

Photometric Test Report

Relevant Standards

- ☒ IES LM-79-2008
- ☒ ANSI C82.77-2017

Prepared For

RAB Lighting Inc.

Prepared By

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Issue Date: 2023-06-14

Revised Date: N/A

1.0 Test Summary

DLC Technical Requirements V5.1

Outdoor Non-Cutoff and Semi-Cutoff Wall-Mounted Area Luminaires				
Requirement Category	Test Method	Requirements		Test Value
Luminaire Output (lm) (Goniophotometer – Section 4.2) (0°-180° zones)	IES LM-79-2008	N/A		11444
Minimum Luminaire Efficacy (lm/W) (Goniophotometer – Section 4.2) (0°-180° zones)	IES LM-79-2008	N/A		127.6
Luminaire Output (lm) (Goniophotometer – Section 4.2) (0°-90° zones)	IES LM-79-2008	300		11060
Minimum Luminaire Efficacy (lm/W) (Goniophotometer – Section 4.2) (0°-90° zones)	IES LM-79-2008	Standard	Premium	123.3
		105	120	
Power (Input Wattage) (W) (Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Case		89.7
Total Harmonic Distortion (A%) (THD & PF – Section 4.3)	ANSI C82.77:2014	20.00%	120V	2.87
			277V	5.12
Power Factor (THD & PF – Section 4.3)	ANSI C82.77:2014	0.9	120V	0.997
			277V	0.952
Allowable CCTs* (K) (Integrating Sphere – Section 4.1)	IES LM-79-2008	7 steps	3045±175	3138
		4 steps	3045±100	
Minimum CRI (Integrating Sphere – Section 4.1)	IES LM-79-2008 CIE13.3-1995	≥70		76.0
Minimum R9 (Integrating Sphere – Section 4.1)	IES LM-79-2008 CIE13.3-1995	N/A		-19
Minimum Rf (Integrating Sphere – Section 4.1)	ANSI/IES TM-30-18	≥70		79
Minimum Rg (Integrating Sphere – Section 4.1)	ANSI/IES TM-30-18	≥89		95
IES Rcs,h1 (Integrating Sphere – Section 4.1)	ANSI/IES TM-30-18	-18%≤IES Rcs,h1≤+23%		-15%
Zonal Lumen Requirement (80°-90°) (Goniophotometer – Section 4.2)	IES LM-79-2008	≤10%		6.8%
Input Voltage (V)				
(Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Cast		120.0
(Goniophotometer – Section 4.2)		Non-Worst Case		277.0
Input Current (A)				
(Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Case		0.750
(Goniophotometer – Section 4.2)		Non-Worst Case		0.336
Power (Input Wattage – W)				
(Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Case		89.7
(Goniophotometer – Section 4.2)		Non-Worst Case		88.7

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2023-06-13	W34M @ 80W / 3000K	230612002-S1
2	Goniophotometer Test	2023-06-13	W34M @ 80W / 3000K	230612002-S1
3	THD and PF Test	2023-06-13	W34M @ 80W / 3000K	230612002-S1

Remark (If any)

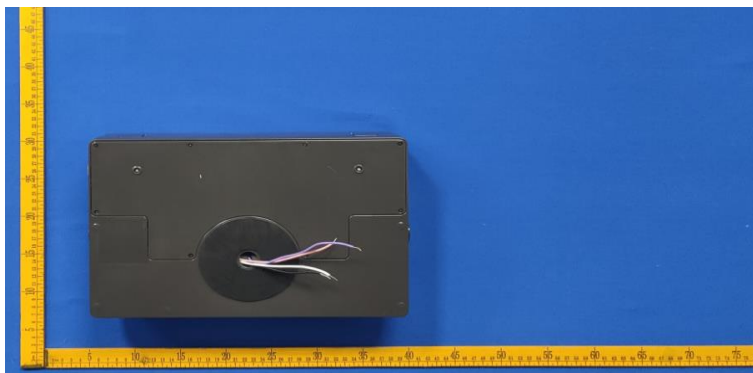
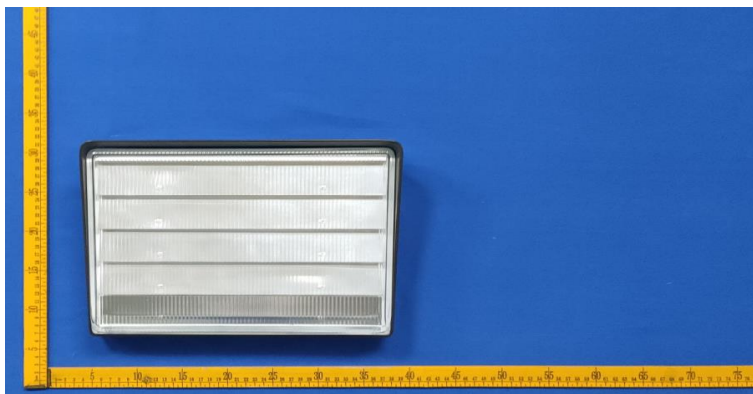
1. The results contained in this report pertain only to the tested samples.
2. This report shall not be reproduced, no limited part or full, without approval of Dongguan New Testing Centre Co., Ltd.
3. This report does not imply product certification, approval, or endorsement by NVLAP, or any agency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

3.0 Product Description

Luminaire Description: Model No. W34M @ 80W / 3000K, color tunable from 3000K, 4000K and 5000K.

Electrical Specification: 120-277Vac, 50/60Hz

Photos of Luminaire Characteristics



4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test

Model No.	W34M @ 80W / 3000K	Sample ID	230612002-S1
Operate time (Min.)	10	Stabilization time (Min.)	60
Temperature (°C)	25.4	Humidity (%RH)	41.0

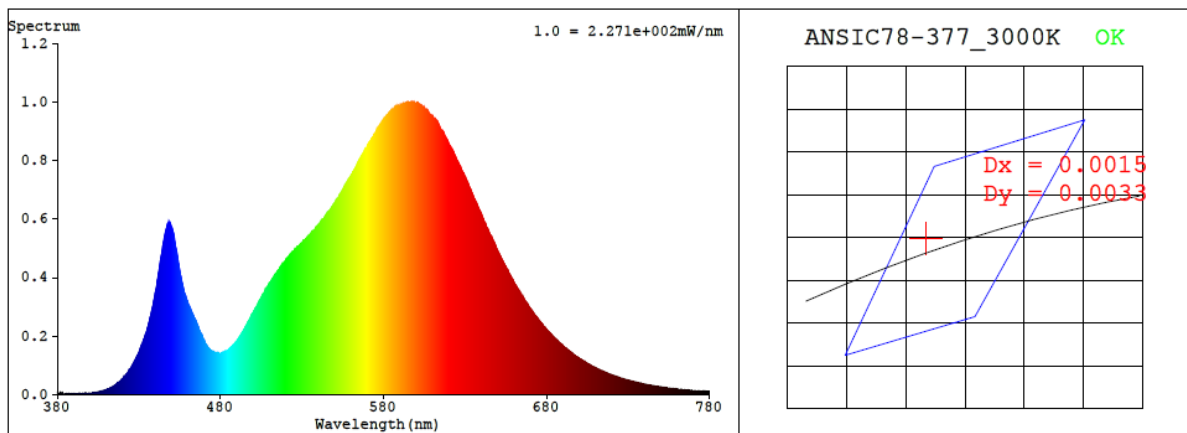
Test Method
<p>The Samples were tested according to the IES LM-79-2008.</p> <p>Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25±1°C.</p> <p>The sample measurements were made using 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.</p> <p>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	0.750	89.7	0.997
277.0	60	0.336	88.7	0.952

CCT (K)	CRI	R9	Duv	Rf	Rg	IES Rcs,h1
3138	76.0	-19	0.0011	79	95	-15%

4.1 Integrating Sphere Test



Colorimetric Parameters

Chromaticity Coordinate: $x = 0.4289$ $y = 0.4039$ / $u' = 0.2455$ $v' = 0.5201$ ($duv=1.11e-03$)

CCT= 3138K Prcp WL: Ld=581.8nm Purity=50.0%

Peak WL: Lp=597nm FWHM: =123.4nm Ratio:R=20.9% G=76.9% B=2.2%

Render Index: Ra = 76.0 AvgR = 67.9 TM30:Rf=79 Rg=94

EEL: 0.10790 A++ Highest

R1 =73 R2 =85 R3 =95 R4 =73 R5 =72 R6 =79 R7 =81

R8 =50 R9 =-19 R10=65 R11=70 R12=58 R13=75 R14=97 R15=65

4.1 Integrating Sphere Test

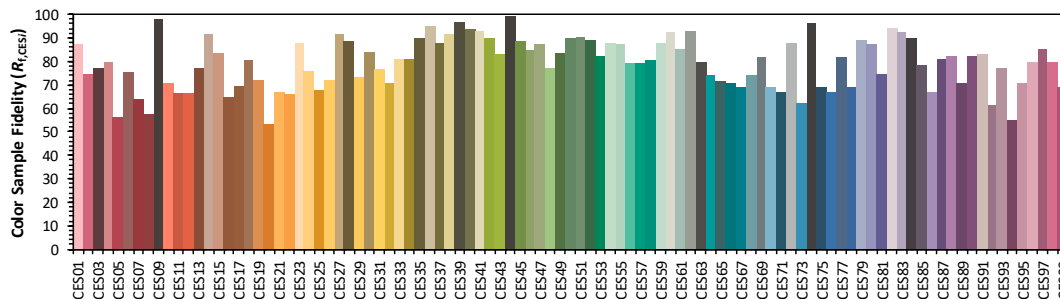
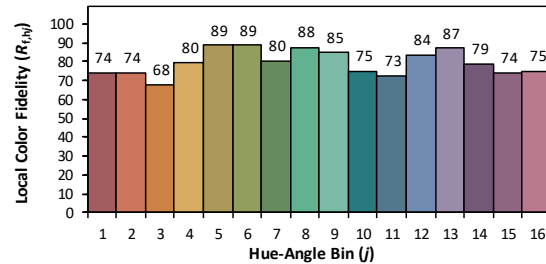
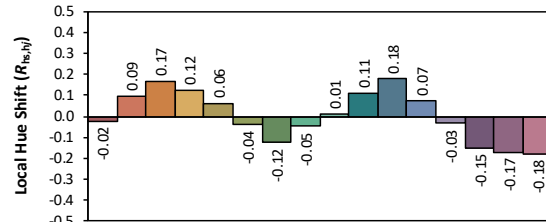
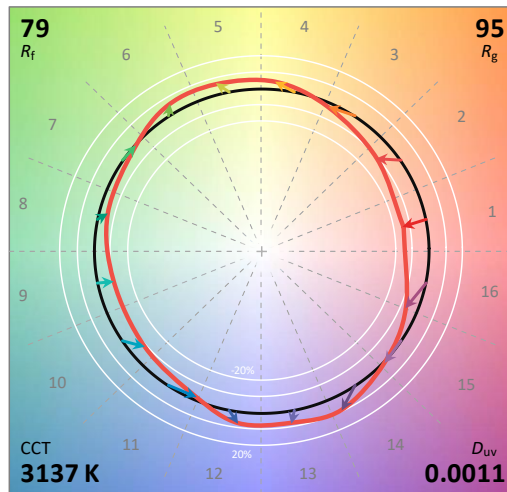
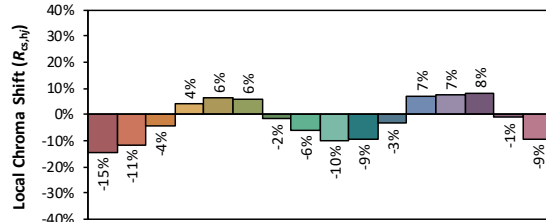
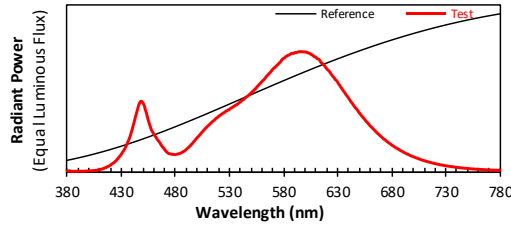
ANSI/IES TM-30-18 Color Rendition Report

Source: 1 CIE F1

Manufacturer: RAB Lighting Inc.

Date: 2023/6/14

Model: W34M @ 80W / 3000K



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

x 0.4289
 y 0.4038
 u' 0.2456
 v' 0.5201

CIE 13.3-1995
(CRI)

R_a 76
 R_g -19

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	6.60E-06	447	5.73E-04	514	4.14E-04	581	9.47E-04	648	5.17E-04	715	7.82E-05
381	2.50E-06	448	5.85E-04	515	4.22E-04	582	9.57E-04	649	5.04E-04	716	7.61E-05
382	7.00E-06	449	5.83E-04	516	4.28E-04	583	9.60E-04	650	4.90E-04	717	7.38E-05
383	4.20E-06	450	5.70E-04	517	4.38E-04	584	9.68E-04	651	4.80E-04	718	7.10E-05
384	9.00E-07	451	5.54E-04	518	4.47E-04	585	9.70E-04	652	4.67E-04	719	6.92E-05
385	2.60E-06	452	5.22E-04	519	4.51E-04	586	9.75E-04	653	4.57E-04	720	6.68E-05
386	1.50E-06	453	4.93E-04	520	4.60E-04	587	9.82E-04	654	4.46E-04	721	6.50E-05
387	3.10E-06	454	4.58E-04	521	4.67E-04	588	9.85E-04	655	4.36E-04	722	6.28E-05
388	2.70E-06	455	4.24E-04	522	4.73E-04	589	9.84E-04	656	4.24E-04	723	6.08E-05
389	3.30E-06	456	3.95E-04	523	4.79E-04	590	9.88E-04	657	4.14E-04	724	5.92E-05
390	3.90E-06	457	3.68E-04	524	4.87E-04	591	9.92E-04	658	4.05E-04	725	5.64E-05
391	2.80E-06	458	3.44E-04	525	4.90E-04	592	9.91E-04	659	3.93E-04	726	5.53E-05
392	3.50E-06	459	3.28E-04	526	4.97E-04	593	9.95E-04	660	3.83E-04	727	5.40E-05
393	3.30E-06	460	3.13E-04	527	5.05E-04	594	9.96E-04	661	3.73E-04	728	5.21E-05
394	2.90E-06	461	2.99E-04	528	5.07E-04	595	9.99E-04	662	3.65E-04	729	5.06E-05
395	3.20E-06	462	2.86E-04	529	5.14E-04	596	9.98E-04	663	3.56E-04	730	4.88E-05
396	3.70E-06	463	2.72E-04	530	5.18E-04	597	9.99E-04	664	3.46E-04	731	4.77E-05
397	4.70E-06	464	2.59E-04	531	5.26E-04	598	9.97E-04	665	3.37E-04	732	4.58E-05
398	4.80E-06	465	2.48E-04	532	5.31E-04	599	9.97E-04	666	3.28E-04	733	4.44E-05
399	4.90E-06	466	2.34E-04	533	5.37E-04	600	9.96E-04	667	3.18E-04	734	4.35E-05
400	5.80E-06	467	2.19E-04	534	5.42E-04	601	9.95E-04	668	3.11E-04	735	4.19E-05
401	6.10E-06	468	2.07E-04	535	5.48E-04	602	9.90E-04	669	3.02E-04	736	4.07E-05
402	6.60E-06	469	1.97E-04	536	5.56E-04	603	9.89E-04	670	2.94E-04	737	3.94E-05
403	7.10E-06	470	1.85E-04	537	5.58E-04	604	9.83E-04	671	2.87E-04	738	3.83E-05
404	8.30E-06	471	1.72E-04	538	5.66E-04	605	9.80E-04	672	2.78E-04	739	3.72E-05
405	9.00E-06	472	1.62E-04	539	5.73E-04	606	9.72E-04	673	2.70E-04	740	3.58E-05
406	1.02E-05	473	1.56E-04	540	5.80E-04	607	9.70E-04	674	2.64E-04	741	3.47E-05
407	1.05E-05	474	1.51E-04	541	5.88E-04	608	9.60E-04	675	2.56E-04	742	3.33E-05
408	1.30E-05	475	1.48E-04	542	5.96E-04	609	9.56E-04	676	2.49E-04	743	3.27E-05
409	1.56E-05	476	1.46E-04	543	5.99E-04	610	9.51E-04	677	2.42E-04	744	3.16E-05
410	1.68E-05	477	1.44E-04	544	6.08E-04	611	9.41E-04	678	2.36E-04	745	3.05E-05
411	1.92E-05	478	1.43E-04	545	6.17E-04	612	9.38E-04	679	2.30E-04	746	2.93E-05
412	2.13E-05	479	1.42E-04	546	6.23E-04	613	9.32E-04	680	2.22E-04	747	2.87E-05
413	2.42E-05	480	1.42E-04	547	6.29E-04	614	9.20E-04	681	2.16E-04	748	2.78E-05
414	2.75E-05	481	1.44E-04	548	6.38E-04	615	9.05E-04	682	2.10E-04	749	2.71E-05
415	3.18E-05	482	1.46E-04	549	6.46E-04	616	9.00E-04	683	2.05E-04	750	2.65E-05
416	3.47E-05	483	1.49E-04	550	6.53E-04	617	8.92E-04	684	1.98E-04	751	2.53E-05
417	4.01E-05	484	1.51E-04	551	6.65E-04	618	8.80E-04	685	1.93E-04	752	2.43E-05
418	4.42E-05	485	1.54E-04	552	6.70E-04	619	8.69E-04	686	1.88E-04	753	2.37E-05
419	4.87E-05	486	1.59E-04	553	6.81E-04	620	8.56E-04	687	1.83E-04	754	2.28E-05
420	5.45E-05	487	1.65E-04	554	6.89E-04	621	8.47E-04	688	1.77E-04	755	2.24E-05
421	6.14E-05	488	1.70E-04	555	7.00E-04	622	8.38E-04	689	1.72E-04	756	2.15E-05
422	6.80E-05	489	1.77E-04	556	7.10E-04	623	8.27E-04	690	1.68E-04	757	2.08E-05
423	7.39E-05	490	1.83E-04	557	7.19E-04	624	8.13E-04	691	1.62E-04	758	2.02E-05
424	8.15E-05	491	1.92E-04	558	7.30E-04	625	8.01E-04	692	1.57E-04	759	1.96E-05
425	9.01E-05	492	2.00E-04	559	7.39E-04	626	7.90E-04	693	1.52E-04	760	1.89E-05
426	1.00E-04	493	2.09E-04	560	7.49E-04	627	7.79E-04	694	1.48E-04	761	1.82E-05
427	1.11E-04	494	2.18E-04	561	7.58E-04	628	7.65E-04	695	1.44E-04	762	1.82E-05
428	1.21E-04	495	2.28E-04	562	7.67E-04	629	7.59E-04	696	1.40E-04	763	1.75E-05
429	1.33E-04	496	2.37E-04	563	7.76E-04	630	7.45E-04	697	1.35E-04	764	1.70E-05
430	1.44E-04	497	2.50E-04	564	7.90E-04	631	7.30E-04	698	1.31E-04	765	1.65E-05
431	1.61E-04	498	2.58E-04	565	7.99E-04	632	7.18E-04	699	1.28E-04	766	1.60E-05
432	1.73E-04	499	2.71E-04	566	8.08E-04	633	7.04E-04	700	1.24E-04	767	1.55E-05
433	1.88E-04	500	2.81E-04	567	8.19E-04	634	6.91E-04	701	1.21E-04	768	1.46E-05
434	2.05E-04	501	2.91E-04	568	8.28E-04	635	6.77E-04	702	1.17E-04	769	1.47E-05
435	2.25E-04	502	3.00E-04	569	8.40E-04	636	6.65E-04	703	1.14E-04	770	1.40E-05
436	2.46E-04	503	3.11E-04	570	8.51E-04	637	6.53E-04	704	1.10E-04	771	1.37E-05
437	2.67E-04	504	3.22E-04	571	8.60E-04	638	6.38E-04	705	1.06E-04	772	1.29E-05
438	2.91E-04	505	3.31E-04	572	8.67E-04	639	6.28E-04	706	1.04E-04	773	1.29E-05
439	3.20E-04	506	3.42E-04	573	8.76E-04	640	6.15E-04	707	1.00E-04	774	1.25E-05
440	3.51E-04	507	3.52E-04	574	8.85E-04	641	6.01E-04	708	9.66E-05	775	1.21E-05
441	3.84E-04	508	3.62E-04	575	8.93E-04	642	5.87E-04	709	9.41E-05	776	1.16E-05
442	4.17E-04	509	3.70E-04	576	9.04E-04	643	5.75E-04	710	9.17E-05	777	1.14E-05
443	4.55E-04	510	3.80E-04	577	9.11E-04	644	5.64E-04	711	8.88E-05	778	1.10E-05
444	4.86E-04	511	3.87E-04	578	9.23E-04	645	5.49E-04	712	8.59E-05	779	1.07E-05
445	5.19E-04	512	3.96E-04	579	9.36E-04	646	5.38E-04	713	8.30E-05	780	1.07E-05
446	5.52E-04	513	4.05E-04	580	9.42E-04	647	5.27E-04	714	8.12E-05	N/A	N/A

4.0 LM-79 Measurement and Test Results

4.2 Goniophotometer Test

Model No.	W34M @ 80W / 3000K	Sample ID	230612002-S1
Operate time (Min.)	30	Stabilization time (Min.)	60
Temperature (°C)	25.0	Humidity (%RH)	42.1

Test Method
<p>The Samples were tested according to the IES LM-79-2008.</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	0.750	89.7	0.997
NON-WORST CASE	277.0	60	0.336	88.7	0.952

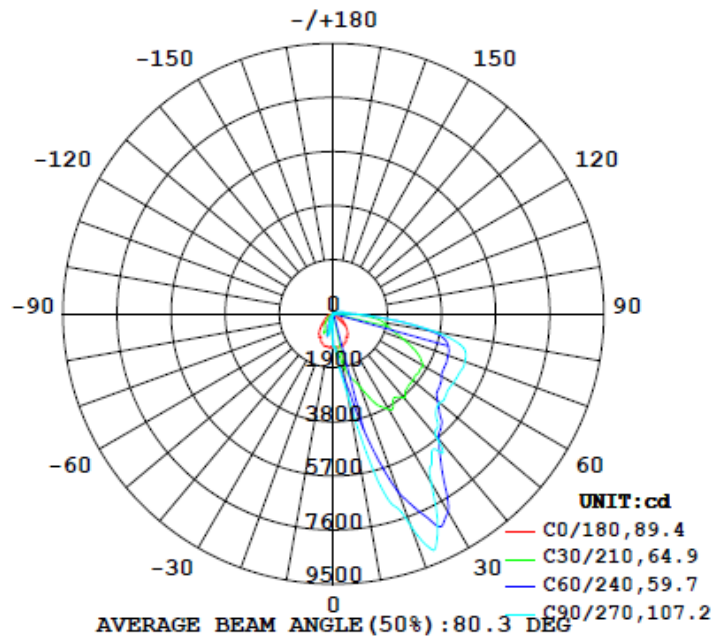
Test Result

Result Type	Flux (lm)	Field Angle (10%)		Beam Angle (50%)		Luminous Efficacy (lm/W)	Zonal Lumen Requirement (80°-90°)	BUG
		C0-180	C90-270	C0-180	C90-270			
0°-180° zones	11444	90.3	124.5	63.4	61.2	127.6	6.5%	B1-U3-G4
0°-90° zones	11060	90.3	124.5	63.4	61.2	123.3	6.8%	B1-U3-G4

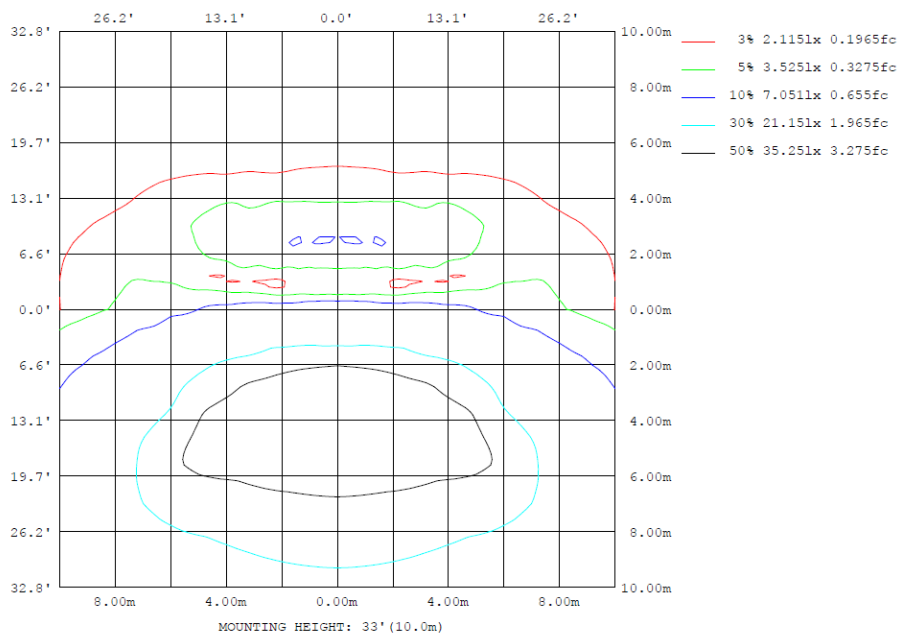
4.2 Goniophotometer Test

Lighting Distribution Curve

LUMINOUS INTENSITY DISTRIBUTION DIAGRAM



Isolux Plot



4.2 Goniophotometer Test

Zonal Lumen Summary

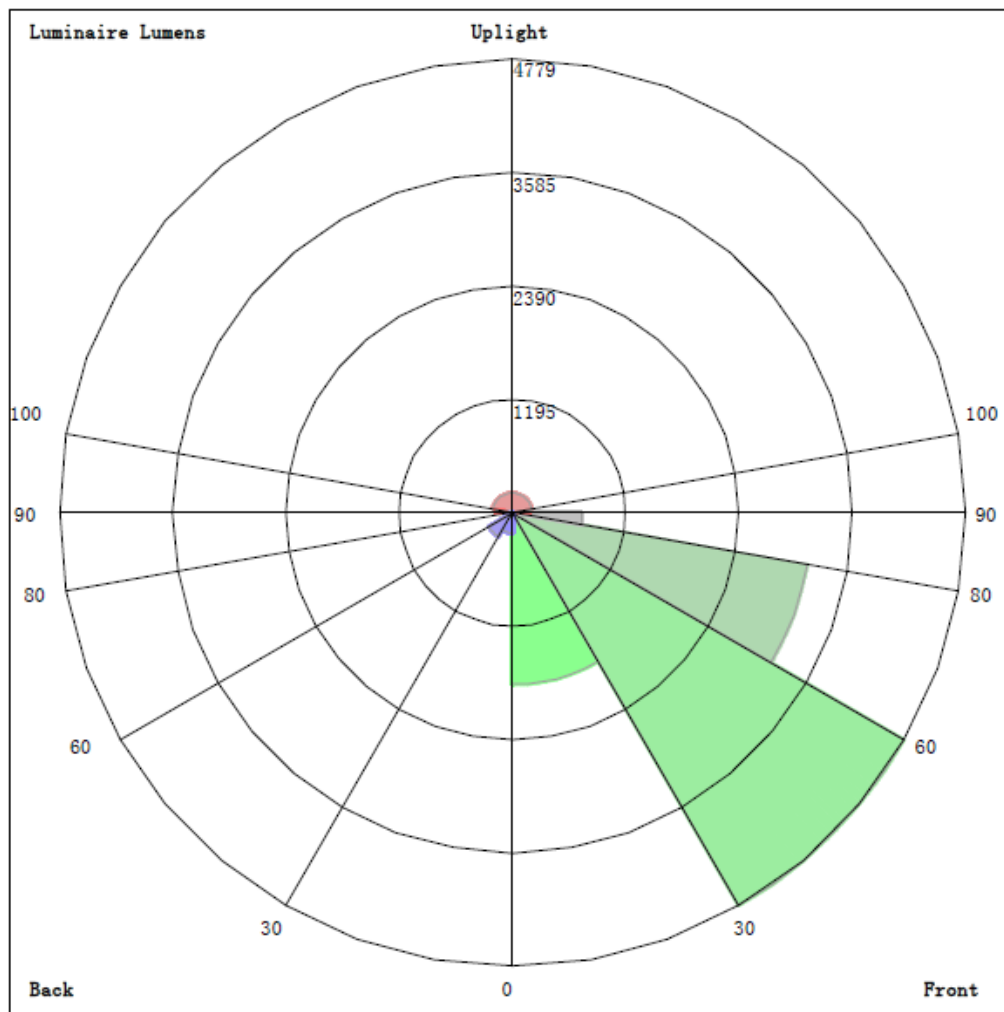
ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	± zone	± total	%lum, lamp
10	1193	2165	2918	2165	1193	257.3	539.5	257.3	0- 10	98.94	98.94	0.86,0.86
20	1120	4457	7912	4457	1120	804.7	430.3	804.7	10- 20	576.6	675.5	5.9,5.9
30	946.1	6883	6876	6883	946.1	472.0	221.6	472.0	20- 30	1347	2022	17.7,17.7
40	766.1	6963	5579	6963	766.1	280.0	83.60	280.0	30- 40	1667	3689	32.2,32.2
50	488.7	4918	4861	4918	488.7	119.8	14.82	119.8	40- 50	1720	5410	47.3,47.3
60	316.9	3963	4868	3963	316.9	46.74	3.478	46.74	50- 60	1681	7090	62,62
70	196.8	3705	4919	3705	196.8	26.22	0.9700	26.22	60- 70	1680	8770	76.6,76.6
80	73.99	3290	3625	3290	73.99	19.74	2.385	19.74	70- 80	1541	10311	90.1,90.1
90	21.67	624.3	697.2	624.3	21.67	12.96	3.789	12.96	80- 90	748.2	11060	96.6,96.6
100	15.38	244.9	374.1	244.9	15.38	7.095	4.563	7.095	90-100	177.0	11237	98.2,98.2
110	11.49	118.2	166.3	118.2	11.49	6.463	4.730	6.463	100-110	85.58	11322	98.9,98.9
120	8.669	95.51	119.5	95.51	8.669	6.076	4.653	6.076	110-120	48.17	11370	99.4,99.4
130	6.736	68.47	95.83	68.47	6.736	5.824	5.234	5.824	120-130	33.49	11404	99.6,99.6
140	5.231	38.17	82.94	38.17	5.231	5.196	5.385	5.196	130-140	23.14	11427	99.9,99.9
150	4.052	21.14	38.53	21.14	4.052	4.506	4.858	4.506	140-150	10.80	11438	99.9,99.9
160	3.103	10.08	17.15	10.08	3.103	4.157	3.564	4.157	150-160	4.668	11442	100,100
170	2.506	1.855	1.916	1.855	2.506	3.056	2.118	3.056	160-170	1.328	11444	100,100
180	2.847	2.590	2.441	2.590	2.847	2.709	2.298	2.709	170-180	0.2277	11444	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

	Zonal (lm)		Total (lm)	Percent
0-10	98.94	0-10	98.94	0.86%
10-20	576.58	0-20	675.52	5.90%
20-30	1346.56	0-30	2022.08	17.67%
30-40	1667.30	0-40	3689.38	32.24%
40-50	1720.21	0-50	5409.59	47.27%
50-60	1680.87	0-60	7090.46	61.96%
60-70	1679.57	0-70	8770.03	76.64%
70-80	1541.38	0-80	10311.41	90.10%
80-90	748.24	0-90	11059.65	96.64%
90-100	176.96	0-100	11236.61	98.19%
100-110	85.58	0-110	11322.19	98.94%
110-120	48.17	0-120	11370.36	99.36%
120-130	33.49	0-130	11403.85	99.65%
130-140	23.14	0-140	11426.99	99.85%
140-150	10.80	0-150	11437.79	99.95%
150-160	4.67	0-160	11442.46	99.99%
160-170	1.33	0-170	11443.79	100.00%
170-180	0.23	0-180	11444.02	100.00%

4.2 Goniophotometer Test

LCS/BUG

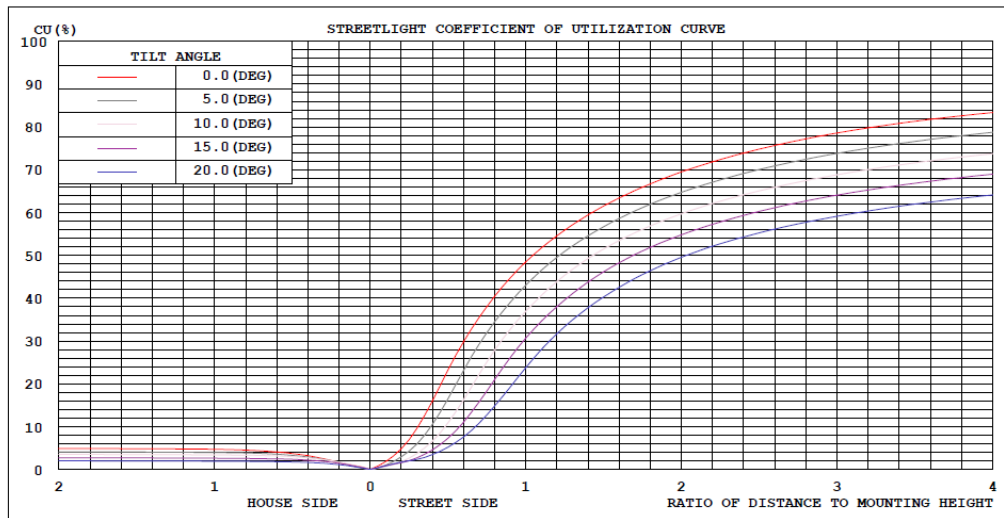


LUMINAIRE CLASSIFICATION SYSTEM (LCS)

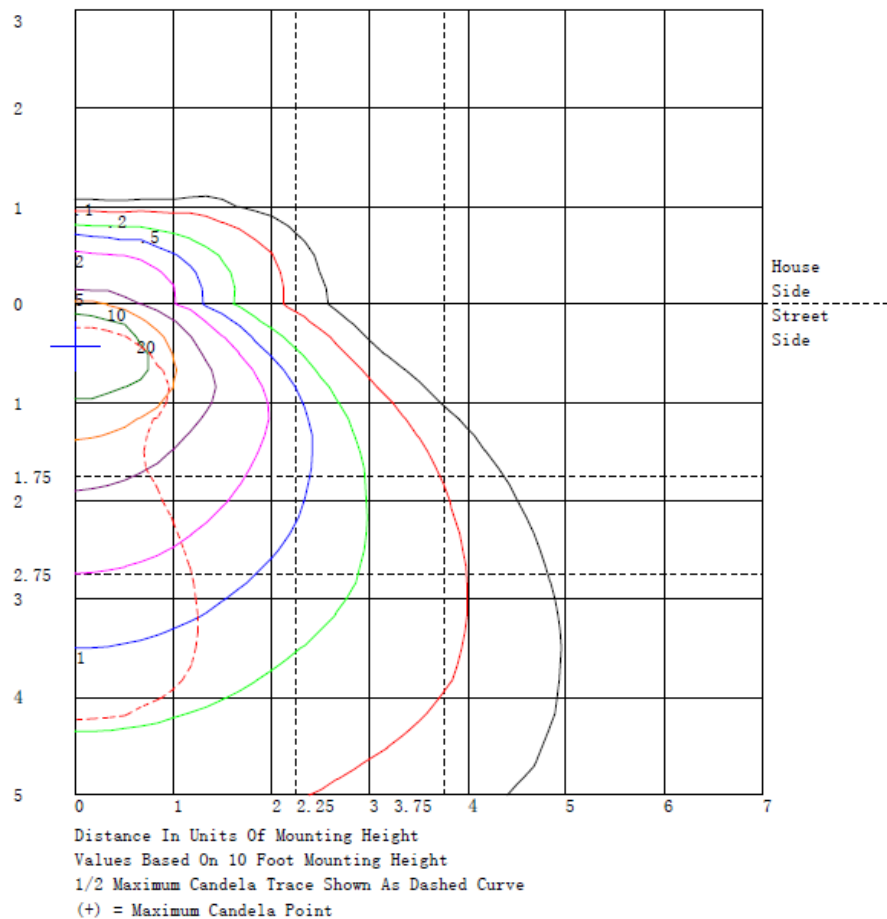
	Lumens	% Lamp	% Luminaire
FL - Front-Low (0-30)	1810.3	N.A.	15.8
FM - Front-Medium (30-60)	4779.4	N.A.	41.8
FH - Front-High (60-80)	3158.6	N.A.	27.6
FVH - Front-Very High (80-90)	737.0	N.A.	6.4
BL - Back-Low (0-30)	211.8	N.A.	1.9
BM - Back-Medium (30-60)	288.9	N.A.	2.5
BH - Back-High (60-80)	62.4	N.A.	0.5
BVH - Back-Very High (80-90)	11.3	N.A.	0.1
UL - Uplight-Low (90-100)	177.0	N.A.	1.5
UH - Uplight-High (100-180)	207.4	N.A.	1.8
Total	11444.1	N.A.	100.0
BUG Rating	B1-U3-G4		

4.2 Goniophotometer Test

Coefficients of Utilization



Isolines



4.2 Goniophotometer Test

Luminous Distribution Intensity Data

Table--1

UNIT: cd

C (DEG)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
y (DEG)	0	1157	1158	1158	1159	1160	1160	1161	1161	1161	1162	1163	1164	1164	1164	1164	1166	1168	1170
5	1169	1153	1146	1147	1155	1172	1199	1241	1288	1339	1386	1433	1478	1524	1567	1605	1633	1652	1662
10	1193	1165	1186	1255	1398	1570	1752	1902	2041	2165	2264	2353	2436	2527	2616	2701	2795	2871	2918
15	1195	1263	1377	1539	1774	2037	2309	2508	2726	2991	3415	3883	4366	4817	5230	5587	5855	6037	6122
20	1120	1370	1626	1890	2120	2388	2725	3223	3805	4457	5233	5997	6680	7090	7380	7579	7758	7870	7912
25	1075	1337	1654	2026	2438	2917	3474	4176	4938	5728	6545	7307	7962	8362	8621	8758	8759	8701	8629
30	946	1256	1638	2092	2589	3179	3882	4698	5536	6383	7243	8049	8784	9369	9769	10000	10000	9932	9876
35	874	1230	1630	2074	2486	2999	3668	4423	5269	6126	6993	7770	8456	9041	9526	9911	10000	10000	10000
40	766	1163	1607	2099	2593	3168	3859	4623	5469	6326	7193	8049	8884	9689	10454	11119	11684	12149	12514
45	591	1077	1575	2085	2586	3115	3687	4294	4945	5626	6326	7043	7766	8484	9196	9891	10569	11231	11776
50	489	947	1432	1945	2520	3096	3650	4169	4604	4918	4951	4886	4782	4781	4793	4813	4830	4846	4861
55	389	703	1108	1604	2295	2999	3638	4237	4737	5137	5437	5637	5737	5737	5737	5737	5737	5737	5737
60	317	541	898	1386	2160	2950	3641	4237	4737	5137	5437	5637	5737	5737	5737	5737	5737	5737	5737
65	253	420	719	1151	1848	2578	3241	3826	4326	4737	5137	5437	5637	5737	5737	5737	5737	5737	5737
70	197	298	519	862	1413	2019	2617	3045	3406	3705	3935	4125	4289	4479	4649	4788	4866	4908	4919
75	131	193	360	633	1055	1549	2084	2633	3152	3601	3851	4026	4159	4236	4294	4336	4362	4379	4379
80	74.0	116	257	496	868	1313	1804	2353	2867	3290	3429	3469	3456	3504	3545	3578	3599	3613	3625
85	42.9	85.0	192	363	643	954	1262	1506	1700	1831	1828	1778	1711	1699	1697	1700	1702	1707	1715
90	21.7	52.1	101	168	270	378	480	545	593	624	630	627	622	639	659	679	687	692	697
95	16.0	34.3	60.5	94.6	141	192	245	297	344	381	390	392	392	408	425	441	447	449	449
100	15.4	29.5	47.0	67.8	92.9	121	150	183	215	245	266	285	302	324	344	360	369	373	374
105	13.9	26.2	39.7	54.2	70.5	87.5	105	121	137	152	165	178	191	213	234	252	262	267	268
110	11.5	19.5	28.9	39.9	53.1	67.2	81.3	94.7	107	118	126	133	140	148	156	163	166	166	166
115	10.1	17.4	25.5	34.4	44.2	54.7	65.9	79.0	91.8	103	110	115	119	126	133	138	138	138	137
120	8.67	15.5	22.5	29.6	36.1	43.4	52.3	67.3	82.4	95.5	99.3	101	102	107	113	119	120	120	120
125	7.52	12.6	18.1	23.9	29.5	35.9	43.7	55.8	68.4	80.0	86.6	91.3	94.7	98.4	101	103	103	103	103
130	6.74	9.23	12.9	17.6	23.6	30.6	38.7	48.3	58.4	68.5	78.2	86.9	93.8	96.7	97.8	97.6	97.3	96.6	95.8
135	5.99	6.58	8.85	12.8	19.4	27.0	34.9	41.2	47.5	54.0	61.4	69.1	76.9	85.7	93.5	99.6	101	99.8	98.4
140	5.23	4.69	6.02	9.21	15.7	23.0	30.0	33.1	35.6	38.2	42.8	47.9	53.5	59.4	65.2	70.7	76.2	80.4	82.9
145	4.62	2.89	3.07	5.15	10.6	16.9	22.8	24.8	26.1	27.5	31.6	35.9	40.1	42.5	44.4	45.9	47.7	49.1	50.0
150	4.05	2.88	2.86	3.98	6.93	10.5	14.2	16.5	18.7	21.1	25.0	28.9	32.3	33.7	34.5	35.0	36.4	37.6	38.5
155	3.54	2.94	2.87	3.34	4.41	5.96	7.95	10.3	13.0	15.9	19.6	23.0	25.6	25.9	25.5	24.9	25.2	25.6	26.0
160	3.10	3.00	2.92	2.88	2.54	2.47	2.95	4.94	7.42	10.1	12.4	14.5	16.2	16.9	17.2	17.3	17.3	17.2	17.1
165	2.67	2.65	2.60	2.52	2.34	2.20	2.16	2.29	2.64	3.25	4.48	5.86	7.20	8.11	8.82	9.35	9.68	9.87	9.97
170	2.51	2.46	2.41	2.35	2.27	2.19	2.10	2.02	1.93	1.85	1.78	1.71	1.66	1.60	1.57	1.57	1.67	1.80	1.92
175	2.65	2.62	2.59	2.56	2.52	2.47	2.42	2.37	2.31	2.25	2.19	2.12	2.06	2.01	1.97	1.94	1.90	1.89	1.91
180	2.85	2.84	2.83	2.81	2.78	2.75	2.71	2.67	2.63	2.59	2.55	2.50	2.46	2.42	2.38	2.36	2.37	2.40	2.44

C (DEG)		UNIT: cd																	
y (DEG)	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185
0	1168	1166	1164	1164	1164	1164	1163	1162	1161	1161	1161	1160	1160	1159	1158	1158	1157	1164	1162
5	1652	1633	1605	1567	1524	1478	1433	1386	1339	1288	1241	1199	1172	1155	1147	1146	1153	1169	1072
10	2871	2795	2701	2616	2527	2436	2353	2264	2165	2041	1902	1752	1570	1398	1255	1186	1165	1193	855
15	6037	5855	5587	5230	4817	4366	3883	3415	2991	2726	2508	2309	2037	1774	1539	1377	1263	1195	779
20	7870	7758	7579	7380	7090	6680	5997	5233	4457	3805	3223	2725	2388	2120	1890	1626	1370	1210	690
25	8701	8759	8758	8621	8362	7962	7307	6545	5728	4938	4176	3474	2917	2438	2026	1654	1337	1075	665
30	6932	7050	7226	7569	7874	8049	7873	7483	6883	5936	4898	3882	3179	2589	2092	1638	1256	946	673
35	6022	6047	6110	6256	6436	6634	7016	7250	7184	6169	4923	3668	2999	2486	2074	1630	1230	874	724
40	5686	5826	5953	5860	5776	5774	6298	6764	6963	6127	5023	3859	3168	2593	2099	1607	1163	766	694
45	5122	5172	5234	5274	5326	5398	5651	5829	5826	5245	4494	3687	3115	2586	2085	1575	1077	591	607
50	4846	4830	4813	4793	4781	4782	4886	4951	4918	4604	4169	3650	3096	2520	1945	1432	947	489	488
55	4837	4798	4746	4680	4609	4539	4514	4471	4386	4237	3996	3638	2999	2295	1604	1108	703	389	398
60	4831	4767	4683	4594	4492	4377	4241	4101	3963	3945	3863	3641	2950	2160	1386	898	541	317	325
65	4878	4834	4758	4636	4489	4326	4168	4001	3826	3711	3533	3241	2578	1848	1151	719	420	253	257
70	4908	4866	4788	4649	4479	4289	4125	3935	3705	3406	3045	2617	2019	1413	862	519	298	197	184
75	4739	4697	4623	4494	4336	4159	4026	3851	3601	3152	2633	2084	1549	1055	633	360	193	131	117
80	3613	3599	3578	3545	3504	3456	3469	3429	3290	2867	2353	1804	1313	868	496	257	116	74	68
85	1707	1702	1700	1697	1699	1711	1778	1828	1831	1700	1506	1262	954	643	363	192	85.0	42.9	46.0
90	692	687	679	659	639	622	627	630	624	593	545	480	378	270	168	101	52.1	21.7	23.4
95	449	447	441	425	408	392	392	390	381	344	297	245	192	141	94.6	60.5	34.3	16.0	16.9
100	373	369	360	344	324	302	285	266	245	215	183	150	121	92.9	67.8	47.0	29.5	15.4	14.7
105	267	262	252	234	213	191	178	165	152	137	121	105	87.5	70.5	54.2	39.7	26.2	13.9	13.1
110	166	166	163	156	148	140	133	126	118	107	94.7	81.3	67.2	53.1	39.9	28.9	19.5	11.5	11.3
115	138	138	138	133	126	119	115	110	103	91.8	79.0	65.9	54.7	44.2	34.4	25.5	17.4	10.1	10.4
120	120	120	119	113	107	102	101	99.3	95.5	82.4	67.3	52.3	43.4	36.1	29.6	22.5	15.5	8.67	9.59
125	103	103	103	101	98.4	94.7	91.3	86.6	80.0	68.4	55.8	43.7	35.9	29.5	23.9	18.1	12.6	7.52	9.02
130	96.6	97.3	97.6	97.8	96.7	93.8	86.9	78.2	68.5	58.4	48.3	38.7	30.6	23.6	17.6	12.9	9.23	6.74	7.09
135	99.8	101	99.6	93.5	85.7	76.9	69.1	61.4	54.0	47.5	41.2	34.9	27.0	19.4	12.8	8.85	6.58	5.99	6.29
140	80.4	76.2	70.7	65.2	59.4	53.5	47.9	42.8	38.2	35.6	33.1	30.0	23.0	15.7	9.21	6.02	4.69	5.23	5.65
145	49.1	47.7	45.9	44.4	42.5	40.1	35.9	31.6	27.5	26.1	24.8	22.8	16.9	10.6	5.15	3.07	2.89	4.62	5.10
150	37.6	36.4	35.0	34.5	33.7	32.3	28.9	25.0	21.1	18.7	16.5	14.2	10.5	6.93	3.98	2.86	2.88	4.05	4.60
155	25.6	25.2	24.9	25.5	25.9	25.6	23.0	19.6	15.9	13.0	10.3	7.95	5.96	4.41	3.34	2.87	2.94	3.54	4.13
160	17.2	17.3	17.3	17.2	16.9	16.2	14.5	12.4	10.1	7.42	4.94	2.95	2.47	2.54	2.88	2.92	3.00	3.10	3.69
165	9.87	9.68	9.35	8.82	8.11	7.20	5.86	4.48	3.25	2.64	2.29	2.16	2.20	2.34	2.52	2.60	2.65	2.67	3.22
170	1.80	1.67	1.57	1.57	1.60	1.66	1.71	1.78	1.85	1.93	2.02	2.10	2.19	2.27	2.35	2.41	2.46	2.51	3.21
175	1.89	1.90	1.94	1.97	2.01	2.06	2.12	2.19	2.25	2.31	2.37	2.42	2.47	2.52	2.56	2.59	2.62	2.65	2.88
180	2.40	2.37	2.36	2.38	2.42	2.46	2.50	2.55	2.59	2.63	2.67	2.71	2.75	2.78	2.81	2.83	2.84	2.85	2.92

Table--3

UNIT: °C

C (DEG)	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280
0	1169	1172	1172	1172	1171	1171	1172	1172	1170	1169	1168	1168	1168	1168	1169	1170	1170	1170	1169
5	963	943	691	542	412	343	300	277	259	251	248	243	240	238	237	235	235	235	237
10	590	396	298	253	245	233	238	257	296	342	388	416	441	463	496	523	540	523	496
15	470	270	211	236	321	443	578	700	738	752	753	774	790	798	776	750	730	750	776
20	398	245	302	445	620	716	781	805	734	637	537	494	468	453	439	432	430	432	439
25	397	269	379	558	734	701	623	528	491	461	435	392	353	321	313	313	319	313	313
30	486	385	426	511	599	579	533	472	418	365	316	280	253	233	224	220	222	220	224
35	611	537	527	536	544	496	435	369	313	263	224	208	202	203	200	199	200	199	200
40	630	574	531	491	450	394	336	280	235	195	161	130	106	87.9	81.9	81.3	83.6	81.3	81.9
45	602	574	513	440	364	307	256	209	161	118	83.3	64.9	54.3	48.9	43.3	40.3	39.6	40.3	43.3
50	473	446	399	343	283	225	169	120	84.9	58.3	39.3	28.2	22.1	19.3	16.4	14.9	14.8	14.9	16.4
55	392	370	324	267	207	154	105	65.3	43.7	30.5	23.0	15.8	11.1	8.43	7.04	6.74	7.15	6.74	7.04
60	319	298	253	200	146	106	72.9	46.7	31.4	21.8	16.1	10.4	6.63	4.32	3.28	3.11	3.48	3.11	3.28
65	249	228	184	135	88.3	63.5	46.2	34.4	24.7	17.7	12.7	7.82	4.13	1.63	0.79	0.77	1.21	0.77	0.79
70	168	147	119	89.5	62.5	46.4	34.7	26.2	19.3	14.1	10.2	6.22	3.13	0.98	0.41	0.52	0.97	0.52	0.41
75	104	89.4	74.0	59.3	45.9	36.1	28.1	21.7	16.7	12.6	9.38	6.12	3.49	1.61	1.13	1.23	1.62	1.23	1.13
80	62.5	56.3	49.4	42.5	35.8	29.9	24.6	19.7	15.4	11.7	8.50	5.84	3.78	2.36	1.99	2.08	2.39	2.08	1.99
85	47.0	45.8	41.1	35.1	28.8	24.5	20.7	17.3	13.8	10.6	7.78	5.68	4.11	3.07	2.80	2.87	3.11	2.87	2.80
90	24.2	24.1	22.7	20.7	18.4	16.6	14.8	13.0	10.6	8.25	6.19	4.98	4.18	3.72	3.60	3.65	3.79	3.65	3.60
95	17.1	16.7	15.3	13.6	11.7	10.4	9.23	8.14	6.89	5.77	4.84	4.41	4.21	4.15	4.15	4.19	4.24	4.19	4.15
100	13.9	12.9	11.9	10.7	9.63	8.72	7.89	7.10	6.22	5.44	4.81	4.56	4.46	4.47	4.48	4.52	4.56	4.52	4.48
105	12.2	11.4	10.4	9.46	8.57	7.90	7.30	6.75	6.07	5.45	4.95	4.75	4.68	4.70	4.71	4.74	4.77	4.74	4.71
110	11.0	10.5	9.66	8.77	7.91	7.36	6.90	6.46	5.89	5.37	4.93	4.75	4.68	4.68	4.69	4.71	4.73	4.71	4.69
115	10.4	10.1	9.29	8.36	7.45	6.99	6.63	6.30	5.79	5.31	4.91	4.74	4.67	4.66	4.66	4.67	4.68	4.67	4.66
120	10.0	10.0	9.21	8.15	7.08	6.63	6.33	6.08	5.64	5.23	4.89	4.74	4.68	4.67	4.65	4.65	4.65	4.65	4.65
125	9.88	10.1	9.26	8.09	6.87	6.42	6.14	5.95	5.61	5.29	5.04	4.94	4.92	4.92	4.90	4.89	4.88	4.89	4.90
130	7.30	7.37	7.22	6.98	6.67	6.39	6.10	5.82	5.56	5.33	5.17	5.15	5.18	5.23	5.24	5.24	5.23	5.24	5.24
135	6.48	6.57	6.52	6.40	6.22	6.01	5.79	5.56	5.37	5.23	5.13	5.17	5.25	5.35	5.39	5.42	5.42	5.42	5.39
140	5.93	6.07	6.01	5.86	5.65	5.49	5.33	5.20	5.08	5.01	4.98	5.06	5.16	5.27	5.34	5.38	5.38	5.38	5.34
145	5.44	5.63	5.61	5.48	5.29	5.11	4.94	4.80	4.75	4.75	4.78	4.87	4.98	5.09	5.16	5.21	5.21	5.21	5.16
150	4.98	5.19	5.15	4.99	4.79	4.67	4.57	4.51	4.50	4.53	4.59	4.65	4.73	4.79	4.85	4.87	4.86	4.87	4.85
155	4.54	4.77	4.74	4.60	4.42	4.35	4.29	4.26	4.23	4.22	4.23	4.28	4.32	4.35	4.32	4.26	4.17	4.26	4.32
160	4.11	4.37	4.37	4.27	4.14	4.14	4.15	4.16	4.09	4.02	3.94	3.92	3.90	3.87	3.78	3.67	3.56	3.67	3.78
165	3.63	3.89	3.96	3.93	3.85	3.84	3.81	3.77	3.69	3.58	3.46	3.34	3.22	3.11	3.02	2.95	2.88	2.95	3.02
170	3.21	3.41	3.45	3.42	3.33	3.27	3.17	3.06	2.89	2.70	2.52	2.36	2.23	2.13	2.09	2.09	2.12	2.09	2.09
175	3.06	3.17	3.21	3.20	3.14	3.01	2.85	2.69	2.57	2.46	2.36	2.27	2.20	2.15	2.14	2.15	2.18	2.15	2.14
180	2.77	2.76	2.76	2.77	2.78	2.77	2.75	2.71	2.63	2.55	2.47	2.40	2.34	2.30	2.29	2.28	2.30	2.28	2.29

C (DEG)	285	290	295	300	305	310	315	320	325	330	335	340	345	350	355				
0	1168	1168	1168	1168	1169	1170	1172	1172	1171	1171	1172	1172	1172	1169	1164				
5	238	240	243	248	251	259	277	300	343	412	542	691	843	963	1072				
10	463	441	416	388	342	296	257	238	233	245	253	298	396	590	855				
15	798	790	774	753	752	738	700	578	443	321	236	211	270	470	779				
20	453	468	494	537	637	734	805	781	716	620	445	302	245	398	690				
25	321	353	392	435	461	491	528	623	701	734	558	379	269	397	665				
30	233	253	280	316	365	418	472	533	579	599	511	426	385	486	673				
35	203	202	208	224	263	313	369	435	496	544	536	527	537	611	724				
40	87.9	106	130	161	195	235	280	336	394	450	491	531	574	630	694				
45	48.9	54.3	64.9	83.3	118	161	209	256	307	364	440	513	574	602	607				
50	19.3	22.1	28.2	39.3	58.3	84.9	120	169	225	283	343	399	446	473	488				
55	8.43	11.1	15.8	23.0	30.5	43.7	65.3	105	154	207	267	324	370	392	398				
60	4.32	6.63	10.4	16.1	21.8	31.4	46.7	72.9	106	146	200	253	298	319	325				
65	1.63	4.13	7.82	12.7	17.7	24.7	34.4	46.2	63.5	88.3	135	184	228	249	257				
70	0.98	3.13	6.22	10.2	14.1	19.3	26.2	34.7	46.4	62.5	89.5	119	147	168	184				
75	1.61	3.49	6.12	9.38	12.6	16.7	21.7	28.1	36.1	45.9	59.3	74.0	89.4	104	117				
80	2.36	3.78	5.84	8.50	11.7	15.4	19.7	24.6	29.9	35.8	42.5	49.4	56.3	62.5	68.4				
85	3.07	4.11	5.68	7.78	10.6	13.8	17.3	20.7	24.5	28.8	35.1	41.1	45.8	47.0	46.0				
90	3.72	4.18	4.98	6.19	8.25	10.6	13.0	14.8	16.6	18.4	20.7	22.7	24.1	24.2	23.4				
95	4.15	4.21	4.41	4.84	5.77	6.89	8.14	9.23	10.4	11.7	13.6	15.3	16.7	17.1	16.9				
100	4.47	4.46	4.56	4.81	5.44	6.22	7.10	7.89	8.72	9.63	10.7	11.9	12.9	13.9	14.7				
105	4.70	4.68	4.75	4.95	5.45	6.07	6.75	7.30	7.90	8.57	9.46	10.4	11.4	12.2	13.1				
110	4.68	4.68	4.75	4.93	5.37	5.89	6.46	6.90	7.36	7.91	8.77	9.66	10.5	11.0	11.3				
115	4.66	4.67	4.74	4.91	5.31	5.79	6.30	6.63	6.99	7.45	8.36	9.29	10.1	10.4	10.4				
120	4.67	4.68	4.74	4.89	5.23	5.64	6.08	6.33	6.63	7.08	8.15	9.21	10.0	10.0	9.59				
125	4.92	4.92	4.94	5.04	5.29	5.61	5.95	6.14	6.42	6.87	8.09	9.26	10.1	9.88	9.02				
130	5.23	5.18	5.15	5.17	5.33	5.56	5.82	6.10	6.39	6.67	6.98	7.22	7.37	7.30	7.09				
135	5.35	5.25	5.17	5.13	5.23	5.37	5.56	5.79	6.01	6.22	6.40	6.52	6.57	6.48	6.29				
140	5.27	5.16	5.06	4.98	5.01	5.08	5.20	5.33	5.49	5.65	5.86	6.01	6.07	5.93	5.65				
145	5.09	4.98	4.87	4.78	4.75	4.75	4.80	4.94	5.11	5.29	5.48	5.61	5.63	5.44	5.10				
150	4.79	4.73	4.65	4.59	4.53	4.50	4.51	4.57	4.67	4.79	4.99	5.15	5.19	4.98	4.60				
155	4.35	4.32	4.28	4.23	4.22	4.23	4.26	4.29	4.35	4.42	4.60	4.74	4.77	4.54	4.13				
160	3.87	3.90	3.92	3.94	4.02	4.09	4.16	4.15	4.14	4.14	4.27	4.37	4.37	4.11	3.69				
165	3.11	3.22	3.34	3.46	3.58	3.69	3.77	3.81	3.84	3.85	3.93	3.96	3.89	3.63	3.22				
170	2.13	2.23	2.36	2.52	2.70	2.89	3.06	3.17	3.27	3.33	3.42	3.45	3.41	3.21	2.91				
175	2.15	2.20	2.27	2.36	2.46	2.57	2.69	2.85	3.01	3.14	3.20	3.21	3.17	3.06	2.88				
180	2.30	2.34	2.40	2.47	2.55	2.63	2.71	2.75	2.77	2.78	2.77	2.76	2.76	2.77	2.80				

4.0 LM-79 Measurement and Test Results

4.3 THD and PF Test

Model No.	W34M @ 80W / 3000K	Sample ID	230612002-S1
Temperature (°C)	25.4	Humidity (%RH)	41.0

Test Method
<p>The samples were tested according to the ANSI C82.77:2014</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	0.750	89.7	0.997	2.87
277.0	60	0.336	88.7	0.952	5.12

5.0 Equipment List:

Equipment ID	Equipment Name	Last Cal.	Due Cal.
NTC-F01-001	Goniophotometer System	2022-11-09	2023-11-08
NTC-F01-006	2.0 meter Integrating Sphere	2022-11-09	2023-11-08
NTC-F01-012	Standard Lamp	2022-11-09	2023-11-08
NTC-F01-013	Standard Lamp	2022-11-09	2023-11-08
NTC-F01-031	Digital Power Meter	2022-08-31	2023-08-30
NTC-F01-019	Temperature & Humidity Meter	2022-11-12	2023-11-11

*****End of Report*****