111	118	118	114	104	88.6	69.1
-50	0.00	6.46	11.1	17.9	27.9	41.9	60.9	86.5	116	149	185	218	245	269	280	283	278	260	238
-40	0.00	7.34	13.5	23.8	39.7	63.1	95.9	139	190	244	297	342	376	402	422	430	437	430	416
-30	0.00	8.08	16.1	29.6	51.9	86.0	133	193	262	328	379	420	453	476	496	510	515	515	512
-20	0.00	8.65	18.3	34.8	62.7	105	165	240	317	381	431	471	502	526	545	559	567	569	568
-10	0.00	9.02	19.8	38.3	70.2	119	187	269	350	412	460	495	527	551	568	580	593	597	597
0	0.00	9.17	20.5	39.7	72.7	123	194	279	359	422	470	505	538	558	579	593	601	609	606
10	0.00	9.05	20.0	38.4	69.8	118	184	266	348	411	459	497	528	551	571	586	598	600	601
20	0.00	8.71	18.5	34.9	62.3	104	161	233	311	379	431	470	502	527	550	561	567	574	573
30	0.00	8.17	16.3	29.9	51.5	84.0	128	186	252	319	376	419	451	477	496	508	514	517	513
40	0.00	7.44	13.8	24.3	40.0	62.3	92.4	131	179	232	285	332	368	396	418	424	430	421	406
50	0.00	6.59	11.4	18.5	28.5	42.0	59.6	82.0	109	138	172	204	229	251	263	267	261	243	219
60	0.00	5.58	9.08	13.2	18.9	25.6	34.3	44.4	55.5	68.0	81.1	91.8	101	108	108	104	96.1	82.6	65.6
70	0.00	4.44	6.82	9.21	11.6	14.2	17.6	20.8	24.0	27.2	29.9	31.5	32.5	32.1	30.1	26.6	23.3	20.1	15.9
80	0.00	2.95	4.44	5.62	6.60	7.27	7.97	8.40	8.67	8.82	8.65	8.28	7.61	7.02	6.29	5.35	4.65	3.88	3.15
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: °C					
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	1.81	1.22	0.65	0.43	0.23	0.07	0.04	0.02	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.00	
-70	12.0	9.15	6.38	4.31	2.43	1.08	0.51	0.17	0.02	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.00	
-60	55.1	40.1	28.6	21.8	15.5	10.3	5.73	2.10	0.56	0.10	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.00	
-50	200	156	115	79.7	49.3	34.5	23.7	15.1	8.04	2.55	0.26	0.01	0.01	0.01	0.01	0.01	0.02	0.00	
-40	393	359	310	248	178	112	65.6	36.8	22.7	12.2	4.43	0.58	0.01	0.01	0.01	0.01	0.02	0.00	
-30	506	492	461	419	356	271	175	92.9	44.1	24.3	12.2	3.45	0.18	0.01	0.01	0.01	0.02	0.00	
-20	562	552	534	511	471	399	294	185	89.8	36.9	19.6	7.87	0.99	0.01	0.01	0.01	0.02	0.00	
-10	593	583	568	545	519	474	367	249	136	53.3	24.7	11.0	2.02	0.01	0.01	0.01	0.02	0.00	
0	605	596	582	561	529	493	392	264	150	62.1	26.2	12.1	2.46	0.01	0.01	0.01	0.02	0.00	
10	597	588	576	551	520	471	360	239	129	52.8	24.9	11.2	2.09	0.01	0.01	0.01	0.02	0.00	
20	567	555	536	515	467	386	273	166	80.4	36.9	20.1	8.04	1.06	0.01	0.01	0.02	0.02	0.00	
30	508	492	454	403	332	239	150	84.4	42.5	24.9	12.8	3.77	0.23	0.01	0.01	0.02	0.02	0.00	
40	377	337	284	219	154	98.7	58.1	35.7	23.6	13.2	4.97	0.71	0.01	0.01	0.02	0.02	0.02	0.00	
50	184	143	106	73.5	48.1	34.6	25.1	16.7	9.16	3.21	0.43	0.02	0.02	0.02	0.02	0.02	0.02	0.00	
60	53.5	40.5	30.1	23.7	17.5	12.2	7.26	3.60	0.97	0.22	0.03	0.02	0.02	0.02	0.03	0.03	0.03	0.00	
70	13.3	10.6	7.87	5.60	3.44	1.76	0.87	0.29	0.05	0.03	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.00	
80	2.36	1.65	0.97	0.65	0.36	0.14	0.08	0.05	0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.03	0.00	
90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
110	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
120	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
130	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
140	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
150	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
160	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
170	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
180	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

4.0 LM-79 Measurement and Test Results

4.3 THD and PF Test

Model No.	BULLET20 @10W5000K	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	0.089	10.6	0.991	13.60

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*****