

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		2095
Minimum Luminaire Efficacy (lm/W) (Goniophotometer – Section 4.2)	ANSI/IES LM-79:2019	Standard	Premium	106.9
		105	120	
Power (Input Wattage) (W) (Goniophotometer – Section 4.2)	ANSI/IES LM-79:2019	Worst Case		19.6
Total Harmonic Distortion (A%) (THD & PF – Section 4.3)	ANSI C82.77:2002 ANSI C82-77-10:2020	20.00%	1200V	14.95
Power Factor (THD & PF – Section 4.3)	ANSI C82.77:2002 ANSI C82-77-10:2020	0.9	120V	0.989
Allowable CCTs* (K) (Integrating Sphere – Section 4.1)	ANSI/IES LM-79:2019	7 steps	3985±275	3918
		4 steps	3985±154	
Minimum CRI (Integrating Sphere – Section 4.1)	ANSI/IES LM-79:2019 CIE13.3-1995	≥70		84.4
Minimum R9 (Integrating Sphere – Section 4.1)	ANSI/IES LM-79-2019 CIE13.3-1995	N/A		17
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		0.165
(Goniophotometer – Section 4.2)		Non-Worst Case		N/A
Power (Input Wattage – W)				
(Goniophotometer – Section 4.2)	ANSI/IES LM-79:2019	Worst Case		19.6
(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 @20W4000K	ES 1st ES #3-2	241216013-S1
2	Goniophotometer Test	2024-12-24	BULLET20 @20W4000K	ES 1st ES #3-2	241216013-S1
3	THD and PF Test	2024-12-24	BULLET20 @20W4000K	ES 1st ES #3-2	241216013-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. BULLET20 @20W4000K, 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 @20W4000K	Sample ID	241216013-S1
Operate time (Min.)	10	Stabilization time (Min.)	60
Temperature (°C)	25.4	Humidity (%RH)	41.0

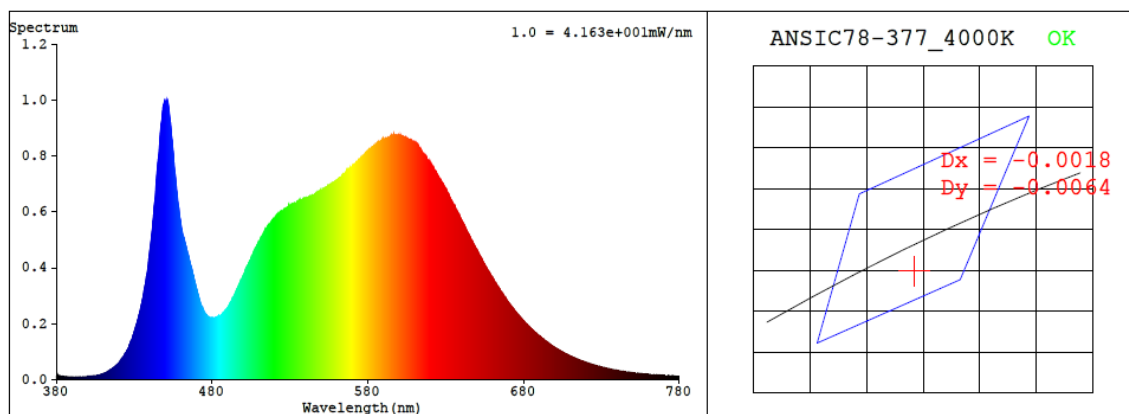
Test Method
<p>The Samples were tested according to the ANSI/IES LM-79:2019.</p> <p>Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25±1°C.</p> <p>The sample measurements were made 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	0.165	19.6	0.989

CCT (K)	CRI	R9	Duv	Rf	Rg	IES Rcs,h1
3918	84.4	17	-0.0025	84	98	-11%

4.1 Integrating Sphere Test



Colorimetric Parameters

Chromaticity Coordinate: $x = 0.3824$ $y = 0.3726$ / $u' = 0.2281$ $v' = 0.5000$ ($duv = -2.52e-03$)

CCT= 3918K Prop WL: $L_d = 580.8\text{nm}$ Purity=26.6%

Peak WL: $L_p = 451\text{nm}$ FWHM: $\approx 21.2\text{nm}$ Ratio: R=19.1% G=77.6% B=3.4%

Render Index: $R_a = 84.4$ AvgR = 78.3 TM30: $R_f = 84$ $R_g = 98$

EEL: 0.13076 A+

R1 =84 R2 =90 R3 =94 R4 =84 R5 =84 R6 =86 R7 =86

R8 =67 R9 =17 R10=75 R11=84 R12=65 R13=85 R14=96 R15=78

4.1 Integrating Sphere Test

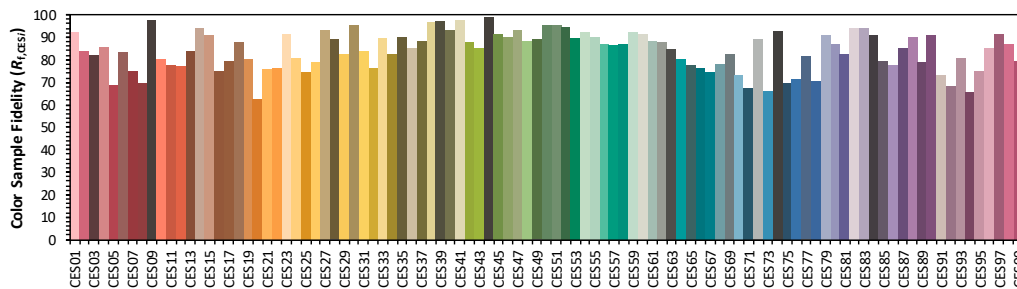
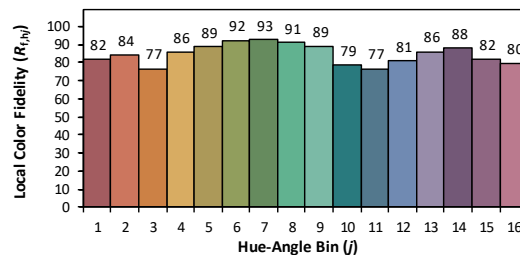
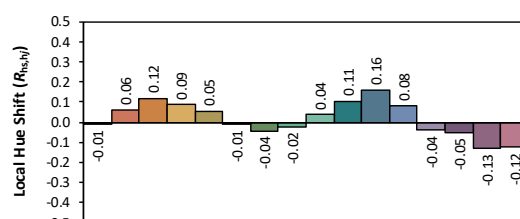
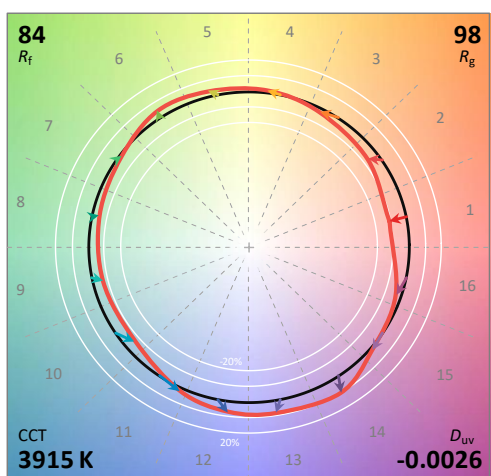
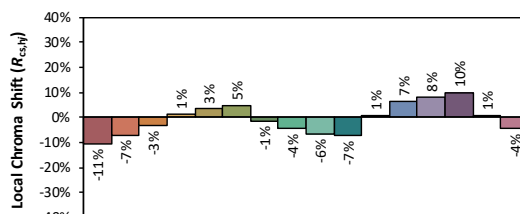
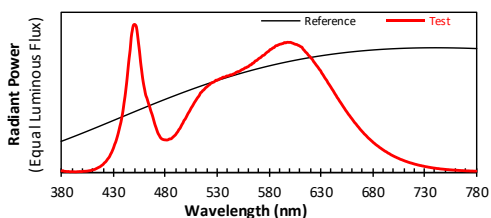
ANSI/IES TM-30-18 Color Rendition Report

Source: 1 CIE F1

Manufacturer: RAB Lighting Inc.

Date: 2024/12/25

Model: BULLET20 @20W4000K



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

x 0.3823
 y 0.3724
 u' 0.2281
 v' 0.4999

CIE 13.3-1995
(CRI)
 R_a 84
 R_g 17

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	1.36E-05	447	9.07E-04	514	5.36E-04	581	8.25E-04	648	4.84E-04	715	7.17E-05
381	1.58E-05	448	9.51E-04	515	5.41E-04	582	8.27E-04	649	4.74E-04	716	6.94E-05
382	1.18E-05	449	9.86E-04	516	5.51E-04	583	8.32E-04	650	4.63E-04	717	6.74E-05
383	1.11E-05	450	9.93E-04	517	5.55E-04	584	8.37E-04	651	4.53E-04	718	6.57E-05
384	1.08E-05	451	9.90E-04	518	5.63E-04	585	8.39E-04	652	4.42E-04	719	6.34E-05
385	9.60E-06	452	9.77E-04	519	5.71E-04	586	8.47E-04	653	4.32E-04	720	6.13E-05
386	1.05E-05	453	9.29E-04	520	5.76E-04	587	8.52E-04	654	4.21E-04	721	5.92E-05
387	9.60E-06	454	8.69E-04	521	5.82E-04	588	8.52E-04	655	4.11E-04	722	5.76E-05
388	7.90E-06	455	8.13E-04	522	5.88E-04	589	8.56E-04	656	4.01E-04	723	5.58E-05
389	9.10E-06	456	7.44E-04	523	5.93E-04	590	8.59E-04	657	3.91E-04	724	5.37E-05
390	8.80E-06	457	6.89E-04	524	6.01E-04	591	8.62E-04	658	3.83E-04	725	5.23E-05
391	8.40E-06	458	6.35E-04	525	6.03E-04	592	8.63E-04	659	3.73E-04	726	5.04E-05
392	8.40E-06	459	5.92E-04	526	6.07E-04	593	8.65E-04	660	3.64E-04	727	4.96E-05
393	7.80E-06	460	5.57E-04	527	6.09E-04	594	8.67E-04	661	3.55E-04	728	4.75E-05
394	8.00E-06	461	5.21E-04	528	6.15E-04	595	8.73E-04	662	3.45E-04	729	4.65E-05
395	9.10E-06	462	5.04E-04	529	6.22E-04	596	8.70E-04	663	3.36E-04	730	4.47E-05
396	9.10E-06	463	4.81E-04	530	6.19E-04	597	8.72E-04	664	3.29E-04	731	4.31E-05
397	9.90E-06	464	4.58E-04	531	6.25E-04	598	8.74E-04	665	3.19E-04	732	4.20E-05
398	9.80E-06	465	4.38E-04	532	6.28E-04	599	8.73E-04	666	3.11E-04	733	4.09E-05
399	9.00E-06	466	4.13E-04	533	6.32E-04	600	8.73E-04	667	3.03E-04	734	3.93E-05
400	1.10E-05	467	3.95E-04	534	6.32E-04	601	8.74E-04	668	2.94E-04	735	3.83E-05
401	1.14E-05	468	3.72E-04	535	6.38E-04	602	8.70E-04	669	2.86E-04	736	3.69E-05
402	1.17E-05	469	3.46E-04	536	6.41E-04	603	8.68E-04	670	2.78E-04	737	3.58E-05
403	1.20E-05	470	3.22E-04	537	6.41E-04	604	8.65E-04	671	2.71E-04	738	3.48E-05
404	1.25E-05	471	3.03E-04	538	6.44E-04	605	8.62E-04	672	2.62E-04	739	3.35E-05
405	1.34E-05	472	2.82E-04	539	6.48E-04	606	8.60E-04	673	2.56E-04	740	3.27E-05
406	1.48E-05	473	2.64E-04	540	6.49E-04	607	8.59E-04	674	2.49E-04	741	3.17E-05
407	1.60E-05	474	2.53E-04	541	6.50E-04	608	8.55E-04	675	2.42E-04	742	3.05E-05
408	1.69E-05	475	2.40E-04	542	6.54E-04	609	8.52E-04	676	2.34E-04	743	2.99E-05
409	1.92E-05	476	2.31E-04	543	6.57E-04	610	8.48E-04	677	2.29E-04	744	2.95E-05
410	2.11E-05	477	2.26E-04	544	6.56E-04	611	8.44E-04	678	2.22E-04	745	2.80E-05
411	2.31E-05	478	2.24E-04	545	6.60E-04	612	8.40E-04	679	2.16E-04	746	2.72E-05
412	2.51E-05	479	2.22E-04	546	6.63E-04	613	8.28E-04	680	2.10E-04	747	2.66E-05
413	2.88E-05	480	2.22E-04	547	6.65E-04	614	8.22E-04	681	2.03E-04	748	2.60E-05
414	3.21E-05	481	2.21E-04	548	6.72E-04	615	8.12E-04	682	1.98E-04	749	2.53E-05
415	3.58E-05	482	2.21E-04	549	6.75E-04	616	8.06E-04	683	1.92E-04	750	2.45E-05
416	3.93E-05	483	2.24E-04	550	6.78E-04	617	7.99E-04	684	1.86E-04	751	2.38E-05
417	4.27E-05	484	2.28E-04	551	6.79E-04	618	7.89E-04	685	1.81E-04	752	2.30E-05
418	4.83E-05	485	2.28E-04	552	6.82E-04	619	7.83E-04	686	1.76E-04	753	2.30E-05
419	5.33E-05	486	2.31E-04	553	6.87E-04	620	7.75E-04	687	1.70E-04	754	2.20E-05
420	5.88E-05	487	2.38E-04	554	6.91E-04	621	7.67E-04	688	1.66E-04	755	2.15E-05
421	6.75E-05	488	2.44E-04	555	6.94E-04	622	7.60E-04	689	1.61E-04	756	2.10E-05
422	7.29E-05	489	2.51E-04	556	6.98E-04	623	7.47E-04	690	1.56E-04	757	2.04E-05
423	8.11E-05	490	2.58E-04	557	7.03E-04	624	7.38E-04	691	1.52E-04	758	1.99E-05
424	9.12E-05	491	2.68E-04	558	7.04E-04	625	7.29E-04	692	1.47E-04	759	1.96E-05
425	9.99E-05	492	2.77E-04	559	7.09E-04	626	7.19E-04	693	1.43E-04	760	1.91E-05
426	1.09E-04	493	2.90E-04	560	7.11E-04	627	7.11E-04	694	1.39E-04	761	1.85E-05
427	1.25E-04	494	2.98E-04	561	7.18E-04	628	7.01E-04	695	1.34E-04	762	1.81E-05
428	1.37E-04	495	3.11E-04	562	7.23E-04	629	6.91E-04	696	1.31E-04	763	1.79E-05
429	1.53E-04	496	3.24E-04	563	7.24E-04	630	6.83E-04	697	1.26E-04	764	1.71E-05
430	1.70E-04	497	3.36E-04	564	7.34E-04	631	6.69E-04	698	1.22E-04	765	1.70E-05
431	1.91E-04	498	3.51E-04	565	7.35E-04	632	6.60E-04	699	1.18E-04	766	1.62E-05
432	2.08E-04	499	3.59E-04	566	7.42E-04	633	6.48E-04	700	1.15E-04	767	1.63E-05
433	2.30E-04	500	3.72E-04	567	7.50E-04	634	6.37E-04	701	1.11E-04	768	1.57E-05
434	2.54E-04	501	3.86E-04	568	7.52E-04	635	6.27E-04	702	1.08E-04	769	1.55E-05
435	2.82E-04	502	3.99E-04	569	7.57E-04	636	6.17E-04	703	1.05E-04	770	1.50E-05
436	3.11E-04	503	4.10E-04	570	7.64E-04	637	6.04E-04	704	1.01E-04	771	1.46E-05
437	3.39E-04	504	4.23E-04	571	7.69E-04	638	5.94E-04	705	9.87E-05	772	1.44E-05
438	3.75E-04	505	4.36E-04	572	7.72E-04	639	5.83E-04	706	9.53E-05	773	1.44E-05
439	4.14E-04	506	4.46E-04	573	7.79E-04	640	5.73E-04	707	9.19E-05	774	1.38E-05
440	4.66E-04	507	4.58E-04	574	7.85E-04	641	5.61E-04	708	8.97E-05	775	1.33E-05
441	5.13E-04	508	4.71E-04	575	7.87E-04	642	5.51E-04	709	8.71E-05	776	1.34E-05
442	5.69E-04	509	4.81E-04	576	7.93E-04	643	5.39E-04	710	8.41E-05	777	1.33E-05
443	6.31E-04	510	4.92E-04	577	8.01E-04	644	5.27E-04	711	8.16E-05	778	1.27E-05
444	7.03E-04	511	5.03E-04	578	8.06E-04	645	5.17E-04	712	7.86E-05	779	1.26E-05
445	7.70E-04	512	5.11E-04	579	8.12E-04	646	5.05E-04	713	7.68E-05	780	1.26E-05
446	8.25E-04	513	5.22E-04	580	8.15E-04	647	4.96E-04	714	7.39E-05	N/A	N/A

4.0 LM-79 Measurement and Test Results

4.2 Goniophotometer Test

Model No.	BULLET20 @20W4000K	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

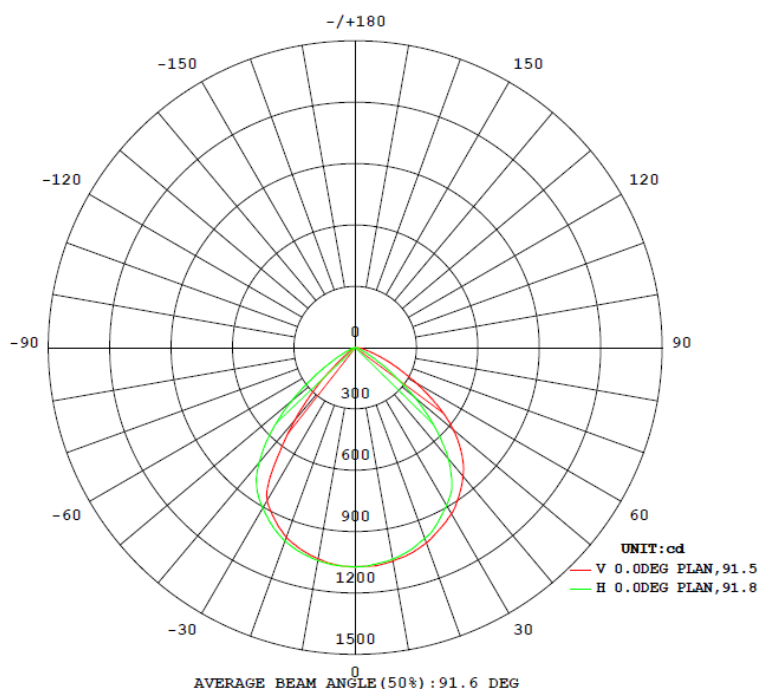
Condition	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
WORST CASE	120.0	60	0.165	19.6	0.989
NON-WORST CASE	N/A	N/A	N/A	N/A	N/A

Test Result

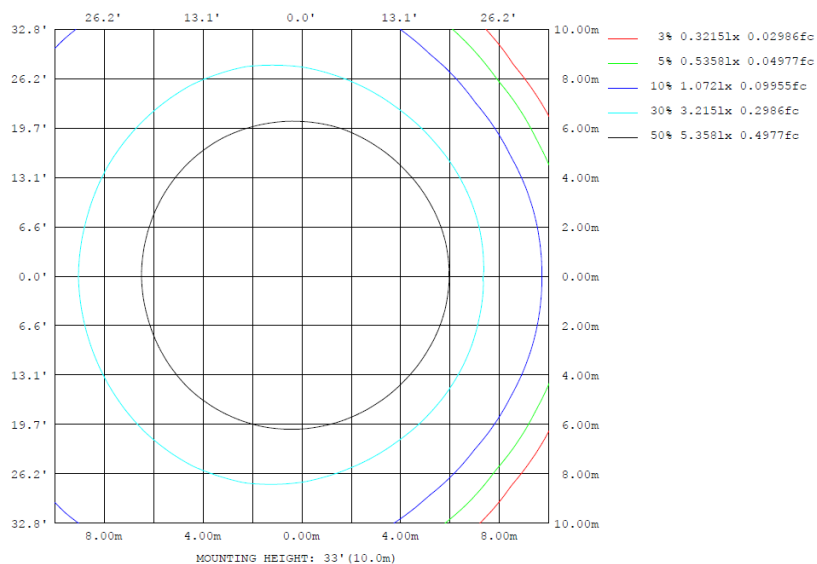
Flux (lm)	Field Angle (10%)		Beam Angle (50%)		Luminous Efficacy (lm/W)	Zonal Lumen Requirement	NEMA Type
	C0-180	C90-270	C0-180	C90-270		(0°-90°)	
2095	123.7	123.9	91.3	91.3	106.9	100.0%	6H x 6V

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	1048	1049	1050	1059	1059	1062	1057	1055	0- 10	101.5	101.5	4.85,4.85
20	986.8	985.0	992.6	1014	1016	1016	1006	993.0	10- 20	291.5	393.0	18.8,18.8
30	863.1	856.1	891.1	933.3	939.2	945.6	905.5	871.2	20- 30	440.6	833.6	39.8,39.8
40	458.1	513.2	706.0	805.9	819.5	813.7	732.0	523.8	30- 40	498.1	1332	63.6,63.6
50	101.6	125.8	379.4	611.9	626.5	618.8	410.2	134.3	40- 50	400.7	1732	82.7,82.7
60	20.74	28.76	106.8	318.8	338.3	325.6	126.3	33.53	50- 60	232.1	1964	93.8,93.8
70	0.0206	0.7245	23.86	103.9	127.1	112.0	29.23	1.679	60- 70	96.75	2061	98.4,98.4
80	0.0225	0.0212	3.996	22.43	34.52	26.41	5.441	0.0410	70- 80	28.36	2090	99.7,99.7
90	0	0	0	0	0	0	0	0	80- 90	5.732	2095	100,100
100	0	0	0	0	0	0	0	0	90-100	0	2095	100,100
110	0	0	0	0	0	0	0	0	100-110	0	2095	100,100
120	0	0	0	0	0	0	0	0	110-120	0	2095	100,100
130	0	0	0	0	0	0	0	0	120-130	0	2095	100,100
140	0	0	0	0	0	0	0	0	130-140	0	2095	100,100
150	0	0	0	0	0	0	0	0	140-150	0	2095	100,100
160	0	0	0	0	0	0	0	0	150-160	0	2095	100,100
170	0	0	0	0	0	0	0	0	160-170	0	2095	100,100
180	0	0	0	0	0	0	0	0	170-180	0	2095	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

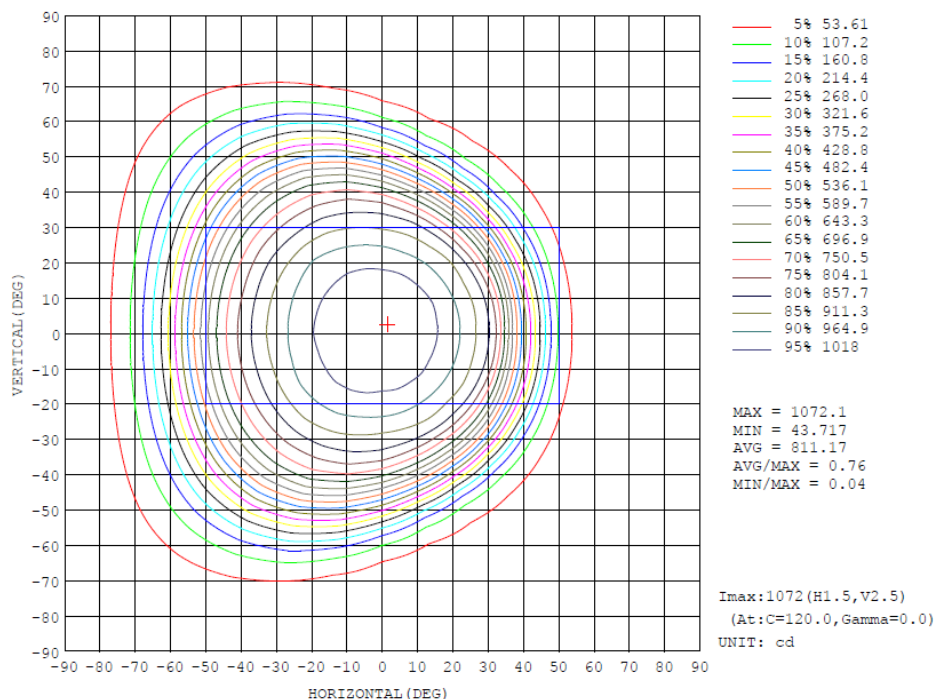
	Zonal (lm)		Total (lm)	Percent
0-10	101.53	0-10	101.53	4.85%
10-20	291.47	0-20	393.00	18.76%
20-30	440.62	0-30	833.62	39.79%
30-40	498.06	0-40	1331.68	63.56%
40-50	400.70	0-50	1732.38	82.68%
50-60	232.07	0-60	1964.45	93.76%
60-70	96.75	0-70	2061.20	98.37%
70-80	28.36	0-80	2089.56	99.73%
80-90	5.73	0-90	2095.29	100.00%
90-100	0.00	0-100	2095.29	100.00%
100-110	0.00	0-110	2095.29	100.00%
110-120	0.00	0-120	2095.29	100.00%
120-130	0.00	0-130	2095.29	100.00%
130-140	0.00	0-140	2095.29	100.00%
140-150	0.00	0-150	2095.29	100.00%
150-160	0.00	0-160	2095.29	100.00%
160-170	0.00	0-170	2095.29	100.00%
170-180	0.00	0-180	2095.29	100.00%

4.2 Goniophotometer Test

Area Flux Diagram

		AREA FLUX DIAGRAM																UNIT:lm				Φ t	Φ a
VERTICAL (DEG)	90	0.01	0.05	0.10	0.15	0.18	0.18	0.16	0.13	0.09	0.05	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	1.12	0.00		
	80	0.02	0.11	0.25	0.44	0.66	0.83	0.88	0.76	0.57	0.36	0.19	0.07	0.02	0.00	0.00	0.00	0.00	0.00	5.16	0.00		
	70	0.03	0.16	0.46	1.01	1.81	2.68	3.32	3.26	2.57	1.65	0.93	0.46	0.15	0.02	0.00	0.00	0.00	0.00	18.5	7.74		
	60	0.03	0.24	0.80	2.00	4.02	6.60	8.87	9.84	8.84	6.29	3.40	1.59	0.70	0.18	0.01	0.00	0.00	0.00	53.4	47.9		
	50	0.04	0.32	1.24	3.42	7.21	12.0	16.2	18.6	18.5	15.7	10.5	5.00	1.83	0.64	0.09	0.00	0.00	0.00	111	108		
	40	0.05	0.41	1.76	5.06	10.6	16.6	21.3	24.4	25.5	24.3	20.0	12.4	4.89	1.32	0.30	0.01	0.00	0.00	169	166		
	30	0.05	0.50	2.26	6.64	13.3	19.5	24.4	27.8	29.1	28.7	26.1	19.9	9.92	2.68	0.54	0.04	0.00	0.00	211	209		
	20	0.06	0.57	2.66	7.84	14.9	21.2	26.2	29.7	31.3	31.1	28.7	24.1	14.4	4.47	0.75	0.07	0.00	0.00	238	236		
	10	0.06	0.61	2.89	8.47	15.7	21.9	26.9	30.4	32.3	32.1	29.9	25.5	16.7	5.64	0.88	0.09	0.00	0.00	250	248		
	0	0.06	0.61	2.89	8.46	15.6	21.9	26.8	30.4	32.2	32.0	29.8	25.4	16.5	5.62	0.88	0.09	0.00	0.00	249	248		
	-10	0.06	0.56	2.65	7.81	14.8	21.0	26.0	29.5	31.1	30.8	28.5	23.8	14.2	4.41	0.73	0.07	0.00	0.00	236	234		
	-20	0.05	0.49	2.24	6.61	13.2	19.3	24.2	27.4	28.8	28.3	25.7	19.5	9.84	2.59	0.51	0.03	0.00	0.00	209	207		
-30	0.05	0.40	1.72	5.04	10.6	16.5	21.1	24.0	25.0	23.6	19.3	12.1	4.70	1.25	0.27	0.01	0.00	0.00	166	163			
-40	0.04	0.30	1.20	3.36	7.14	11.9	15.8	17.9	17.6	14.8	9.83	4.61	1.70	0.56	0.08	0.00	0.00	0.00	107	103			
-50	0.03	0.22	0.75	1.91	3.88	6.37	8.48	9.20	8.05	5.55	2.94	1.40	0.59	0.14	0.01	0.00	0.00	0.00	49.5	43.7			
-60	0.03	0.15	0.42	0.92	1.67	2.48	3.03	2.90	2.21	1.38	0.76	0.36	0.10	0.01	0.00	0.00	0.00	0.00	16.4	5.90			
-70	0.02	0.09	0.21	0.38	0.57	0.71	0.75	0.63	0.46	0.28	0.14	0.05	0.01	0.00	0.00	0.00	0.00	0.00	4.31	0.00			
-80	0.01	0.04	0.08	0.12	0.14	0.15	0.13	0.10	0.06	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.88	0.00			
-90																							
		-90	-80	-70	-60	-50	-40	-30	-20	HORIZONTAL (DEG)	20	30	40	50	60	70	80	90					
Φ t	a	0.68	5.84	24.6	69.6	136	202	254	287	294	277	237	176	96.3	29.5	5.04	0.40	0.00	0.00	2095	---		
Φ a	0	0.00	0.41	19.3	65.1	132	198	251	283	290	273	232	171	91.4	23.3	0.00	0.00	0.00	0.00	---	2028		

Isocandela



4.2 Goniophotometer Test

Luminous Distribution Intensity Data

															UNIT: od					
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	5.12	7.36	8.83	10.00	11.1	12.0	12.7	13.1	13.4	13.2	12.6	11.7	10.8	9.67	8.15	6.30	5.51	4.00	
-70	0.00	7.61	11.11	14.7	18.4	22.7	27.8	33.2	38.9	44.8	49.5	52.7	54.4	53.4	49.9	43.5	38.0	31.1	23.9	
-60	0.00	9.50	15.0	21.7	30.4	42.2	57.2	76.2	95.3	118	142	162	180	190	189	180	164	138	107	
-50	0.00	11.2	19.4	30.4	47.4	71.8	103	144	193	248	307	362	407	445	462	466	455	423	379	
-40	0.00	12.8	23.5	40.7	68.6	107	162	234	321	413	504	584	642	688	723	735	745	731	706	
-30	0.00	14.1	27.5	51.1	89.1	147	227	329	447	562	655	728	786	828	863	885	896	898	891	
-20	0.00	15.1	31.0	60.3	108	182	284	411	546	659	748	817	871	918	953	976	989	995	993	
-10	0.00	15.7	33.5	66.9	122	207	324	466	606	716	801	864	921	965	999	1023	1042	1051	1050	
0	0.00	16.0	34.5	69.4	127	217	338	487	626	736	820	884	939	978	1016	1042	1059	1071	1072	
10	0.00	15.9	33.8	67.4	123	208	324	467	606	719	802	869	924	968	1002	1028	1049	1057	1057	
20	0.00	15.3	31.6	61.4	110	184	284	412	549	664	755	825	881	925	966	999	1001	1005	1006	
30	0.00	14.4	28.3	52.8	91.7	149	229	330	448	564	661	736	793	837	871	897	908	911	906	
40	0.00	13.1	24.5	42.6	71.0	111	165	236	322	414	507	590	652	701	738	753	765	753	732	
50	0.00	11.6	20.6	32.4	50.8	75.2	107	148	198	253	314	370	417	460	483	490	481	452	411	
60	0.00	9.85	16.1	23.8	33.2	46.0	62.0	80.8	101	125	150	171	191	204	204	200	185	159	126	
70	0.00	7.86	12.1	16.4	21.1	25.6	31.4	37.5	43.9	50.3	55.6	59.2	61.6	60.9	57.2	50.8	45.0	37.7	29.2	
80	0.00	5.24	7.90	10.0	11.7	13.1	14.5	15.5	16.1	16.4	16.3	15.6	14.4	13.2	11.8	9.87	8.53	7.05	5.44	
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	

H (DBG)		UNIT: cd																	
V (DBG)	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	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	3.03	2.05	1.10	0.73	0.39	0.12	0.07	0.04	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.03	0.00
-70	19.6	15.1	10.7	7.25	4.10	1.82	0.87	0.28	0.04	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.04	0.00
-60	86.2	64.1	46.6	36.1	25.9	17.3	9.71	3.56	0.93	0.16	0.03	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.00
-50	318	246	180	123	80.3	57.6	39.6	25.4	13.3	4.54	0.44	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.00
-40	659	595	508	396	281	176	101	61.8	38.1	20.6	7.92	0.98	0.02	0.02	0.02	0.02	0.02	0.03	0.00
-30	878	849	792	710	593	440	280	149	74.2	41.1	20.6	6.38	0.29	0.02	0.02	0.02	0.02	0.03	0.00
-20	986	966	935	891	814	676	492	305	147	65.1	33.3	13.0	1.68	0.02	0.02	0.02	0.02	0.03	0.00
-10	1044	1027	1002	960	908	824	626	424	227	89.0	42.1	18.7	3.54	0.02	0.02	0.02	0.02	0.03	0.00
0	1067	1048	1023	987	930	863	679	458	258	102	45.0	20.7	4.17	0.02	0.02	0.02	0.02	0.03	0.00
10	1053	1035	1010	965	912	831	642	422	231	91.3	43.0	19.4	3.59	0.02	0.02	0.02	0.02	0.03	0.00
20	997	976	944	900	828	692	496	304	153	64.8	35.0	13.9	1.84	0.02	0.02	0.02	0.02	0.03	0.00
30	894	869	831	730	607	445	282	156	76.5	43.7	22.9	6.44	0.41	0.02	0.02	0.03	0.03	0.04	0.00
40	685	619	529	413	295	189	108	64.2	41.7	23.5	8.80	1.27	0.03	0.03	0.03	0.03	0.04	0.04	0.00
50	348	275	205	141	89.4	62.8	44.8	29.8	16.4	5.70	0.78	0.04	0.03	0.03	0.03	0.04	0.04	0.04	0.00
60	102	75.9	55.0	42.7	31.4	21.8	13.0	5.32	1.73	0.40	0.05	0.03	0.03	0.04	0.05	0.05	0.05	0.05	0.00
70	24.4	19.1	14.0	9.94	6.12	3.12	1.55	0.53	0.09	0.05	0.04	0.04	0.04	0.05	0.06	0.05	0.05	0.05	0.00
80	4.22	2.95	1.72	1.15	0.64	0.25	0.15	0.08	0.04	0.05	0.05	0.06	0.06	0.07	0.07	0.06	0.05	0.05	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.	BULLET20 @20W4000K	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	0.165	19.6	0.989	14.95

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*****