

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		1623
Minimum Luminaire Efficacy (lm/W) (Goniophotometer – Section 4.2)	ANSI/IES LM-79:2019	Standard	Premium	108.2
		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	14.60
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	5029±283	5130
		4 steps	5029±220	
Minimum CRI (Integrating Sphere – Section 4.1)	ANSI/IES LM-79:2019 CIE13.3-1995	≥70		82.7
Minimum R9 (Integrating Sphere – Section 4.1)	ANSI/IES LM-79-2019 CIE13.3-1995	N/A		10
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		0.126
(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 @15W5000K	ES 1st ES #3-2	241216013-S1
2	Goniophotometer Test	2024-12-24	BULLET20 @15W5000K	ES 1st ES #3-2	241216013-S1
3	THD and PF Test	2024-12-24	BULLET20 @15W5000K	ES 1st ES #3-2	241216013-S1

Remark (If any):

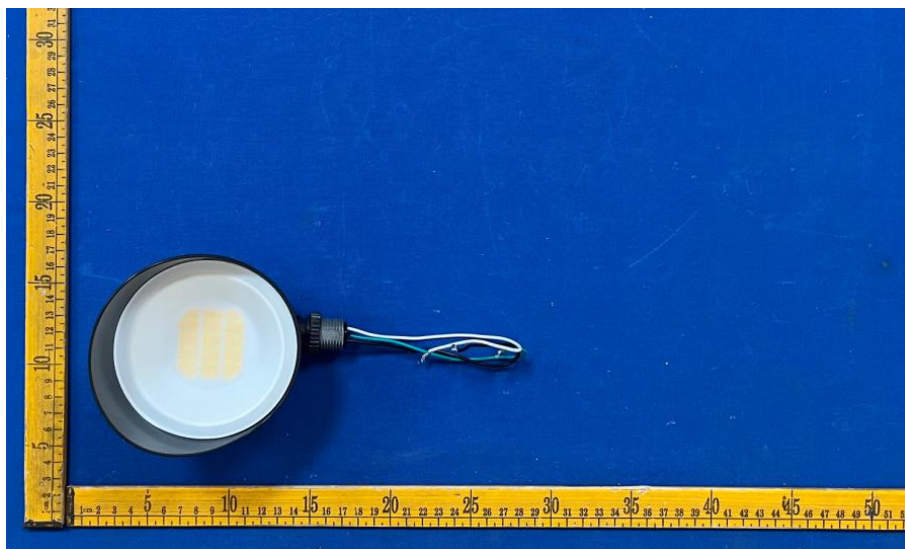
1. The results contained in this report pertain only to the tested samples.
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3. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the U.S. Government.

3.0 Product Description

Luminaire Description: Model No. BULLET20 @15W5000K, 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 @15W5000K	Sample ID	241216013-S1
Operate time (Min.)	10	Stabilization time (Min.)	60
Temperature (°C)	25.4	Humidity (%RH)	41.0

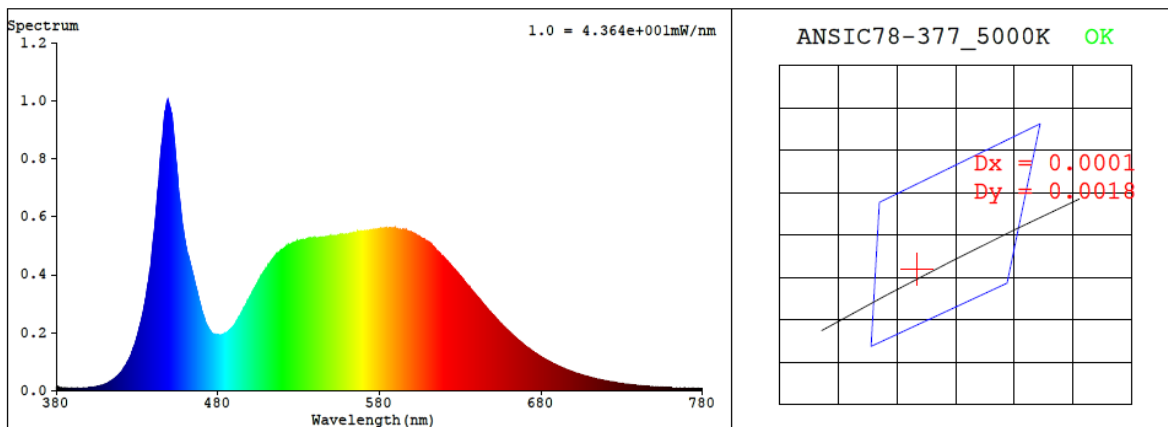
Test Method
<p>The Samples were tested according to the ANSI/IES LM-79:2019.</p> <p>Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25±1°C.</p> <p>The sample measurements were made 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
5130	82.7	10	0.0009	83	98	-12%

4.1 Integrating Sphere Test



Colorimetric Parameters

Chromaticity Coordinate: $x = 0.3416$ $y = 0.3505$ / $u' = 0.2095$ $v' = 0.4836$ ($duv=8.77e-04$)

CCT= 5130K Prcp WL: $L_d=569.6nm$ Purity=7.7%

Peak WL: $L_p=449nm$ FWHM: $=20.5nm$ Ratio: $R=15.6\%$ $G=80.2\%$ $B=4.2\%$

Render Index: $R_a = 82.7$ AvgR = 75.9 TM30: $R_f=83$ $R_g=97$

EEI: 0.12988 A+

R1 =82 R2 =86 R3 =89 R4 =84 R5 =83 R6 =82 R7 =87

R8 =69 R9 =10 R10=67 R11=84 R12=62 R13=83 R14=94 R15=77

4.1 Integrating Sphere Test

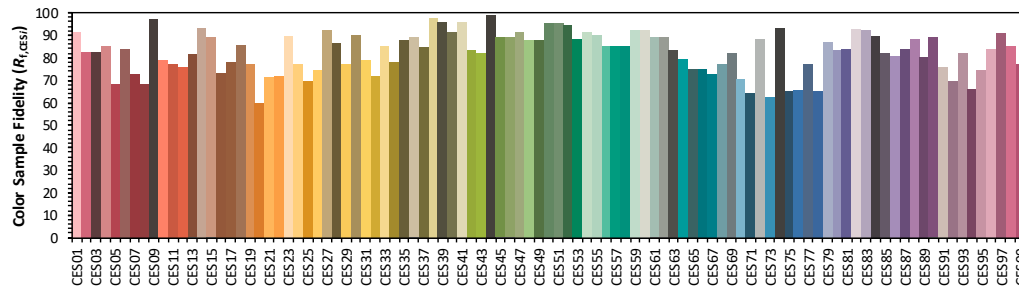
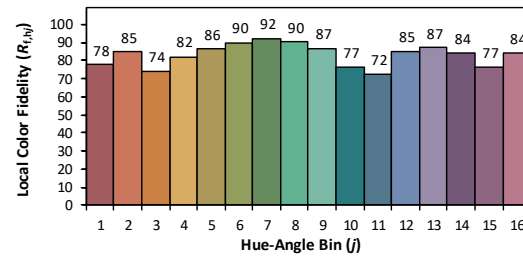
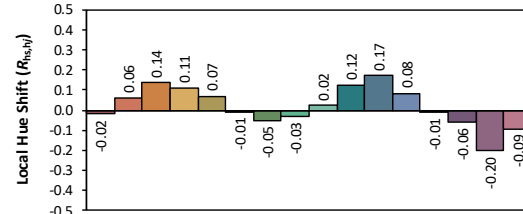
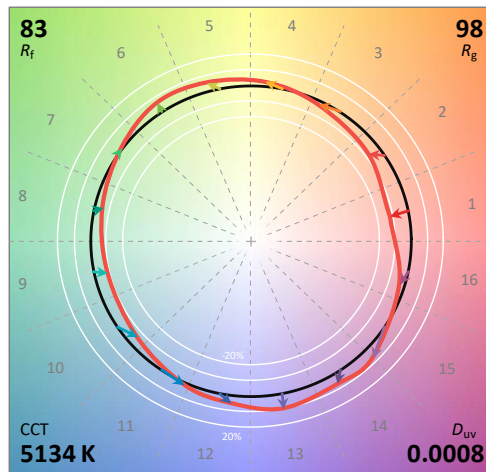
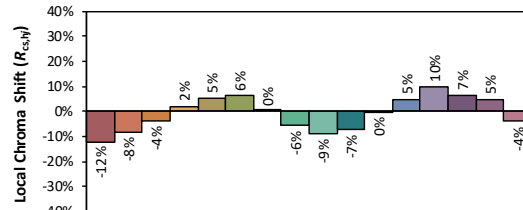
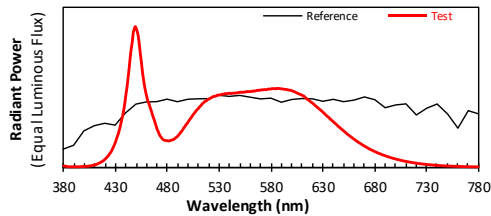
ANSI/IES TM-30-18 Color Rendition Report

Source: 1 CIE F1

Manufacturer: RAB Lighting Inc.

Date: 2024/12/25

Model: BULLET20 @15W5000K



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

x 0.3416
 y 0.3504
 u' 0.2095
 v' 0.4835

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	1.29E-05	447	9.54E-04	514	4.55E-04	581	5.60E-04	648	2.75E-04	715	3.96E-05
381	1.40E-05	448	9.79E-04	515	4.61E-04	582	5.59E-04	649	2.69E-04	716	3.85E-05
382	1.04E-05	449	9.98E-04	516	4.68E-04	583	5.59E-04	650	2.63E-04	717	3.72E-05
383	1.04E-05	450	9.81E-04	517	4.72E-04	584	5.60E-04	651	2.57E-04	718	3.62E-05
384	8.60E-06	451	9.59E-04	518	4.76E-04	585	5.58E-04	652	2.50E-04	719	3.52E-05
385	8.20E-06	452	9.24E-04	519	4.83E-04	586	5.61E-04	653	2.44E-04	720	3.42E-05
386	7.50E-06	453	8.63E-04	520	4.85E-04	587	5.61E-04	654	2.38E-04	721	3.26E-05
387	8.00E-06	454	7.97E-04	521	4.91E-04	588	5.60E-04	655	2.32E-04	722	3.20E-05
388	8.20E-06	455	7.39E-04	522	4.94E-04	589	5.60E-04	656	2.26E-04	723	3.10E-05
389	7.70E-06	456	6.72E-04	523	4.98E-04	590	5.58E-04	657	2.21E-04	724	3.00E-05
390	8.10E-06	457	6.23E-04	524	5.03E-04	591	5.58E-04	658	2.16E-04	725	2.91E-05
391	8.30E-06	458	5.74E-04	525	5.05E-04	592	5.56E-04	659	2.10E-04	726	2.81E-05
392	7.90E-06	459	5.37E-04	526	5.07E-04	593	5.56E-04	660	2.05E-04	727	2.72E-05
393	8.60E-06	460	5.05E-04	527	5.08E-04	594	5.54E-04	661	1.99E-04	728	2.63E-05
394	8.40E-06	461	4.76E-04	528	5.13E-04	595	5.55E-04	662	1.94E-04	729	2.57E-05
395	8.20E-06	462	4.58E-04	529	5.15E-04	596	5.51E-04	663	1.88E-04	730	2.50E-05
396	8.20E-06	463	4.34E-04	530	5.14E-04	597	5.51E-04	664	1.84E-04	731	2.39E-05
397	9.00E-06	464	4.12E-04	531	5.16E-04	598	5.49E-04	665	1.79E-04	732	2.34E-05
398	9.20E-06	465	3.89E-04	532	5.18E-04	599	5.48E-04	666	1.74E-04	733	2.25E-05
399	9.80E-06	466	3.65E-04	533	5.20E-04	600	5.46E-04	667	1.70E-04	734	2.18E-05
400	1.05E-05	467	3.45E-04	534	5.20E-04	601	5.43E-04	668	1.64E-04	735	2.11E-05
401	1.10E-05	468	3.22E-04	535	5.23E-04	602	5.40E-04	669	1.60E-04	736	2.04E-05
402	1.16E-05	469	2.98E-04	536	5.25E-04	603	5.36E-04	670	1.56E-04	737	1.99E-05
403	1.19E-05	470	2.75E-04	537	5.23E-04	604	5.34E-04	671	1.51E-04	738	1.94E-05
404	1.29E-05	471	2.58E-04	538	5.25E-04	605	5.30E-04	672	1.47E-04	739	1.86E-05
405	1.40E-05	472	2.40E-04	539	5.27E-04	606	5.26E-04	673	1.43E-04	740	1.82E-05
406	1.50E-05	473	2.26E-04	540	5.27E-04	607	5.23E-04	674	1.39E-04	741	1.74E-05
407	1.62E-05	474	2.16E-04	541	5.25E-04	608	5.20E-04	675	1.35E-04	742	1.72E-05
408	1.78E-05	475	2.07E-04	542	5.27E-04	609	5.17E-04	676	1.30E-04	743	1.66E-05
409	1.97E-05	476	2.00E-04	543	5.27E-04	610	5.13E-04	677	1.28E-04	744	1.60E-05
410	2.18E-05	477	1.95E-04	544	5.27E-04	611	5.10E-04	678	1.24E-04	745	1.57E-05
411	2.33E-05	478	1.94E-04	545	5.28E-04	612	5.06E-04	679	1.20E-04	746	1.51E-05
412	2.67E-05	479	1.92E-04	546	5.29E-04	613	4.98E-04	680	1.16E-04	747	1.49E-05
413	3.05E-05	480	1.92E-04	547	5.29E-04	614	4.93E-04	681	1.14E-04	748	1.45E-05
414	3.36E-05	481	1.91E-04	548	5.31E-04	615	4.85E-04	682	1.10E-04	749	1.41E-05
415	3.74E-05	482	1.91E-04	549	5.32E-04	616	4.80E-04	683	1.07E-04	750	1.36E-05
416	4.16E-05	483	1.93E-04	550	5.34E-04	617	4.76E-04	684	1.04E-04	751	1.34E-05
417	4.57E-05	484	1.97E-04	551	5.34E-04	618	4.68E-04	685	1.01E-04	752	1.33E-05
418	5.02E-05	485	1.98E-04	552	5.34E-04	619	4.63E-04	686	9.82E-05	753	1.27E-05
419	5.64E-05	486	2.01E-04	553	5.35E-04	620	4.59E-04	687	9.43E-05	754	1.25E-05
420	6.27E-05	487	2.07E-04	554	5.35E-04	621	4.52E-04	688	9.19E-05	755	1.23E-05
421	7.16E-05	488	2.13E-04	555	5.35E-04	622	4.47E-04	689	8.93E-05	756	1.17E-05
422	7.80E-05	489	2.18E-04	556	5.37E-04	623	4.38E-04	690	8.70E-05	757	1.15E-05
423	8.72E-05	490	2.25E-04	557	5.39E-04	624	4.33E-04	691	8.41E-05	758	1.13E-05
424	9.76E-05	491	2.34E-04	558	5.38E-04	625	4.26E-04	692	8.18E-05	759	1.11E-05
425	1.08E-04	492	2.42E-04	559	5.39E-04	626	4.20E-04	693	7.91E-05	760	1.09E-05
426	1.18E-04	493	2.53E-04	560	5.39E-04	627	4.15E-04	694	7.73E-05	761	1.05E-05
427	1.35E-04	494	2.60E-04	561	5.40E-04	628	4.08E-04	695	7.41E-05	762	1.03E-05
428	1.50E-04	495	2.72E-04	562	5.43E-04	629	4.02E-04	696	7.20E-05	763	1.03E-05
429	1.67E-04	496	2.84E-04	563	5.40E-04	630	3.96E-04	697	7.01E-05	764	9.90E-06
430	1.85E-04	497	2.93E-04	564	5.44E-04	631	3.88E-04	698	6.76E-05	765	9.70E-06
431	2.10E-04	498	3.06E-04	565	5.43E-04	632	3.81E-04	699	6.58E-05	766	9.50E-06
432	2.28E-04	499	3.13E-04	566	5.46E-04	633	3.74E-04	700	6.36E-05	767	9.30E-06
433	2.53E-04	500	3.24E-04	567	5.49E-04	634	3.67E-04	701	6.15E-05	768	9.00E-06
434	2.79E-04	501	3.36E-04	568	5.47E-04	635	3.61E-04	702	5.97E-05	769	9.00E-06
435	3.11E-04	502	3.46E-04	569	5.49E-04	636	3.56E-04	703	5.82E-05	770	8.70E-06
436	3.44E-04	503	3.56E-04	570	5.50E-04	637	3.47E-04	704	5.60E-05	771	8.60E-06
437	3.76E-04	504	3.67E-04	571	5.51E-04	638	3.41E-04	705	5.46E-05	772	8.30E-06
438	4.16E-04	505	3.77E-04	572	5.52E-04	639	3.34E-04	706	5.28E-05	773	8.00E-06
439	4.63E-04	506	3.86E-04	573	5.52E-04	640	3.28E-04	707	5.10E-05	774	8.00E-06
440	5.21E-04	507	3.96E-04	574	5.54E-04	641	3.21E-04	708	4.94E-05	775	7.90E-06
441	5.71E-04	508	4.06E-04	575	5.52E-04	642	3.15E-04	709	4.80E-05	776	7.80E-06
442	6.35E-04	509	4.13E-04	576	5.53E-04	643	3.09E-04	710	4.64E-05	777	7.50E-06
443	7.00E-04	510	4.21E-04	577	5.56E-04	644	3.01E-04	711	4.51E-05	778	7.50E-06
444	7.74E-04	511	4.31E-04	578	5.57E-04	645	2.94E-04	712	4.36E-05	779	7.40E-06
445	8.38E-04	512	4.37E-04	579	5.57E-04	646	2.88E-04	713	4.22E-05	780	7.40E-06
446	8.85E-04	513	4.46E-04	580	5.57E-04	647	2.82E-04	714	4.10E-05	N/A	N/A

4.0 LM-79 Measurement and Test Results

4.2 Goniophotometer Test

Model No.	BULLET20 @15W5000K	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

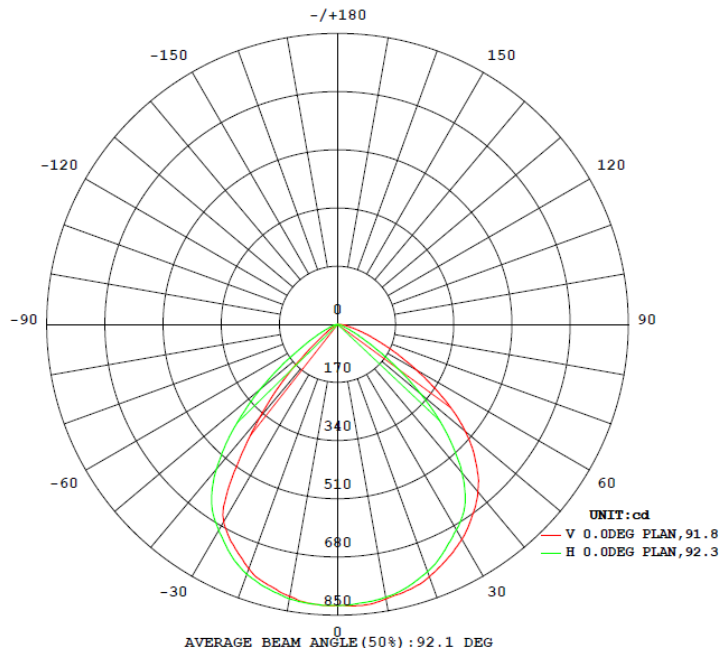
Condition	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
WORST CASE	120.0	60	0.126	15.0	0.990
NON-WORST CASE	N/A	N/A	N/A	N/A	N/A

Test Result

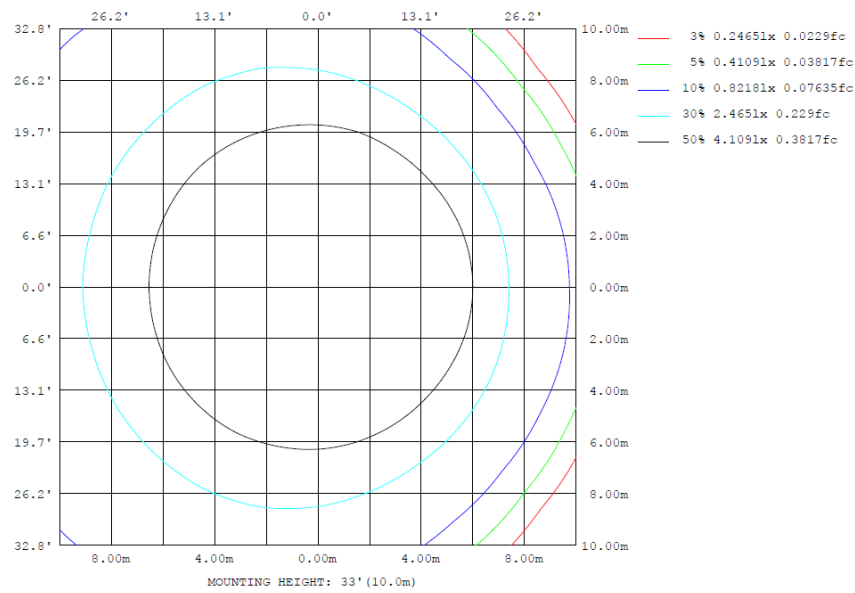
Flux (lm)	Field Angle (10%)		Beam Angle (50%)		Luminous Efficacy (lm/W)	Zonal Lumen Requirement	NEMA Type
	C0-180	C90-270	C0-180	C90-270		(0°-90°)	
1623	123.9	125.4	91.6	93.6	108.2	100.0%	6H x 6V

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	806.8	807.3	809.3	814.7	814.4	818.3	813.9	812.2	0- 10	78.08	78.08	4.81,4.81
20	759.9	759.4	768.5	783.0	784.0	784.6	776.5	765.0	10- 20	224.7	302.7	18.6,18.6
30	666.9	666.7	693.9	723.5	726.0	728.7	695.3	668.1	20- 30	340.3	643.0	39.6,39.6
40	354.9	422.3	566.0	628.4	638.0	627.7	550.4	383.4	30- 40	385.9	1029	63.4,63.4
50	80.04	107.4	319.0	485.1	488.0	473.3	296.6	96.75	40- 50	311.6	1341	82.6,82.6
60	16.31	23.15	92.37	260.6	264.1	242.8	88.68	25.61	50- 60	180.9	1521	93.7,93.7
70	0.0153	0.5856	19.71	86.69	98.94	81.99	21.86	1.275	60- 70	75.43	1597	98.4,98.4
80	0.0167	0.0164	3.226	18.58	26.92	19.80	4.123	0.0322	70- 80	22.10	1619	99.7,99.7
90	0	0	0	0	0	0	0	0	80- 90	4.449	1623	100,100
100	0	0	0	0	0	0	0	0	90-100	0	1623	100,100
110	0	0	0	0	0	0	0	0	100-110	0	1623	100,100
120	0	0	0	0	0	0	0	0	110-120	0	1623	100,100
130	0	0	0	0	0	0	0	0	120-130	0	1623	100,100
140	0	0	0	0	0	0	0	0	130-140	0	1623	100,100
150	0	0	0	0	0	0	0	0	140-150	0	1623	100,100
160	0	0	0	0	0	0	0	0	150-160	0	1623	100,100
170	0	0	0	0	0	0	0	0	160-170	0	1623	100,100
180	0	0	0	0	0	0	0	0	170-180	0	1623	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

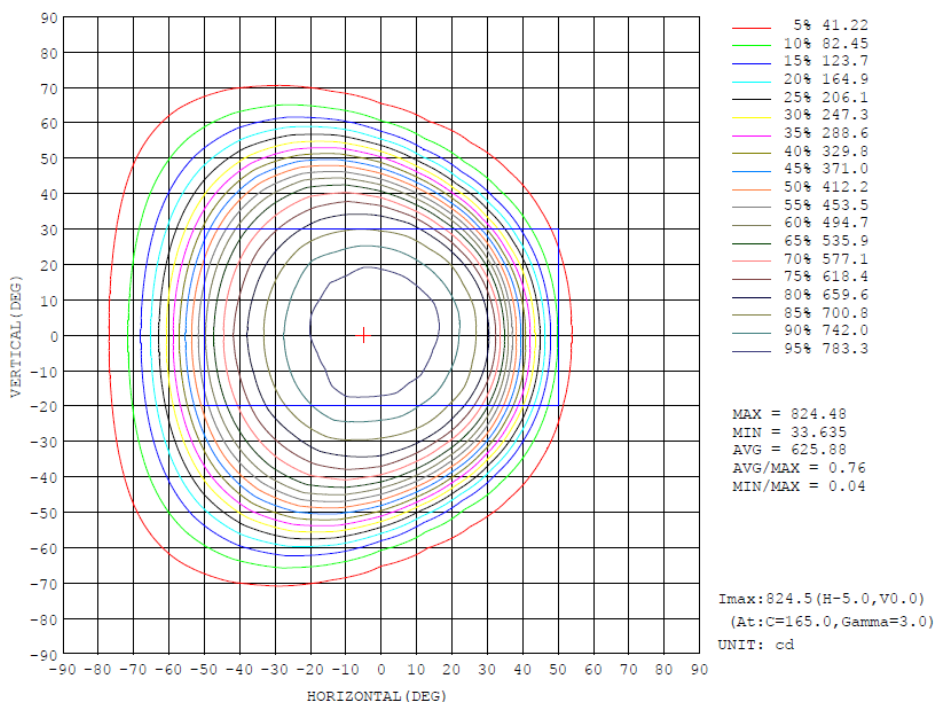
	Zonal (lm)		Total (lm)	Percent
0-10	78.08	0-10	78.08	4.81%
10-20	224.65	0-20	302.73	18.65%
20-30	340.30	0-30	643.03	39.61%
30-40	385.88	0-40	1028.91	63.38%
40-50	311.64	0-50	1340.55	82.57%
50-60	180.94	0-60	1521.49	93.72%
60-70	75.43	0-70	1596.92	98.36%
70-80	22.10	0-80	1619.02	99.73%
80-90	4.45	0-90	1623.47	100.00%
90-100	0.00	0-100	1623.47	100.00%
100-110	0.00	0-110	1623.47	100.00%
110-120	0.00	0-120	1623.47	100.00%
120-130	0.00	0-130	1623.47	100.00%
130-140	0.00	0-140	1623.47	100.00%
140-150	0.00	0-150	1623.47	100.00%
150-160	0.00	0-160	1623.47	100.00%
160-170	0.00	0-170	1623.47	100.00%
170-180	0.00	0-180	1623.47	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	0.08	0.11	0.13	0.13	0.12	0.09	0.06	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.83	0.00
	80	0.02	0.08	0.19	0.33	0.48	0.60	0.63	0.54	0.42	0.27	0.15	0.06	0.01	0.00	0.00	0.00	0.00	0.00	3.77	0.00
	70	0.02	0.13	0.35	0.75	1.33	1.95	2.38	2.30	1.82	1.19	0.69	0.35	0.11	0.01	0.00	0.00	0.00	0.00	13.4	4.89
	60	0.03	0.18	0.60	1.50	2.98	4.87	6.50	7.14	6.33	4.44	2.42	1.18	0.53	0.13	0.01	0.00	0.00	0.00	38.8	34.4
	50	0.03	0.25	0.95	2.58	5.45	9.11	12.3	14.0	13.8	11.5	7.50	3.53	1.35	0.49	0.07	0.00	0.00	0.00	82.7	79.9
	40	0.04	0.32	1.34	3.86	8.13	12.8	16.4	18.7	19.5	18.5	14.9	9.01	3.51	1.00	0.23	0.01	0.00	0.00	128	126
	30	0.04	0.39	1.73	5.09	10.3	15.1	18.8	21.3	22.4	22.1	20.0	15.0	7.29	1.99	0.42	0.03	0.00	0.00	162	160
	20	0.04	0.44	2.06	6.05	11.6	16.4	20.2	22.9	24.1	23.9	22.2	18.5	10.9	3.36	0.58	0.05	0.00	0.00	183	182
	10	0.05	0.47	2.25	6.58	12.2	17.0	20.8	23.5	24.8	24.7	23.1	19.7	12.8	4.34	0.70	0.07	0.00	0.00	193	192
	0	0.05	0.47	2.26	6.61	12.2	17.0	20.7	23.4	24.8	24.6	22.9	19.6	12.9	4.43	0.70	0.07	0.00	0.00	193	191
	-10	0.04	0.44	2.08	6.15	11.6	16.4	20.2	22.8	24.0	23.8	22.0	18.5	11.3	3.57	0.58	0.05	0.00	0.00	183	182
	-20	0.04	0.39	1.77	5.24	10.4	15.1	18.8	21.3	22.3	22.0	20.0	15.5	8.06	2.13	0.40	0.03	0.00	0.00	163	162
	-30	0.04	0.32	1.37	4.02	8.42	12.9	16.5	18.8	19.6	18.7	15.5	10.0	3.97	1.03	0.22	0.01	0.00	0.00	132	130
	-40	0.03	0.24	0.96	2.71	5.78	9.53	12.7	14.4	14.3	12.2	8.29	3.94	1.41	0.45	0.06	0.00	0.00	0.00	87.1	84.4
	-50	0.03	0.17	0.60	1.56	3.19	5.25	7.01	7.68	6.82	4.76	2.50	1.15	0.48	0.11	0.00	0.00	0.00	0.00	41.3	37.1
	-60	0.02	0.12	0.34	0.75	1.39	2.09	2.58	2.49	1.89	1.16	0.62	0.29	0.08	0.01	0.00	0.00	0.00	0.00	13.8	5.95
	-70	0.01	0.07	0.17	0.31	0.47	0.60	0.64	0.54	0.39	0.23	0.11	0.04	0.01	0.00	0.00	0.00	0.00	0.00	3.59	0.00
	-80	0.01	0.03	0.07	0.10	0.12	0.12	0.11	0.08	0.05	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.71	0.00
	-90	0.01	0.03	0.07	0.10	0.12	0.12	0.11	0.08	0.05	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.71	0.00
		-90	-80	-70	-60	-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	
Φ t		0.53	4.55	19.2	54.3	106	157	197	222	227	214	183	136	74.8	23.0	3.96	0.32	0.00	0.00	1623	---
Φ a		0.00	0.42	15.1	50.8	103	154	194	219	224	211	179	133	71.0	18.3	0.00	0.00	0.00	0.00	---	1572

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	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	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	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	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	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	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	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	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	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	0.00									
-80	0.80	3.86	5.61	6.90	7.98	8.92	9.71	10.31	10.7	11.0	11.0	10.7	9.96	9.03	8.00	6.70	5.68	4.51	3.23										
-70	0.00	3.84	8.74	11.6	14.7	18.2	22.5	27.1	32.0	37.1	41.4	44.2	46.2	45.6	42.5	37.4	32.5	26.6	21.9	17.7									
-60	0.00	7.37	11.8	17.3	24.3	33.9	46.2	61.8	78.7	97.7	118	135	150	160	159	154	141	119	92.4										
-50	0.00	8.74	15.2	24.1	37.8	56.9	83.0	117	157	202	251	296	332	364	379	383	376	352	319										
-40	0.93	9.93	18.8	32.1	53.8	85.8	130	188	258	331	402	463	509	545	572	583	591	582	566										
-30	0.00	11.0	22.0	40.2	71.2	116	180	262	355	444	514	570	614	644	672	691	698	697	694										
-20	0.00	11.0	24.6	47.2	85.3	143	224	325	430	516	584	637	679	713	739	758	768	768	770	768									
-10	0.00	12.2	26.2	52.1	95.3	162	254	366	474	558	623	671	715	746	769	787	804	809	809										
0	0.00	12.5	26.9	54.0	98.9	168	264	379	488	572	638	685	726	757	784	803	814	824	822										
10	0.00	12.3	26.4	52.3	95.0	160	251	362	472	558	622	673	715	746	774	793	811	813	814										
20	0.00	11.8	24.9	47.5	84.8	141	220	317	423	514	584	638	681	714	745	760	768	777	777										
30	0.00	11.1	22.5	40.6	70.5	114	174	253	343	433	510	568	612	646	671	689	697	700	695										
40	0.00	10.1	19.3	32.7	54.3	84.7	126	178	244	315	387	450	499	538	567	575	583	571	550										
50	0.85	15.7	25.0	38.7	57.1	81.0	112	148	190	234	277	311	341	357	361	353	333	329	297										
60	0.00	7.58	12.3	18.3	25.3	34.7	46.7	60.4	75.4	92.4	110	125	138	146	146	142	130	112	88.7										
70	0.00	6.04	9.26	12.5	15.7	19.7	23.6	28.0	32.4	37.0	40.5	42.7	44.1	43.4	40.6	35.9	32.0	27.4	21.9										
80	0.00	4.02	6.03	7.63	8.83	9.88	10.9	11.4	11.8	12.0	11.8	11.2	10.3	9.53	8.82	7.34	6.30	5.26	4.12										
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	2.44	1.64	0.88	0.58	0.31	0.10	0.06	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.00	
-70	16.1	12.3	8.71	5.94	3.33	1.45	0.69	0.22	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.00	
-60	73.7	53.9	38.5	29.4	20.9	13.9	7.65	2.84	0.74	0.13	0.02	0.01	0.02	0.02	0.02	0.02	0.03	0.00	
-50	270	211	155	105	67.1	47.3	32.0	20.4	10.6	3.46	0.36	0.01	0.01	0.01	0.02	0.02	0.03	0.00	
-40	532	485	420	334	241	150	86.5	49.6	30.6	16.4	6.18	0.78	0.01	0.01	0.02	0.02	0.02	0.00	
-30	685	666	624	567	482	365	235	125	61.9	32.8	16.4	4.89	0.23	0.01	0.01	0.02	0.02	0.00	
-20	762	745	723	693	637	539	397	249	120	50.3	26.4	10.3	1.33	0.01	0.01	0.02	0.02	0.00	
-10	804	790	770	738	702	641	496	335	182	73.6	33.3	14.8	2.73	0.01	0.01	0.02	0.02	0.00	
0	820	807	788	760	716	667	529	355	201	80.0	35.3	16.3	3.32	0.02	0.01	0.02	0.02	0.00	
10	809	797	780	746	704	639	487	321	174	72.0	33.6	15.1	2.84	0.02	0.02	0.02	0.02	0.00	
20	769	751	727	697	633	522	369	226	113	49.9	27.2	10.8	1.44	0.02	0.02	0.02	0.03	0.00	
30	687	666	616	546	449	322	205	114	57.5	33.6	17.6	5.14	0.31	0.02	0.02	0.02	0.03	0.00	
40	511	456	385	295	209	133	78.4	48.3	31.9	17.9	6.77	0.98	0.02	0.02	0.02	0.03	0.03	0.00	
50	249	193	142	99.2	65.0	46.8	34.0	22.8	12.5	4.38	0.59	0.03	0.02	0.03	0.03	0.03	0.03	0.00	
60	72.3	54.8	40.6	32.0	24.0	16.7	9.86	4.08	1.32	0.30	0.04	0.02	0.03	0.03	0.04	0.04	0.04	0.00	
70	18.3	14.5	10.7	7.61	4.68	2.39	1.18	0.40	0.06	0.04	0.03	0.03	0.03	0.04	0.05	0.04	0.04	0.00	
80	3.20	2.25	1.32	0.88	0.49	0.19	0.12	0.06	0.03	0.04	0.04	0.05	0.05	0.05	0.06	0.05	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 @15W5000K	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	14.60

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*****