

Photometric Test Report

Relevant Standards

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

Prepared For

RAB Lighting Inc.

Address: 408 W 14th St New York, NY 10014

Prepared By

Dongguan New Testing Centre Co., Ltd.

Address: 3F No. 1 the 1st North Industry Road, Songshan Lake Science & Technology Park, Dongguan, Guangdong, China

Prepare by:

Alan Wang

Engineer: Alan Wang

Date: 2024-12-25

Review by:

Vincent Yuan

Technical Lead: Vincent Yuan

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		1324
Minimum Luminaire Efficacy (lm/W) (Goniophotometer – Section 4.2)	ANSI/IES LM-79:2019	Standard	Premium	107.6
		105	120	
Power (Input Wattage) (W) (Goniophotometer – Section 4.2)	ANSI/IES LM-79:2019	Worst Case		12.3
Total Harmonic Distortion (A%) (THD & PF – Section 4.3)	ANSI C82.77:2002 ANSI C82-77-10:2020	20.00%	120V	14.53
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	3985±275	3920
		4 steps	3985±154	
Minimum CRI (Integrating Sphere – Section 4.1)	ANSI/IES LM-79:2019 CIE13.3-1995	≥70		84.3
Minimum R9 (Integrating Sphere – Section 4.1)	ANSI/IES LM-79-2019 CIE13.3-1995	N/A		16
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		0.104
(Goniophotometer – Section 4.2)		Non-Worst Case		N/A
Power (Input Wattage – W)				
(Goniophotometer – Section 4.2)	ANSI/IES LM-79:2019	Worst Case		12.3
(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	BULLET12 @12W4000K	ES 1st ES #3-1	241216012-S1
2	Goniophotometer Test	2024-12-24	BULLET12 @12W4000K	ES 1st ES #3-1	241216012-S1
3	THD and PF Test	2024-12-24	BULLET12 @12W4000K	ES 1st ES #3-1	241216012-S1

Remark (If any):

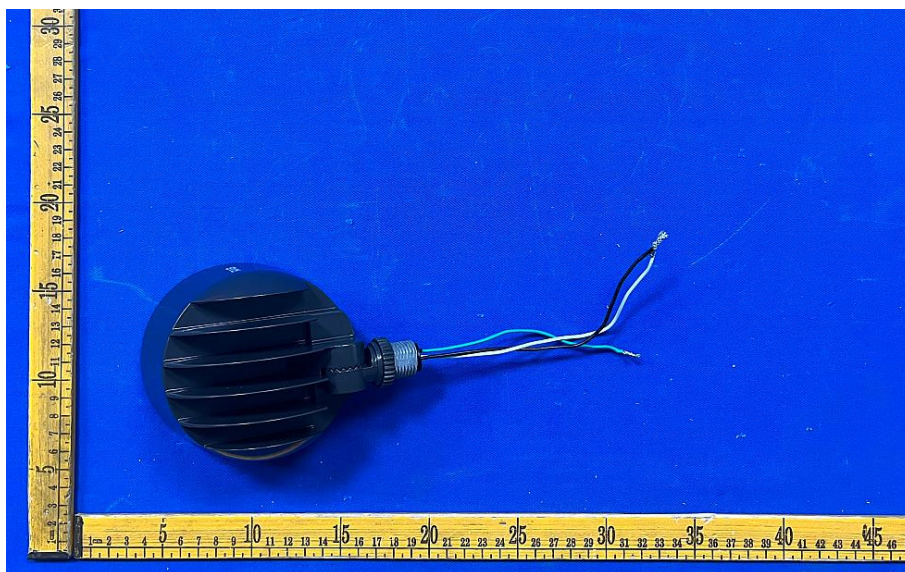
1. The results contained in this report pertain only to the tested samples.
2. This report shall not be reproduced, no limited part or full, without approval of Dongguan New Testing Centre Co., Ltd.
3. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the U.S. Government.

3.0 Product Description

Luminaire Description: Model No. BULLET12 @12W4000K, 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.	BULLET12 @12W4000K	Sample ID	241216012-S1
Operate time (Min.)	10	Stabilization time (Min.)	60
Temperature (°C)	25.4	Humidity (%RH)	41.0

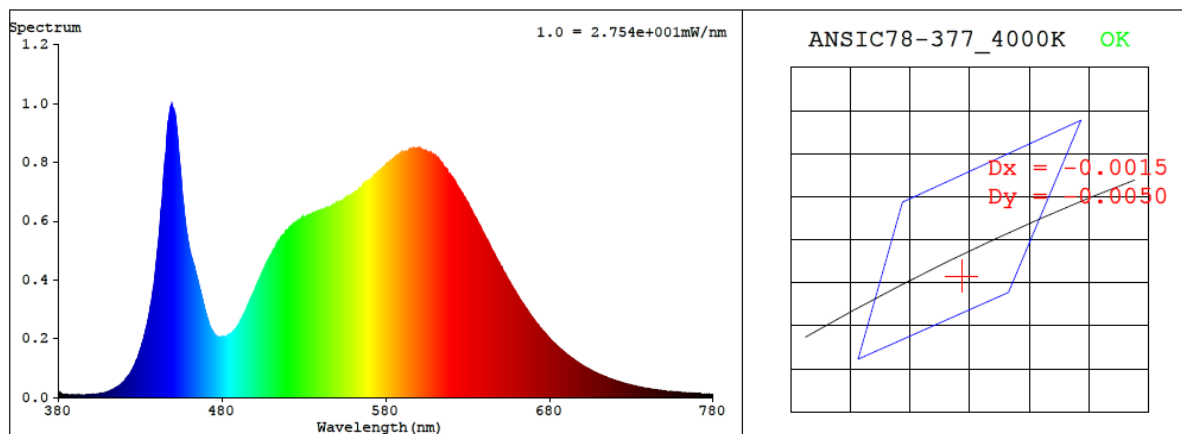
Test Method
<p>The Samples were tested according to the ANSI/IES LM-79:2019.</p> <p>Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25±1°C.</p> <p>The sample measurements were made 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	0.104	12.3	0.990

CCT (K)	CRI	R9	Duv	Rf	Rg	IES Rcs,h1
3920	84.3	16	-0.0019	84	98	-11%

4.1 Integrating Sphere Test



Colorimetric Parameters

Chromaticity Coordinate: $x = 0.3826$ $y = 0.3740$ / $u' = 0.2276$ $v' = 0.5007$ ($duv = -1.92e-03$)

CCT= 3920K Prpc WL: Ld=580.4nm Purity=27.0%

Peak WL: Lp=449nm FWHM: =20.0nm Ratio:R=19.0% G=77.7% B=3.3%

Render Index: Ra = 84.3 AvgR = 78.2 TM30:Rf=84 Rg=98

EEL: 0.12949 A+

R1 =84 R2 =89 R3 =93 R4 =85 R5 =84 R6 =85 R7 =87

R8 =68 R9 =16 R10=74 R11=84 R12=64 R13=85 R14=96 R15=78

4.1 Integrating Sphere Test

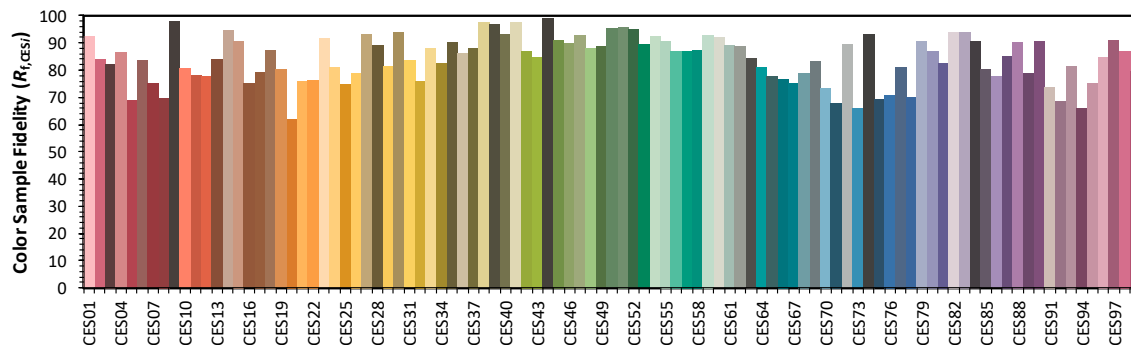
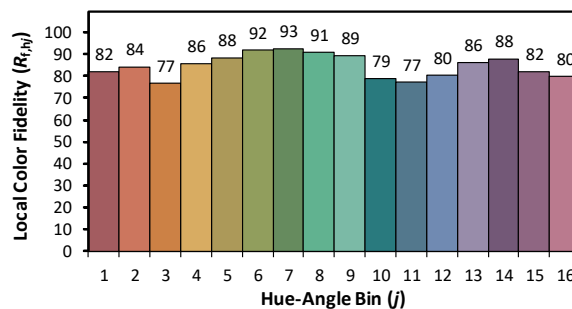
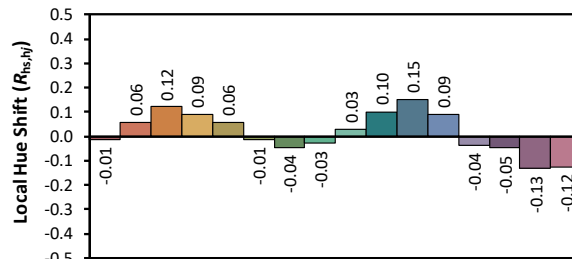
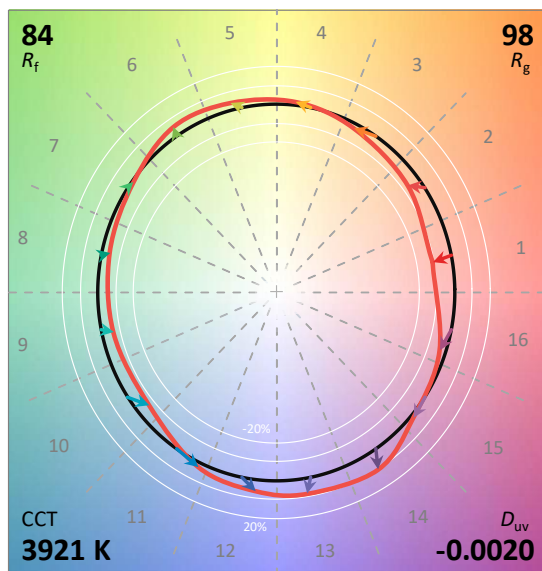
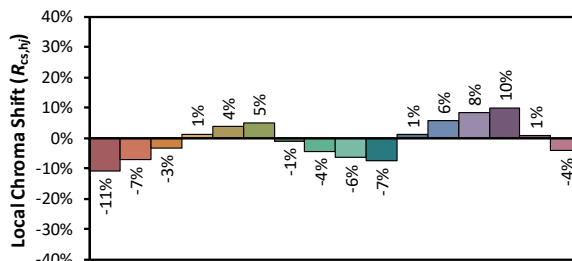
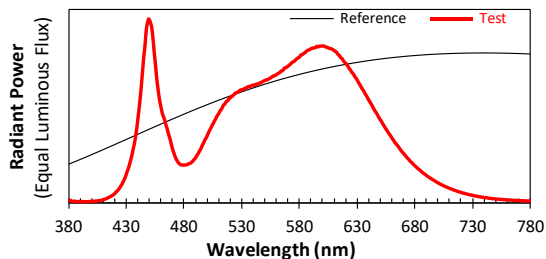
ANSI/IES TM-30-18 Color Rendition Report

Source: 1 CIE F1

Manufacturer: RAB Lighting Inc.

Date: 2024/12/25

Model: BULLET12 @12W4000K



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

x 0.3825
 y 0.3738
 u' 0.2277
 v' 0.5006

CIE 13.3-1995
(CRI)
 R_a 84
 R_g 16

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	1.34E-05	447	9.33E-04	514	5.28E-04	581	7.97E-04	648	4.70E-04	715	6.86E-05
381	1.62E-05	448	9.69E-04	515	5.34E-04	582	7.99E-04	649	4.60E-04	716	6.58E-05
382	1.21E-05	449	9.92E-04	516	5.43E-04	583	8.04E-04	650	4.49E-04	717	6.40E-05
383	9.80E-06	450	9.84E-04	517	5.50E-04	584	8.09E-04	651	4.40E-04	718	6.19E-05
384	1.03E-05	451	9.66E-04	518	5.55E-04	585	8.12E-04	652	4.29E-04	719	6.00E-05
385	1.11E-05	452	9.36E-04	519	5.65E-04	586	8.19E-04	653	4.19E-04	720	5.83E-05
386	9.70E-06	453	8.77E-04	520	5.68E-04	587	8.24E-04	654	4.08E-04	721	5.58E-05
387	7.80E-06	454	8.07E-04	521	5.74E-04	588	8.25E-04	655	3.99E-04	722	5.46E-05
388	9.10E-06	455	7.47E-04	522	5.79E-04	589	8.28E-04	656	3.90E-04	723	5.30E-05
389	9.00E-06	456	6.78E-04	523	5.84E-04	590	8.32E-04	657	3.80E-04	724	5.11E-05
390	7.50E-06	457	6.26E-04	524	5.91E-04	591	8.35E-04	658	3.71E-04	725	4.95E-05
391	8.70E-06	458	5.79E-04	525	5.95E-04	592	8.35E-04	659	3.62E-04	726	4.77E-05
392	8.90E-06	459	5.41E-04	526	5.97E-04	593	8.37E-04	660	3.52E-04	727	4.63E-05
393	7.90E-06	460	5.11E-04	527	6.00E-04	594	8.39E-04	661	3.43E-04	728	4.51E-05
394	7.50E-06	461	4.82E-04	528	6.07E-04	595	8.45E-04	662	3.34E-04	729	4.35E-05
395	8.20E-06	462	4.66E-04	529	6.10E-04	596	8.42E-04	663	3.24E-04	730	4.23E-05
396	8.20E-06	463	4.46E-04	530	6.11E-04	597	8.45E-04	664	3.18E-04	731	4.08E-05
397	8.80E-06	464	4.23E-04	531	6.13E-04	598	8.46E-04	665	3.10E-04	732	3.95E-05
398	8.70E-06	465	4.04E-04	532	6.15E-04	599	8.46E-04	666	3.01E-04	733	3.80E-05
399	9.40E-06	466	3.79E-04	533	6.21E-04	600	8.47E-04	667	2.92E-04	734	3.72E-05
400	1.01E-05	467	3.59E-04	534	6.22E-04	601	8.47E-04	668	2.84E-04	735	3.62E-05
401	1.03E-05	468	3.37E-04	535	6.26E-04	602	8.43E-04	669	2.76E-04	736	3.48E-05
402	1.08E-05	469	3.11E-04	536	6.29E-04	603	8.41E-04	670	2.69E-04	737	3.37E-05
403	1.15E-05	470	2.88E-04	537	6.27E-04	604	8.40E-04	671	2.61E-04	738	3.24E-05
404	1.14E-05	471	2.70E-04	538	6.32E-04	605	8.36E-04	672	2.54E-04	739	3.18E-05
405	1.33E-05	472	2.52E-04	539	6.35E-04	606	8.33E-04	673	2.47E-04	740	3.06E-05
406	1.33E-05	473	2.37E-04	540	6.36E-04	607	8.33E-04	674	2.40E-04	741	2.99E-05
407	1.43E-05	474	2.27E-04	541	6.34E-04	608	8.30E-04	675	2.34E-04	742	2.91E-05
408	1.57E-05	475	2.17E-04	542	6.40E-04	609	8.27E-04	676	2.25E-04	743	2.82E-05
409	1.78E-05	476	2.11E-04	543	6.42E-04	610	8.22E-04	677	2.21E-04	744	2.71E-05
410	1.93E-05	477	2.07E-04	544	6.41E-04	611	8.17E-04	678	2.14E-04	745	2.64E-05
411	2.09E-05	478	2.06E-04	545	6.46E-04	612	8.14E-04	679	2.07E-04	746	2.56E-05
412	2.37E-05	479	2.06E-04	546	6.49E-04	613	8.04E-04	680	2.01E-04	747	2.49E-05
413	2.63E-05	480	2.06E-04	547	6.51E-04	614	7.98E-04	681	1.96E-04	748	2.39E-05
414	2.94E-05	481	2.06E-04	548	6.55E-04	615	7.90E-04	682	1.90E-04	749	2.35E-05
415	3.27E-05	482	2.07E-04	549	6.58E-04	616	7.82E-04	683	1.84E-04	750	2.31E-05
416	3.65E-05	483	2.09E-04	550	6.62E-04	617	7.78E-04	684	1.80E-04	751	2.20E-05
417	3.97E-05	484	2.14E-04	551	6.64E-04	618	7.66E-04	685	1.74E-04	752	2.15E-05
418	4.29E-05	485	2.15E-04	552	6.65E-04	619	7.60E-04	686	1.69E-04	753	2.14E-05
419	4.81E-05	486	2.19E-04	553	6.68E-04	620	7.53E-04	687	1.63E-04	754	2.05E-05
420	5.39E-05	487	2.25E-04	554	6.72E-04	621	7.46E-04	688	1.59E-04	755	2.03E-05
421	6.16E-05	488	2.32E-04	555	6.75E-04	622	7.37E-04	689	1.54E-04	756	1.96E-05
422	6.69E-05	489	2.38E-04	556	6.80E-04	623	7.25E-04	690	1.50E-04	757	1.94E-05
423	7.43E-05	490	2.47E-04	557	6.85E-04	624	7.18E-04	691	1.45E-04	758	1.87E-05
424	8.29E-05	491	2.57E-04	558	6.86E-04	625	7.07E-04	692	1.41E-04	759	1.84E-05
425	9.29E-05	492	2.67E-04	559	6.89E-04	626	7.00E-04	693	1.36E-04	760	1.81E-05
426	1.03E-04	493	2.79E-04	560	6.93E-04	627	6.92E-04	694	1.33E-04	761	1.74E-05
427	1.16E-04	494	2.89E-04	561	6.97E-04	628	6.81E-04	695	1.29E-04	762	1.73E-05
428	1.28E-04	495	3.02E-04	562	7.02E-04	629	6.73E-04	696	1.25E-04	763	1.68E-05
429	1.43E-04	496	3.17E-04	563	7.04E-04	630	6.63E-04	697	1.21E-04	764	1.62E-05
430	1.62E-04	497	3.28E-04	564	7.12E-04	631	6.51E-04	698	1.17E-04	765	1.58E-05
431	1.80E-04	498	3.43E-04	565	7.13E-04	632	6.41E-04	699	1.13E-04	766	1.54E-05
432	1.98E-04	499	3.52E-04	566	7.20E-04	633	6.30E-04	700	1.10E-04	767	1.51E-05
433	2.20E-04	500	3.65E-04	567	7.28E-04	634	6.19E-04	701	1.06E-04	768	1.49E-05
434	2.44E-04	501	3.80E-04	568	7.30E-04	635	6.10E-04	702	1.03E-04	769	1.44E-05
435	2.72E-04	502	3.92E-04	569	7.34E-04	636	6.00E-04	703	9.98E-05	770	1.40E-05
436	3.01E-04	503	4.04E-04	570	7.38E-04	637	5.88E-04	704	9.72E-05	771	1.40E-05
437	3.31E-04	504	4.17E-04	571	7.44E-04	638	5.78E-04	705	9.36E-05	772	1.35E-05
438	3.69E-04	505	4.28E-04	572	7.49E-04	639	5.66E-04	706	9.08E-05	773	1.31E-05
439	4.13E-04	506	4.41E-04	573	7.55E-04	640	5.56E-04	707	8.83E-05	774	1.32E-05
440	4.68E-04	507	4.51E-04	574	7.60E-04	641	5.45E-04	708	8.52E-05	775	1.27E-05
441	5.21E-04	508	4.64E-04	575	7.63E-04	642	5.35E-04	709	8.26E-05	776	1.25E-05
442	5.83E-04	509	4.75E-04	576	7.68E-04	643	5.24E-04	710	8.01E-05	777	1.22E-05
443	6.50E-04	510	4.84E-04	577	7.75E-04	644	5.12E-04	711	7.76E-05	778	1.20E-05
444	7.26E-04	511	4.97E-04	578	7.79E-04	645	5.01E-04	712	7.54E-05	779	1.19E-05
445	7.98E-04	512	5.04E-04	579	7.84E-04	646	4.92E-04	713	7.27E-05	780	1.20E-05
446	8.54E-04	513	5.16E-04	580	7.88E-04	647	4.81E-04	714	7.05E-05	N/A	N/A

4.0 LM-79 Measurement and Test Results

4.2 Goniophotometer Test

Model No.	BULLET12 @12W4000K	Sample ID	241216012-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 $25 \pm 1^\circ\text{C}$, 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

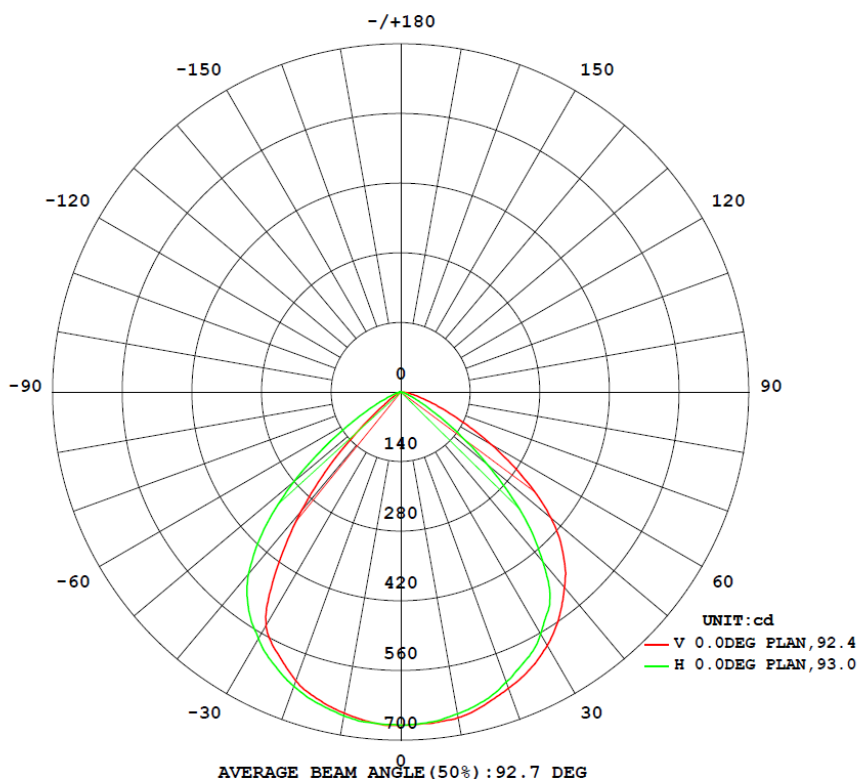
Condition	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
WORST CASE	120.0	60	0.104	12.3	0.990
NON-WORST CASE	N/A	N/A	N/A	N/A	N/A

Test Result

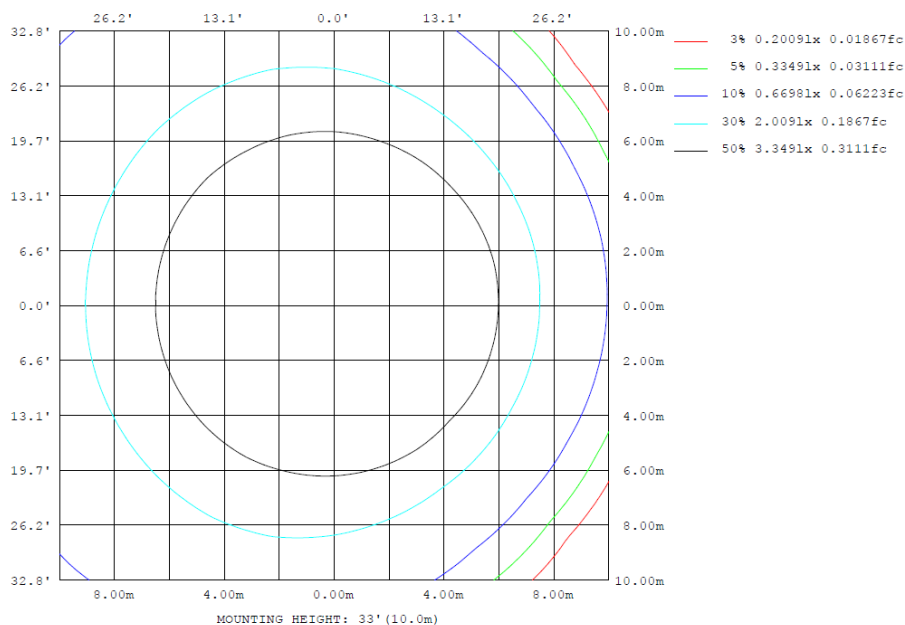
Flux (lm)	Field Angle (10%)		Beam Angle (50%)		Luminous Efficacy (lm/W)	Zonal Lumen Requirement	NEMA Type
	C0-180	C90-270	C0-180	C90-270		(0°-90°)	
1324	123.7	123.9	92.2	91.4	107.6	100.0%	6H x 6V

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	zone	total	lum, lamp
10	655.3	653.1	656.7	659.6	664.7	663.3	661.0	656.5	0- 10	63.43	63.43	4.79,4.79
20	617.7	619.2	620.4	630.2	633.7	637.9	629.7	625.5	10- 20	182.2	245.7	18.6,18.6
30	542.3	536.3	562.6	580.1	588.9	592.3	572.7	549.2	20- 30	276.2	521.9	39.4,39.4
40	310.2	316.5	444.1	504.8	512.5	516.4	476.2	354.3	30- 40	315.6	837.5	63.3,63.3
50	76.25	78.44	230.0	380.4	394.9	398.2	281.4	99.78	40- 50	258.6	1096	82.8,82.8
60	13.96	19.87	65.45	185.0	209.4	216.9	90.83	21.71	50- 60	148.5	1245	94,94
70	0.0122	0.7201	14.96	56.77	71.41	71.92	20.00	0.9352	60- 70	59.58	1304	98.5,98.5
80	0.0130	0.0143	2.548	12.73	18.90	15.34	3.345	0.0229	70- 80	16.52	1321	99.8,99.8
90	0	0	0	0	0	0	0	0	80- 90	3.192	1324	100,100
100	0	0	0	0	0	0	0	0	90-100	0	1324	100,100
110	0	0	0	0	0	0	0	0	100-110	0	1324	100,100
120	0	0	0	0	0	0	0	0	110-120	0	1324	100,100
130	0	0	0	0	0	0	0	0	120-130	0	1324	100,100
140	0	0	0	0	0	0	0	0	130-140	0	1324	100,100
150	0	0	0	0	0	0	0	0	140-150	0	1324	100,100
160	0	0	0	0	0	0	0	0	150-160	0	1324	100,100
170	0	0	0	0	0	0	0	0	160-170	0	1324	100,100
180	0	0	0	0	0	0	0	0	170-180	0	1324	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

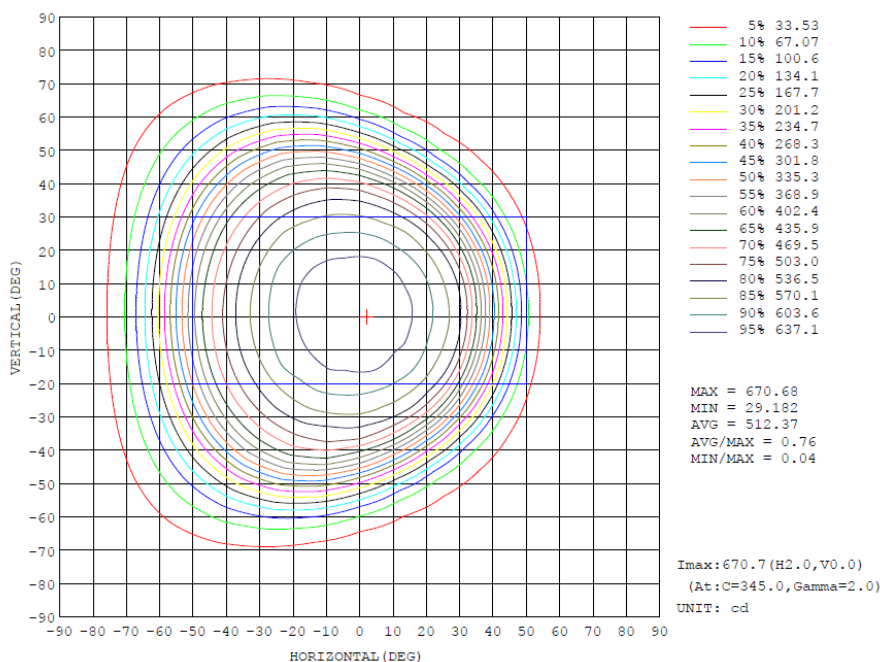
Zonal (lm)		Total (lm)		Percent
0-10	63.43	0-10	63.43	4.79%
10-20	182.23	0-20	245.66	18.56%
20-30	276.23	0-30	521.89	39.42%
30-40	315.62	0-40	837.51	63.26%
40-50	258.55	0-50	1096.06	82.79%
50-60	148.48	0-60	1244.54	94.01%
60-70	59.58	0-70	1304.12	98.51%
70-80	16.52	0-80	1320.64	99.76%
80-90	3.19	0-90	1323.83	100.00%
90-100	0.00	0-100	1323.83	100.00%
100-110	0.00	0-110	1323.83	100.00%
110-120	0.00	0-120	1323.83	100.00%
120-130	0.00	0-130	1323.83	100.00%
130-140	0.00	0-140	1323.83	100.00%
140-150	0.00	0-150	1323.83	100.00%
150-160	0.00	0-160	1323.83	100.00%
160-170	0.00	0-170	1323.83	100.00%
170-180	0.00	0-180	1323.83	100.00%

4.2 Goniophotometer Test

Area Flux Diagram

		AREA FLUX DIAGRAM																UNIT:lm				Φ t	Φ a
VERTICAL (DEG)	90	0.00	0.02	0.05	0.08	0.10	0.10	0.10	0.08	0.05	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.62	0.00		
	80	0.01	0.05	0.13	0.24	0.39	0.52	0.58	0.51	0.38	0.24	0.12	0.04	0.01	0.00	0.00	0.00	0.00	0.00	3.23	0.00		
	70	0.01	0.09	0.26	0.59	1.13	1.78	2.29	2.31	1.82	1.14	0.60	0.29	0.09	0.01	0.00	0.00	0.00	0.00	12.4	6.03		
	60	0.02	0.13	0.45	1.21	2.60	4.43	6.08	6.77	6.13	4.43	2.40	1.07	0.45	0.11	0.01	0.00	0.00	0.00	36.3	33.0		
	50	0.02	0.18	0.72	2.13	4.72	7.90	10.6	12.1	12.2	10.6	7.34	3.63	1.27	0.42	0.06	0.00	0.00	0.00	73.8	71.7		
	40	0.02	0.23	1.03	3.22	6.89	10.6	13.6	15.4	16.2	15.6	13.1	8.58	3.61	0.92	0.20	0.01	0.00	0.00	109	108		
	30	0.03	0.28	1.35	4.24	8.48	12.3	15.4	17.4	18.3	18.0	16.5	12.9	6.96	1.97	0.36	0.02	0.00	0.00	135	133		
	20	0.03	0.32	1.60	4.96	9.43	13.3	16.5	18.6	19.6	19.4	18.1	15.2	9.58	3.25	0.51	0.05	0.00	0.00	150	149		
	10	0.03	0.34	1.73	5.32	9.87	13.7	16.9	19.1	20.2	20.0	18.7	16.0	10.8	3.98	0.61	0.06	0.00	0.00	157	156		
	0	0.03	0.33	1.71	5.27	9.84	13.7	16.8	19.0	20.1	20.0	18.6	15.9	10.6	3.88	0.59	0.06	0.00	0.00	156	155		
	-10	0.03	0.31	1.54	4.81	9.31	13.2	16.3	18.4	19.4	19.3	17.9	15.0	9.09	2.98	0.48	0.04	0.00	0.00	148	147		
	-20	0.03	0.27	1.27	3.99	8.22	12.1	15.1	17.1	18.0	17.7	16.1	12.3	6.27	1.71	0.34	0.02	0.00	0.00	131	129		
	-30	0.02	0.22	0.95	2.94	6.46	10.3	13.2	15.1	15.7	14.9	12.1	7.48	3.00	0.81	0.18	0.01	0.00	0.00	103	102		
	-40	0.02	0.17	0.65	1.88	4.19	7.21	9.85	11.3	11.1	9.19	6.06	2.88	1.08	0.38	0.05	0.00	0.00	0.00	65.9	63.6		
	-50	0.02	0.12	0.41	1.05	2.16	3.64	4.97	5.47	4.84	3.39	1.84	0.90	0.41	0.10	0.00	0.00	0.00	0.00	29.3	25.5		
	-60	0.01	0.08	0.23	0.51	0.91	1.35	1.65	1.63	1.30	0.86	0.51	0.25	0.08	0.01	0.00	0.00	0.00	0.00	9.39	2.55		
	-70	0.01	0.05	0.12	0.22	0.32	0.39	0.41	0.36	0.28	0.18	0.10	0.03	0.01	0.00	0.00	0.00	0.00	0.00	2.49	0.00		
	-80	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	0.53	0.00		
	-90																						
HORIZONTAL (DEG)																							
Φ t	0.36	3.19	14.3	42.7	85.1	127	160	181	186	175	150	112	63.3	20.5	3.38	0.27	0.00	0.00	1324	---			
Φ a	0.00	0.04	10.8	39.9	82.4	124	158	178	183	172	147	109	60.3	17.0	0.12	0.00	0.00	0.00	---	1283			

Isocandela



4.2 Goniophotometer Test

Luminous Distribution Intensity Data

Table--1

Table--1															UNIT: °cd				
H (DEG) V (DEG)	-90	-85	-80	-75	-70	-65	-60	-55	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0
-180	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-170	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-160	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-150	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-140	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-130	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-120	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-110	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-80	0.00	2.67	3.90	4.91	5.74	6.46	7.18	7.51	7.71	7.87	7.70	7.35	6.88	6.34	5.62	4.74	4.08	3.35	2.55
-70	0.00	4.01	6.16	8.31	10.4	12.8	15.6	18.5	21.6	24.6	27.1	28.7	29.3	28.9	27.4	24.5	21.9	18.7	15.0
-60	0.00	5.07	8.33	12.0	16.8	23.1	31.5	41.4	52.3	65.3	78.3	88.8	98.3	105	106	102	94.5	81.8	65.5
-50	0.00	6.04	10.5	16.7	25.7	38.7	56.2	79.6	107	141	178	214	244	271	284	286	280	259	230
-40	0.00	6.88	12.7	22.1	36.8	58.5	90.1	133	187	247	307	361	402	434	456	465	471	461	444
-30	0.00	7.58	14.9	27.5	48.6	81.7	130	195	271	347	409	456	492	520	540	553	561	564	563
-20	0.00	8.12	16.8	32.6	59.6	103	168	251	338	413	470	512	545	572	593	608	618	620	620
-10	0.00	8.46	18.3	36.7	68.0	120	197	289	379	450	502	543	577	606	625	638	650	657	657
0	0.00	8.59	18.9	37.7	71.4	127	209	304	395	462	512	555	589	615	634	651	665	669	670
10	0.00	8.46	18.4	36.7	69.3	123	202	295	385	453	504	547	582	610	630	645	656	660	661
20	0.00	8.13	17.1	33.5	62.1	108	178	263	350	422	476	518	554	583	603	616	625	627	630
30	0.00	7.60	15.1	28.7	51.5	87.4	141	211	290	363	422	466	503	530	550	564	572	575	573
40	0.00	6.89	13.0	23.3	39.6	64.1	99.9	148	208	271	331	381	419	448	470	482	490	485	476
50	0.00	6.07	10.7	17.6	27.9	42.8	63.3	90.9	125	164	208	247	280	309	324	329	324	306	288
60	0.00	5.11	8.38	12.5	18.3	25.6	35.7	48.1	62.5	79.7	98.4	115	130	141	143	141	130	113	90.8
70	0.00	4.06	6.21	8.42	10.8	13.7	17.7	21.7	25.9	30.4	38.8	46.9	49.1	42.1	39.2	35.6	31.5	26.2	20.0
80	0.00	2.73	4.02	5.03	5.88	6.66	7.40	7.96	8.47	8.91	9.05	8.93	8.64	8.07	7.27	6.22	5.37	4.40	3.34
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

H (DEG) V (DEG)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	UNIT: cd
-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	1.96	1.35	0.77	0.51	0.28	0.10	0.06	0.03	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.00
-70	12.6	10.0	7.46	5.17	3.01	1.42	0.68	0.22	0.03	0.02	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.00
-60	53.5	40.7	30.7	24.4	18.1	12.3	6.99	2.67	0.81	0.15	0.02	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.00
-50	194	152	113	78.1	49.4	36.3	26.6	17.6	9.54	3.13	0.38	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.00
-40	413	369	312	242	175	111	65.3	38.2	25.4	14.0	5.40	0.68	0.01	0.01	0.01	0.01	0.01	0.02	0.00
-30	554	537	503	448	369	274	181	96.2	46.2	27.1	14.0	4.08	0.23	0.01	0.01	0.01	0.01	0.02	0.00
-20	616	604	585	560	514	425	314	201	99.0	40.2	22.2	8.85	1.14	0.01	0.01	0.01	0.01	0.02	0.00
-10	652	640	628	600	568	516	403	280	157	64.3	28.0	12.6	2.39	0.01	0.01	0.01	0.01	0.02	0.00
0	667	655	640	618	582	542	437	310	193	76.2	30.1	14.0	2.90	0.01	0.01	0.01	0.01	0.02	0.00
10	655	645	631	607	572	526	419	293	167	67.7	28.8	13.0	2.48	0.01	0.01	0.01	0.01	0.02	0.00
20	625	613	593	567	529	450	339	222	114	45.1	23.4	9.36	1.24	0.01	0.01	0.01	0.01	0.02	0.00
30	563	548	522	477	404	310	210	117	54.8	29.2	15.0	4.46	0.27	0.01	0.01	0.02	0.02	0.02	0.00
40	450	413	358	289	216	140	79.0	44.2	27.6	15.3	5.76	0.80	0.02	0.02	0.02	0.02	0.02	0.02	0.00
50	242	195	147	101	63.1	42.4	29.2	19.3	10.3	3.59	0.47	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.00
60	72.4	52.5	36.6	27.8	20.0	13.5	7.85	3.13	0.99	0.22	0.03	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.00
70	16.4	12.5	8.78	6.13	3.65	1.77	0.87	0.29	0.05	0.03	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.00
80	2.57	1.77	0.99	0.66	0.37	0.14	0.09	0.05	0.02	0.03	0.03	0.03	0.03	0.03	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	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

Model No.	BULLET12 @12W4000K	Sample ID	241216012-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	0.104	12.3	0.990	14.53

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*****