

Photometric Test Report

Relevant Standards

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

Prepared For

RAB Lighting Inc.

Prepared By

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Date: 2023-06-14

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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		9625
Minimum Luminaire Efficacy (lm/W) (Goniophotometer – Section 4.2) (0°-180° zones)	IES LM-79-2008	N/A		152.5
Luminaire Output (lm) (Goniophotometer – Section 4.2) (0°-90° zones)	IES LM-79-2008	300		9297
Minimum Luminaire Efficacy (lm/W) (Goniophotometer – Section 4.2) (0°-90° zones)	IES LM-79-2008	Standard	Premium	147.3
		105	120	
Power (Input Wattage) (W) (Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Case		63.1
Total Harmonic Distortion (A%) (THD & PF – Section 4.3)	ANSI C82.77:2014	20.00%	120V	2.26
			277V	7.55
Power Factor (THD & PF – Section 4.3)	ANSI C82.77:2014	0.9	120V	0.995
			277V	0.915
Allowable CCTs* (K) (Integrating Sphere – Section 4.1)	IES LM-79-2008	7 steps	3985±275	4048
		4 steps	3985±154	
Minimum CRI (Integrating Sphere – Section 4.1)	IES LM-79-2008 CIE13.3-1995	≥70		76.8
Minimum R9 (Integrating Sphere – Section 4.1)	IES LM-79-2008 CIE13.3-1995	N/A		-15
Minimum Rf (Integrating Sphere – Section 4.1)	ANSI/IES TM-30-18	≥70		78
Minimum Rg (Integrating Sphere – Section 4.1)	ANSI/IES TM-30-18	≥89		94
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%		6.9%
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		0.528
(Goniophotometer – Section 4.2)		Non-Worst Case		0.246
Power (Input Wattage – W)				
(Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Case		63.1
(Goniophotometer – Section 4.2)		Non-Worst Case		62.4

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2023-06-13	W34M @ 60W / 4000K	230612002-S1
2	Goniophotometer Test	2023-06-13	W34M @ 60W / 4000K	230612002-S1
3	THD and PF Test	2023-06-13	W34M @ 60W / 4000K	230612002-S1

Remark (If any)

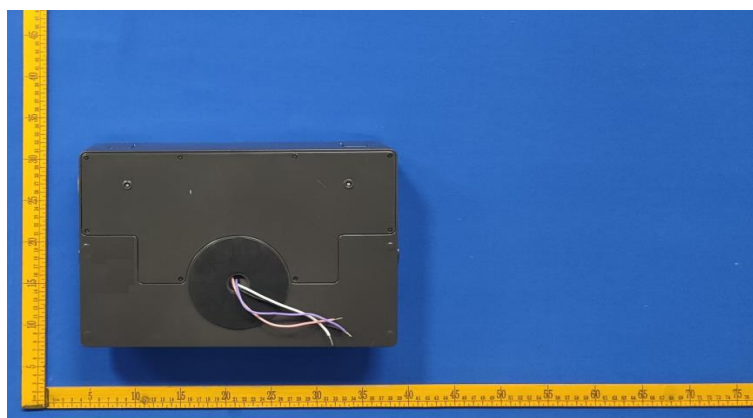
1. The results contained in this report pertain only to the tested samples.
2. This report shall not be reproduced, no limited part or full, without approval of Dongguan New Testing Centre Co., Ltd.
3. This report does not imply product certification, approval, or endorsement by NVLAP, or any agency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

3.0 Product Description

Luminaire Description: Model No. W34M @ 60W / 4000K, 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 @ 60W / 4000K	Sample ID	230612002-S1
Operate time (Min.)	10	Stabilization time (Min.)	60
Temperature (°C)	25.4	Humidity (%RH)	41.0

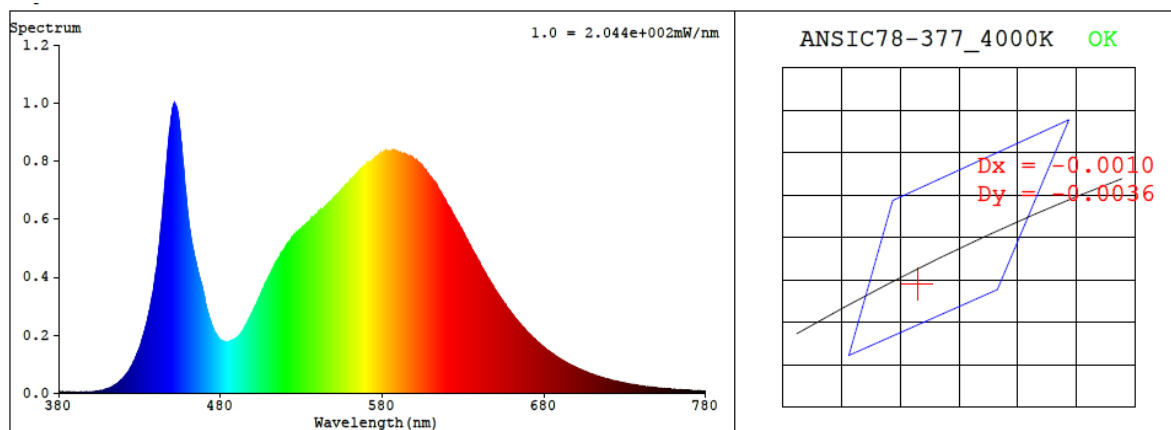
Test Method
<p>The Samples were tested according to the IES LM-79-2008.</p> <p>Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25±1°C.</p> <p>The sample measurements were made using 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. 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	0.528	63.1	0.995
277.0	60	0.246	62.4	0.915

CCT (K)	CRI	R9	Duv	Rf	Rg	IES Rcs,h1
4048	76.8	-15	-0.0014	78	94	-15%

4.1 Integrating Sphere Test



Colorimetric Parameters

Chromaticity Coordinate: $x = 0.3774$ $y = 0.3719$ / $u' = 0.2251$ $v' = 0.4990$ ($duv = -1.41e-03$)

CCT= 4048K Prcp WL: Ld=579.7nm Purity=24.9%

Peak WL: Lp=452nm FWHM: =21.1nm Ratio:R=17.3% G=79.5% B=3.1%

Render Index: Ra = 76.8 AvgR = 68.2 TM30:Rf=78 Rg=94

EEL: 0.09114 A++ Highest

R1 =74 R2 =84 R3 =91 R4 =74 R5 =74 R6 =77 R7 =83

R8 =56 R9 =-15 R10=62 R11=71 R12=51 R13=77 R14=95 R15=69

4.1 Integrating Sphere Test

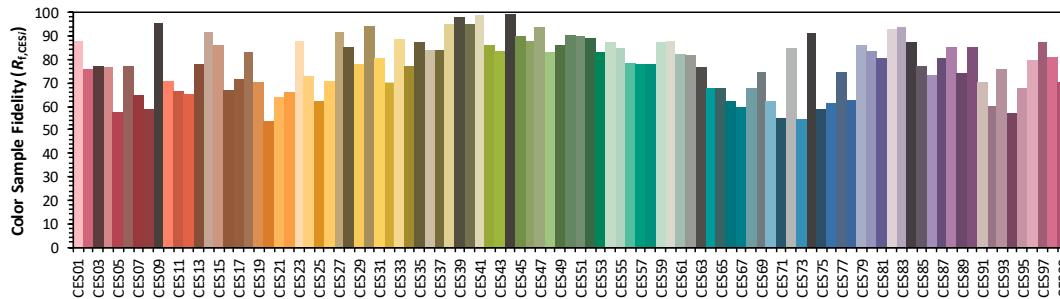
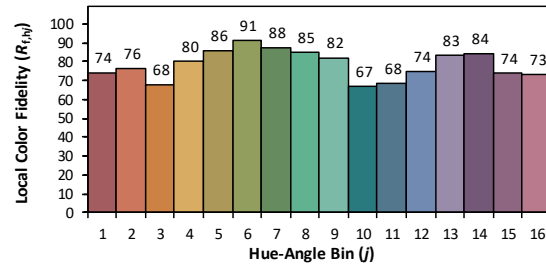
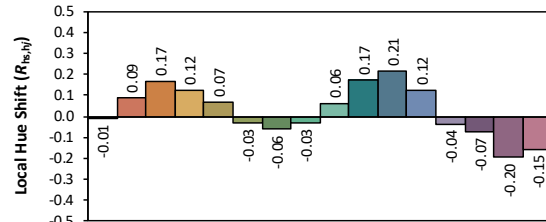
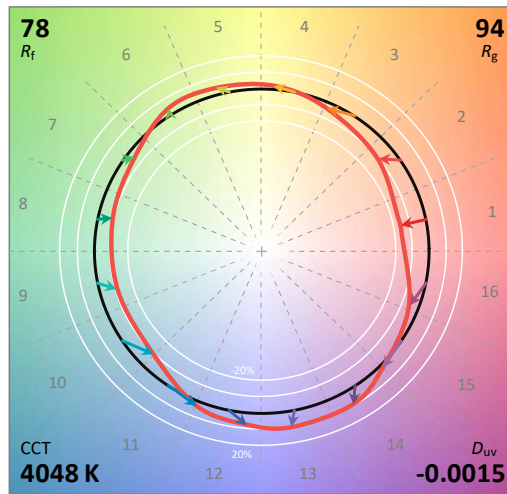
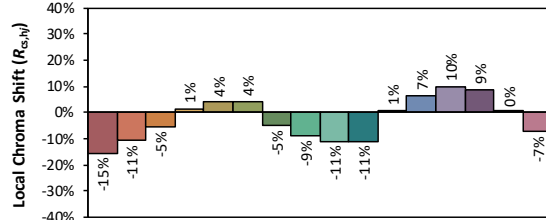
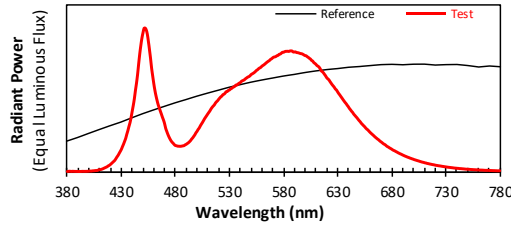
ANSI/IES TM-30-18 Color Rendition Report

Source: 1 CIE F1

Manufacturer: RAB Lighting Inc.

Date: 2023/6/14

Model: W34M @ 60W / 4000K



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

x 0.3774
 y 0.3717
 u' 0.2251
 v' 0.4989

CIE 13.3-1995
(CRI)

R_a 77
 R_g -15

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	3.10E-06	447	8.15E-04	514	4.47E-04	581	8.31E-04	648	3.74E-04	715	5.55E-05
381	4.00E-06	448	8.74E-04	515	4.56E-04	582	8.34E-04	649	3.65E-04	716	5.39E-05
382	4.90E-06	449	9.24E-04	516	4.63E-04	583	8.34E-04	650	3.55E-04	717	5.23E-05
383	4.20E-06	450	9.62E-04	517	4.76E-04	584	8.35E-04	651	3.47E-04	718	5.07E-05
384	3.70E-06	451	9.93E-04	518	4.85E-04	585	8.33E-04	652	3.37E-04	719	4.96E-05
385	4.60E-06	452	9.95E-04	519	4.92E-04	586	8.37E-04	653	3.29E-04	720	4.77E-05
386	3.90E-06	453	9.83E-04	520	5.02E-04	587	8.37E-04	654	3.21E-04	721	4.60E-05
387	3.80E-06	454	9.53E-04	521	5.11E-04	588	8.36E-04	655	3.14E-04	722	4.49E-05
388	3.50E-06	455	9.03E-04	522	5.19E-04	589	8.30E-04	656	3.05E-04	723	4.34E-05
389	3.50E-06	456	8.47E-04	523	5.25E-04	590	8.30E-04	657	2.97E-04	724	4.23E-05
390	3.10E-06	457	7.86E-04	524	5.35E-04	591	8.31E-04	658	2.91E-04	725	4.12E-05
391	2.90E-06	458	7.17E-04	525	5.38E-04	592	8.26E-04	659	2.83E-04	726	3.99E-05
392	3.30E-06	459	6.64E-04	526	5.45E-04	593	8.25E-04	660	2.75E-04	727	3.85E-05
393	3.60E-06	460	6.11E-04	527	5.55E-04	594	8.24E-04	661	2.68E-04	728	3.76E-05
394	4.30E-06	461	5.66E-04	528	5.57E-04	595	8.21E-04	662	2.61E-04	729	3.62E-05
395	3.90E-06	462	5.28E-04	529	5.64E-04	596	8.18E-04	663	2.54E-04	730	3.51E-05
396	4.00E-06	463	4.96E-04	530	5.67E-04	597	8.17E-04	664	2.47E-04	731	3.40E-05
397	4.00E-06	464	4.67E-04	531	5.74E-04	598	8.14E-04	665	2.40E-04	732	3.28E-05
398	4.30E-06	465	4.45E-04	532	5.78E-04	599	8.09E-04	666	2.34E-04	733	3.18E-05
399	4.60E-06	466	4.22E-04	533	5.84E-04	600	8.05E-04	667	2.28E-04	734	3.10E-05
400	5.20E-06	467	4.01E-04	534	5.88E-04	601	8.03E-04	668	2.22E-04	735	3.00E-05
401	6.20E-06	468	3.79E-04	535	5.93E-04	602	7.97E-04	669	2.15E-04	736	2.92E-05
402	5.70E-06	469	3.59E-04	536	6.01E-04	603	7.92E-04	670	2.09E-04	737	2.82E-05
403	7.10E-06	470	3.34E-04	537	6.01E-04	604	7.86E-04	671	2.04E-04	738	2.71E-05
404	7.80E-06	471	3.02E-04	538	6.08E-04	605	7.80E-04	672	1.98E-04	739	2.63E-05
405	8.40E-06	472	2.81E-04	539	6.14E-04	606	7.71E-04	673	1.92E-04	740	2.57E-05
406	9.50E-06	473	2.61E-04	540	6.17E-04	607	7.67E-04	674	1.88E-04	741	2.49E-05
407	9.70E-06	474	2.43E-04	541	6.26E-04	608	7.57E-04	675	1.82E-04	742	2.43E-05
408	1.13E-05	475	2.28E-04	542	6.31E-04	609	7.51E-04	676	1.76E-04	743	2.31E-05
409	1.40E-05	476	2.15E-04	543	6.34E-04	610	7.44E-04	677	1.72E-04	744	2.29E-05
410	1.56E-05	477	2.05E-04	544	6.39E-04	611	7.36E-04	678	1.67E-04	745	2.21E-05
411	1.70E-05	478	1.98E-04	545	6.46E-04	612	7.31E-04	679	1.63E-04	746	2.14E-05
412	1.93E-05	479	1.89E-04	546	6.51E-04	613	7.24E-04	680	1.58E-04	747	2.08E-05
413	2.23E-05	480	1.83E-04	547	6.56E-04	614	7.13E-04	681	1.53E-04	748	1.98E-05
414	2.60E-05	481	1.81E-04	548	6.60E-04	615	6.99E-04	682	1.49E-04	749	1.92E-05
415	2.95E-05	482	1.78E-04	549	6.65E-04	616	6.93E-04	683	1.46E-04	750	1.86E-05
416	3.29E-05	483	1.78E-04	550	6.73E-04	617	6.85E-04	684	1.41E-04	751	1.83E-05
417	3.69E-05	484	1.77E-04	551	6.78E-04	618	6.74E-04	685	1.37E-04	752	1.79E-05
418	4.26E-05	485	1.78E-04	552	6.83E-04	619	6.64E-04	686	1.33E-04	753	1.71E-05
419	4.63E-05	486	1.79E-04	553	6.88E-04	620	6.52E-04	687	1.29E-04	754	1.66E-05
420	5.25E-05	487	1.81E-04	554	6.95E-04	621	6.44E-04	688	1.25E-04	755	1.63E-05
421	5.93E-05	488	1.82E-04	555	7.02E-04	622	6.37E-04	689	1.22E-04	756	1.56E-05
422	6.64E-05	489	1.87E-04	556	7.07E-04	623	6.26E-04	690	1.18E-04	757	1.53E-05
423	7.33E-05	490	1.91E-04	557	7.14E-04	624	6.15E-04	691	1.15E-04	758	1.49E-05
424	8.08E-05	491	1.97E-04	558	7.19E-04	625	6.04E-04	692	1.11E-04	759	1.42E-05
425	9.23E-05	492	2.02E-04	559	7.23E-04	626	5.95E-04	693	1.08E-04	760	1.40E-05
426	1.04E-04	493	2.09E-04	560	7.31E-04	627	5.86E-04	694	1.05E-04	761	1.35E-05
427	1.15E-04	494	2.17E-04	561	7.36E-04	628	5.74E-04	695	1.02E-04	762	1.30E-05
428	1.29E-04	495	2.27E-04	562	7.42E-04	629	5.67E-04	696	9.93E-05	763	1.28E-05
429	1.42E-04	496	2.36E-04	563	7.48E-04	630	5.55E-04	697	9.59E-05	764	1.26E-05
430	1.56E-04	497	2.46E-04	564	7.54E-04	631	5.43E-04	698	9.34E-05	765	1.20E-05
431	1.75E-04	498	2.57E-04	565	7.60E-04	632	5.34E-04	699	9.05E-05	766	1.14E-05
432	1.92E-04	499	2.71E-04	566	7.66E-04	633	5.23E-04	700	8.82E-05	767	1.11E-05
433	2.12E-04	500	2.81E-04	567	7.71E-04	634	5.12E-04	701	8.50E-05	768	1.10E-05
434	2.32E-04	501	2.94E-04	568	7.78E-04	635	5.01E-04	702	8.29E-05	769	1.07E-05
435	2.60E-04	502	3.03E-04	569	7.83E-04	636	4.91E-04	703	8.04E-05	770	1.05E-05
436	2.85E-04	503	3.18E-04	570	7.89E-04	637	4.81E-04	704	7.81E-05	771	1.00E-05
437	3.14E-04	504	3.30E-04	571	7.94E-04	638	4.72E-04	705	7.59E-05	772	9.70E-06
438	3.41E-04	505	3.42E-04	572	7.96E-04	639	4.61E-04	706	7.34E-05	773	9.40E-06
439	3.77E-04	506	3.55E-04	573	7.99E-04	640	4.51E-04	707	7.10E-05	774	9.00E-06
440	4.18E-04	507	3.68E-04	574	8.04E-04	641	4.39E-04	708	6.87E-05	775	9.00E-06
441	4.59E-04	508	3.79E-04	575	8.06E-04	642	4.30E-04	709	6.69E-05	776	8.50E-06
442	5.05E-04	509	3.90E-04	576	8.13E-04	643	4.20E-04	710	6.51E-05	777	8.40E-06
443	5.62E-04	510	4.02E-04	577	8.15E-04	644	4.11E-04	711	6.27E-05	778	7.80E-06
444	6.14E-04	511	4.12E-04	578	8.21E-04	645	4.00E-04	712	6.13E-05	779	8.00E-06
445	6.74E-04	512	4.23E-04	579	8.27E-04	646	3.92E-04	713	5.88E-05	780	8.00E-06
446	7.46E-04	513	4.36E-04	580	8.28E-04	647	3.83E-04	714	5.75E-05	N/A	N/A

4.0 LM-79 Measurement and Test Results

4.2 Goniophotometer Test

Model No.	W34M @ 60W / 4000K	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	0.528	63.1	0.995
NON-WORST CASE	277.0	60	0.246	62.4	0.915

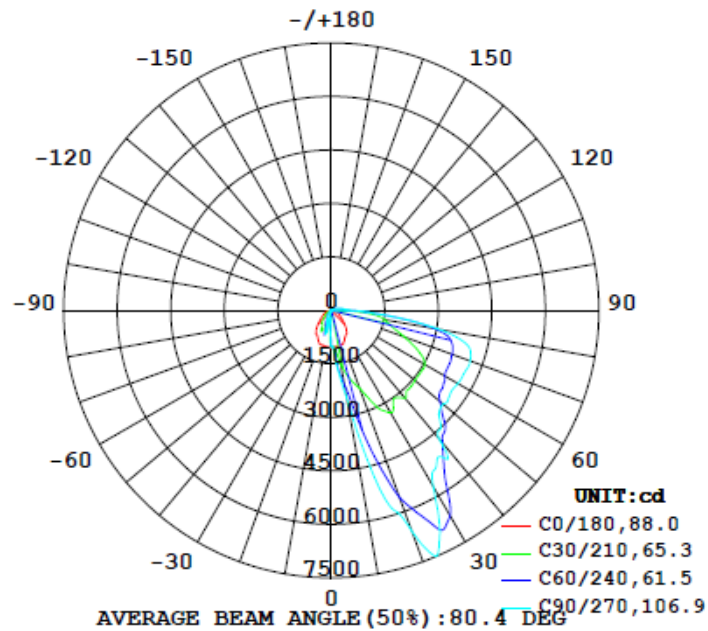
Test Result

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	9625	90.6	124.3	63.7	61.4	152.5	6.7%	B1-U3-G4
0°-90° zones	9297	90.6	124.3	63.7	61.4	147.3	6.9%	B1-U3-G4

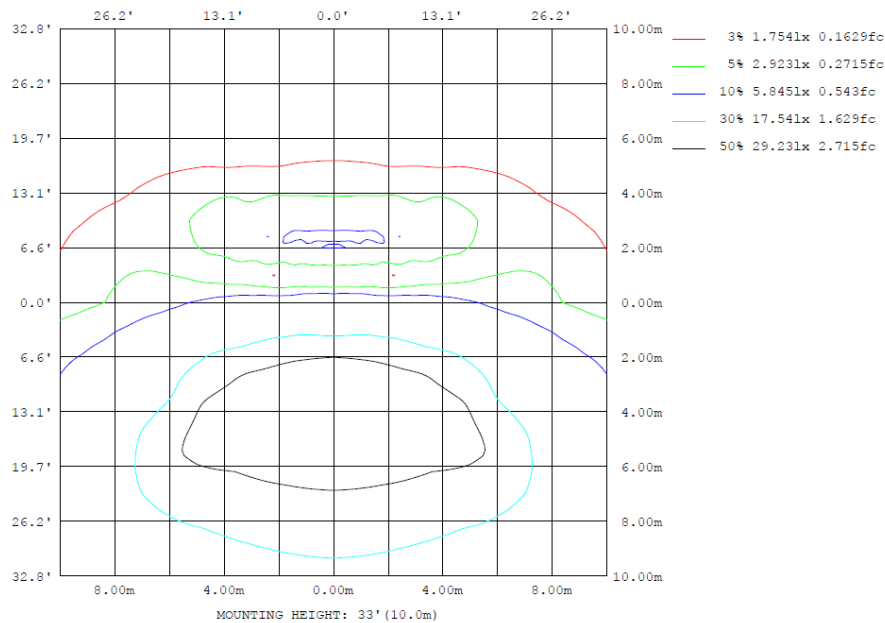
4.2 Goniophotometer Test

Lighting Distribution Curve

LUMINOUS INTENSITY DISTRIBUTION DIAGRAM



Isolux Plot



4.2 Goniophotometer Test

Zonal Lumen Summary

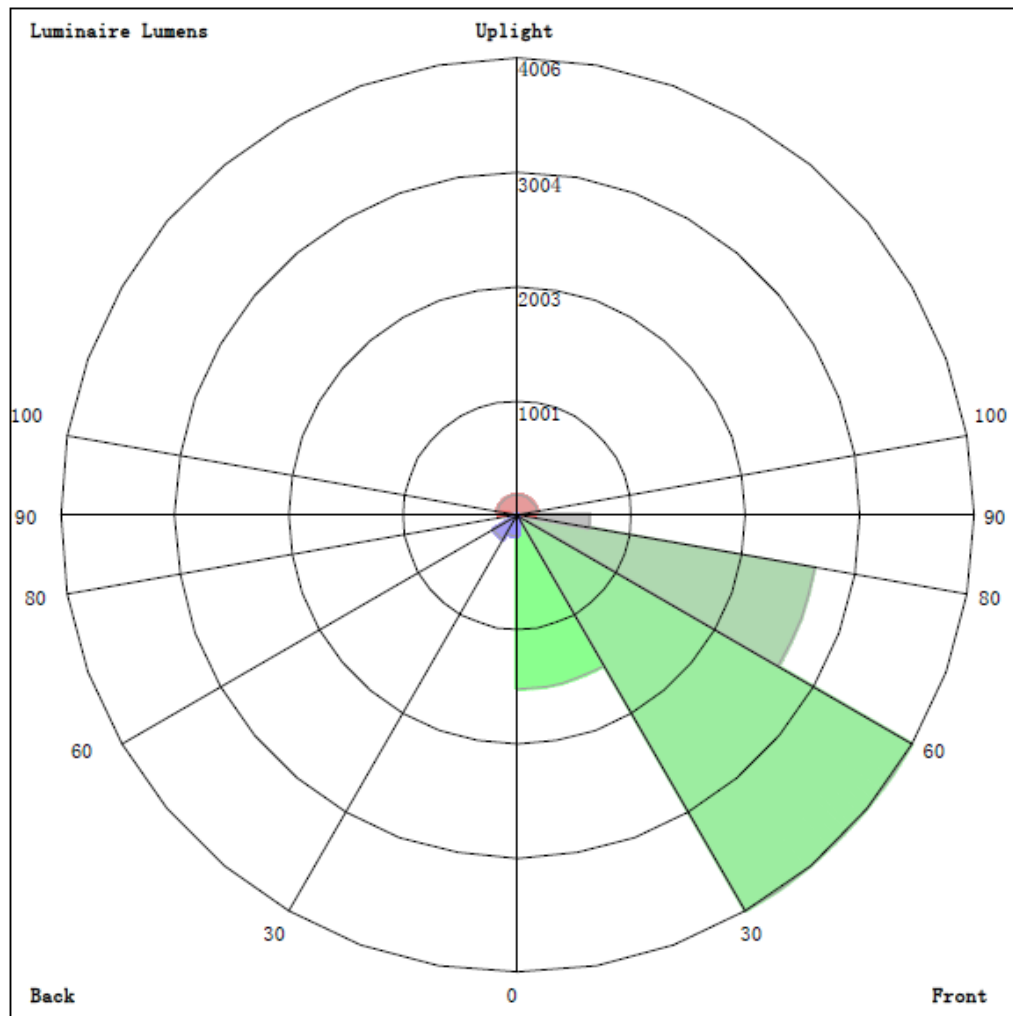
ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	± zone	± total	%lum, lamp
10	1036	1891	2487	1891	1036	235.9	471.2	235.9	0- 10	86.79	86.79	0.90,0.90
20	989.9	3768	6566	3768	989.9	682.6	359.8	682.6	10- 20	489.0	575.8	5.98,5.98
30	800.0	5670	5727	5670	800.0	399.3	186.9	399.3	20- 30	1127	1703	17.7,17.7
40	646.5	5761	4687	5761	646.5	233.3	68.92	233.3	30- 40	1399	3102	32.2,32.2
50	406.9	4154	4091	4154	406.9	97.01	12.53	97.01	40- 50	1442	4544	47.2,47.2
60	265.9	3295	4100	3295	265.9	39.21	2.951	39.21	50- 60	1408	5952	61.8,61.8
70	166.2	3077	4139	3077	166.2	21.77	0.8342	21.77	60- 70	1406	7358	76.5,76.5
80	62.02	2752	3071	2752	62.02	16.35	2.027	16.35	70- 80	1295	8653	89.9,89.9
90	18.47	557.5	607.2	557.5	18.47	10.97	3.204	10.97	80- 90	643.3	9297	96.6,96.6
100	12.98	206.9	316.9	206.9	12.98	6.037	3.850	6.037	90-100	151.5	9448	98.2,98.2
110	9.797	99.43	141.2	99.43	9.797	5.505	3.988	5.505	100-110	72.45	9521	98.9,98.9
120	7.442	81.76	102.2	81.76	7.442	5.170	3.924	5.170	110-120	40.95	9562	99.3,99.3
130	5.797	58.17	83.28	58.17	5.797	4.942	4.398	4.942	120-130	28.67	9590	99.6,99.6
140	4.494	32.66	71.65	32.66	4.494	4.396	4.515	4.396	130-140	20.00	9610	99.8,99.8
150	3.464	18.09	33.10	18.09	3.464	3.815	4.082	3.815	140-150	9.238	9619	99.9,99.9
160	2.634	8.720	14.79	8.720	2.634	3.515	3.003	3.515	150-160	3.998	9623	100,100
170	2.100	1.562	1.719	1.562	2.100	2.571	1.787	2.571	160-170	1.136	9625	100,100
180	2.398	2.172	2.054	2.172	2.398	2.287	1.935	2.287	170-180	0.1919	9625	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT: lm		

	Zonal (lm)		Total (lm)	Percent
0-10	86.79	0-10	86.79	0.90%
10-20	488.96	0-20	575.75	5.98%
20-30	1127.08	0-30	1702.83	17.69%
30-40	1398.88	0-40	3101.71	32.23%
40-50	1442.48	0-50	4544.19	47.21%
50-60	1407.94	0-60	5952.13	61.84%
60-70	1406.22	0-70	7358.35	76.45%
70-80	1295.06	0-80	8653.41	89.91%
80-90	643.29	0-90	9296.70	96.59%
90-100	151.45	0-100	9448.15	98.17%
100-110	72.45	0-110	9520.60	98.92%
110-120	40.95	0-120	9561.55	99.34%
120-130	28.67	0-130	9590.22	99.64%
130-140	20.00	0-140	9610.22	99.85%
140-150	9.24	0-150	9619.46	99.95%
150-160	4.00	0-160	9623.46	99.99%
160-170	1.14	0-170	9624.60	100.00%
170-180	0.19	0-180	9624.79	100.00%

4.2 Goniophotometer Test

LCS/BUG

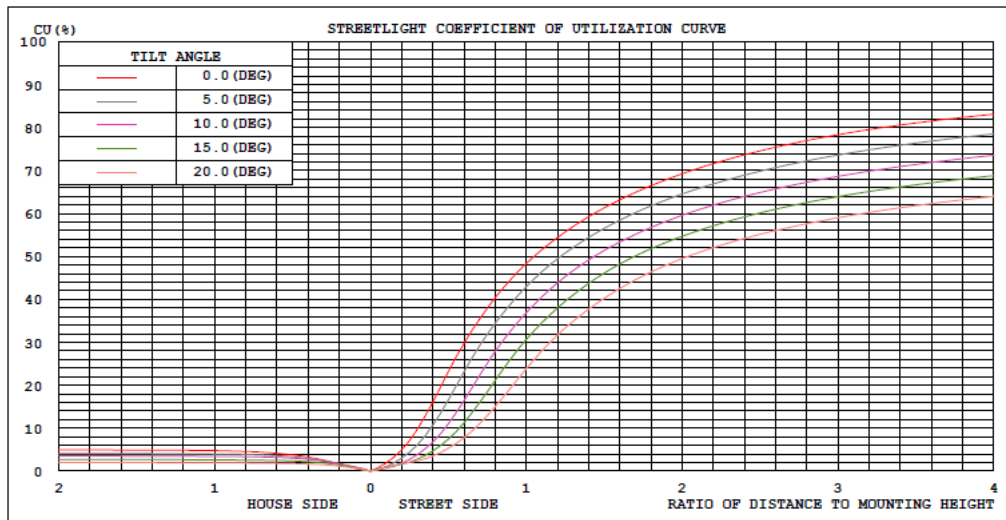


LUMINAIRE CLASSIFICATION SYSTEM (LCS)

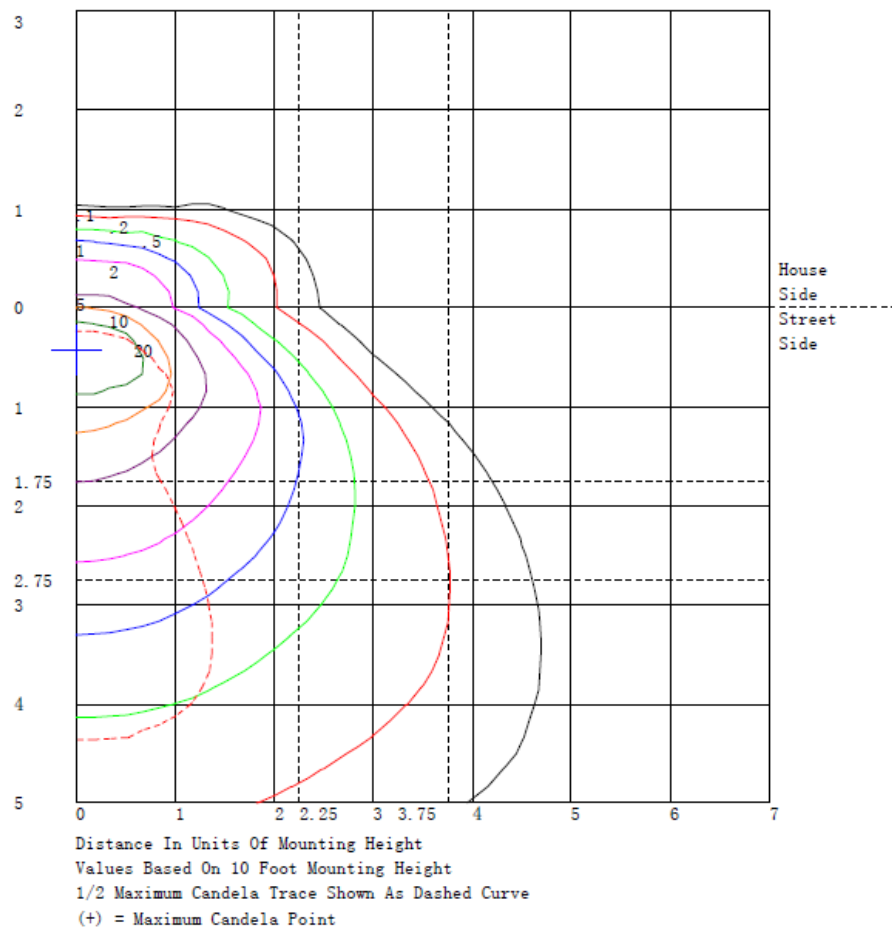
	Lumens	% Lamp	% Luminaire
FL - Front-Low (0-30)	1520.5	N.A.	15.8
FM - Front-Medium (30-60)	4005.7	N.A.	41.6
FH - Front-High (60-80)	2648.8	N.A.	27.5
FVH - Front-Very High (80-90)	633.7	N.A.	6.6
BL - Back-Low (0-30)	182.3	N.A.	1.9
BM - Back-Medium (30-60)	243.6	N.A.	2.5
BH - Back-High (60-80)	52.5	N.A.	0.5
BVH - Back-Very High (80-90)	9.5	N.A.	0.1
UL - Uplight-Low (90-100)	151.5	N.A.	1.6
UH - Uplight-High (100-180)	176.6	N.A.	1.8
Total	9624.7	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) y	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
0	1015	1016	1017	1017	1017	1017	1017	1018	1018	1019	1019	1020	1021	1021	1021	1022	1022	1023	1024
5	1032	1017	1010	1011	1021	1038	1063	1099	1140	1182	1219	1256	1290	1322	1351	1376	1395	1409	1417
10	1036	1019	1041	1103	1225	1371	1526	1658	1780	1891	1979	2056	2126	2197	2264	2327	2397	2453	2487
15	1021	1087	1189	1328	1522	1739	1963	2128	2311	2534	2893	3289	3694	4065	4402	4689	4898	5037	5101
20	990	1210	1432	1655	1843	2060	2333	2747	3230	3768	4399	5017	5568	5892	6120	6277	6428	6526	6566
25	882	1153	1455	1786	2127	2513	2960	3544	4175	4822	5460	6051	6560	6896	7125	7257	7265	7221	7163
30	800	1064	1391	1779	2215	2724	3314	4116	4928	5670	6163	6494	6654	6522	6283	6010	5869	5773	5727
35	753	1073	1418	1787	2111	2512	3044	4078	5110	5956	6013	5827	5524	5398	5291	5207	5172	5158	5159
40	646	997	1378	1791	2195	2660	3219	4168	5072	5761	5618	5259	4852	4863	4936	5013	4902	4780	4687
45	516	943	1371	1800	2210	2637	3098	3754	4367	4843	4854	4719	4520	4456	4407	4369	4327	4296	4283
50	407	790	1197	1627	2107	2591	3058	3507	3884	4154	4161	4082	3973	3979	4002	4034	4057	4077	4091
55	328	580	913	1327	1912	2509	3049	3338	3526	3641	3721	3769	3803	3865	3924	3978	4022	4055	4073
60	266	449	743	1147	1791	2449	3025	3209	3278	3295	3419	3547	3671	3774	3866	3944	4017	4071	4100
65	213	348	594	952	1532	2140	2691	2930	3074	3170	3331	3487	3636	3781	3909	4014	4077	4112	4122
70	166	246	428	713	1174	1683	2183	2535	2830	3077	3278	3449	3599	3765	3913	4033	4099	4133	4139
75	111	160	300	528	885	1302	1752	2204	2630	3001	3216	3371	3492	3647	3785	3898	3960	3992	3998
80	62.0	99.4	219	421	736	1110	1521	1975	2400	2752	2880	2929	2933	2979	3017	3046	3060	3068	3071
85	36.1	73.9	166	313	553	819	1083	1295	1465	1580	1575	1529	1470	1466	1471	1480	1485	1490	1496
90	18.5	45.6	87.8	145	230	321	409	473	524	558	559	552	542	556	573	590	599	604	607
95	13.6	27.9	49.6	78.7	120	165	211	254	292	322	330	331	332	346	361	375	380	383	383
100	13.0	24.6	39.3	57.2	79.3	104	129	156	183	207	224	240	254	273	290	304	312	316	317
105	11.8	22.4	33.9	46.4	60.6	75.2	89.8	103	116	129	139	150	162	180	197	213	221	226	227
110	9.80	16.6	24.6	33.8	45.1	57.0	68.9	80.0	90.2	99.4	106	112	118	126	133	138	141	141	141
115	8.62	14.9	21.8	29.4	37.7	46.6	56.1	67.2	78.0	87.6	93.2	97.6	101	107	113	117	118	118	117
120	7.44	13.2	19.2	25.3	30.9	37.2	44.8	57.7	70.6	81.8	84.7	85.7	86.2	91.1	96.3	101	102	102	102
125	6.46	10.8	15.5	20.5	25.2	30.7	37.3	47.7	58.5	68.5	74.3	78.5	81.5	84.4	86.7	88.1	88.4	88.2	87.9
130	5.80	7.94	11.0	15.1	20.2	26.3	33.1	41.1	49.6	58.2	67.1	75.1	81.5	84.1	85.0	84.7	84.4	83.9	83.3
135	5.17	5.68	7.64	11.0	16.6	23.0	29.8	35.2	40.6	46.2	52.8	59.7	66.7	74.8	82.1	87.6	88.3	87.3	85.8
140	4.49	4.05	5.20	7.93	13.5	19.7	25.7	28.4	30.5	32.7	36.6	41.1	45.9	51.0	56.0	60.8	65.5	69.4	71.7
145	3.96	2.50	2.67	4.46	9.14	14.5	19.5	21.2	22.3	23.5	27.0	30.8	34.4	36.5	38.0	39.3	40.8	42.0	42.8
150	3.46	2.47	2.46	3.43	5.97	9.05	12.2	14.2	16.1	18.1	21.4	24.8	27.7	28.9	29.6	30.0	31.2	32.3	33.1
155	3.02	2.51	2.46	2.86	3.78	5.11	6.81	8.86	11.2	13.7	16.8	19.7	22.0	22.3	22.0	21.4	21.7	22.1	22.4
160	2.63	2.54	2.48	2.45	2.17	2.14	2.56	4.29	6.42	8.72	10.7	12.5	14.0	14.6	14.8	14.8	14.8	14.8	14.8
165	2.25	2.23	2.19	2.13	1.98	1.86	1.83	1.97	2.30	2.86	3.92	5.11	6.26	7.02	7.61	8.06	8.34	8.52	8.63
170	2.10	2.06	2.02	1.97	1.91	1.84	1.77	1.70	1.63	1.56	1.50	1.44	1.40	1.36	1.35	1.37	1.48	1.61	1.72
175	2.21	2.19	2.17	2.14	2.11	2.07	2.02	1.98	1.93	1.88	1.83	1.78	1.73	1.69	1.66	1.63	1.60	1.59	1.61
180	2.40	2.37	2.34	2.31	2.29	2.28	2.26	2.23	2.20	2.17	2.14	2.10	2.06	2.02	2.00	1.98	1.99	2.02	2.05

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	1023	1022	1022	1021	1021	1021	1020	1019	1019	1018	1018	1017	1017	1017	1017	1017	1016	1015	1021	
5	1409	1395	1376	1351	1322	1290	1256	1219	1182	1140	1099	1063	1038	1021	1011	1010	1017	1032	955	
10	2453	2397	2327	2264	2197	2126	2056	1979	1891	1780	1658	1526	1371	1225	1103	1041	1019	1036	745	
15	5037	4898	4689	4402	4065	3694	3289	2893	2534	2311	2128	1963	1739	1522	1328	1189	1087	1021	666	
20	6526	6428	6277	6120	5892	5568	5017	4399	3768	3230	2747	2333	2060	1843	1655	1432	1210	990	612	
25	7221	7265	7257	7125	6896	6560	6051	5460	4822	4175	3544	2960	2513	2127	1786	1455	1153	882	554	
30	5773	5869	6010	6283	6522	6654	6494	6163	5670	4928	4116	3314	2724	2215	1779	1391	1064	800	580	
35	5158	5172	5207	5291	5398	5524	5827	6013	5956	5110	4078	3044	2512	2111	1787	1418	1073	753	620	
40	4780	4902	5013	4936	4863	4852	5259	5618	5761	5072	4168	3219	2660	2195	1791	1378	997	646	589	
45	4296	4327	4369	4407	4456	4520	4719	4854	4843	4367	3754	3098	2637	2210	1800	1371	943	516	524	
50	4077	4057	4034	4002	3979	3973	4082	4161	4154	3884	3507	3058	2591	2107	1627	1197	790	407	412	
55	4055	4022	3978	3924	3865	3803	3769	3721	3641	3526	3338	3049	2509	1912	1327	913	580	328	335	
60	4071	4017	3944	3866	3774	3671	3547	3419	3295	3278	3209	3025	2449	1791	1147	743	449	266	275	
65	4112	4077	4014	3909	3781	3636	3487	3331	3170	3074	2930	2691	2140	1532	952	594	348	213	217	
70	4133	4099	4033	3913	3765	3599	3449	3278	3077	2830	2535	2183	1683	1174	713	428	246	166	156	
75	3992	3960	3898	3785	3647	3492	3371	3216	3001	2630	2204	1752	1302	885	528	300	160	111	98.5	
80	3068	3060	3046	3017	2979	2933	2929	2880	2752	2400	1975	1521	1110	736	421	219	99.4	62.0	58.0	
85	1490	1485	1480	1471	1466	1470	1529	1575	1580	1465	1295	1083	819	553	313	166	73.9	36.1	38.6	
90	604	599	590	573	556	542	552	559	558	524	473	409	321	230	145	87.8	45.6	18.5	20.6	
95	383	380	375	361	346	332	331	330	322	292	254	211	165	120	78.7	49.6	27.9	13.6	14.3	
100	316	312	304	290	273	254	240	224	207	183	156	129	104	79.3	57.2	39.3	24.6	13.0	12.4	
105	226	221	213	197	180	162	150	139	129	116	103	89.8	75.2	60.6	46.4	33.9	22.4	11.8	11.2	
110	141	141	138	133	126	118	112	106	99.4	90.2	80.0	68.9	57.0	45.1	33.8	24.6	16.6	9.80	9.67	
115	118	118	117	113	107	101	97.6	93.2	87.6	78.0	67.2	56.1	46.6	37.7	29.4	21.8	14.9	8.62	8.85	
120	102	102	101	96.3	91.1	86.2	85.7	84.7	81.8	70.6	57.7	44.8	37.2	30.9	25.3	19.2	13.2	7.44	8.57	
125	88.2	88.4	88.1	86.7	84.4	81.5	78.5	74.3	68.5	58.5	47.7	37.3	30.7	25.2	20.5	15.5	10.8	6.46	7.73	
130	83.9	84.4	84.7	85.0	84.1	81.5	75.1	67.1	58.2	49.6	41.1	33.1	26.3	20.2	15.1	11.0	7.94	5.80	6.07	
135	87.3	88.3	87.6	82.1	74.8	66.7	59.7	52.8	46.2	40.6	35.2	29.8	23.0	16.6	11.0	7.64	5.68	5.17	5.51	
140	69.4	65.5	60.8	56.0	51.0	45.9	41.1	36.6	32.3	28.3	24.5	19.7	13.5	7.93	5.20	4.05	4.49	4.84		
145	42.0	40.8	39.3	38.0	36.5	34.4	30.8	27.0	23.5	20.3	21.2	19.5	14.5	9.14	4.66	2.67	2.50	3.96	3.47	
150	32.3	31.2	30.0	29.6	28.9	27.7	24.8	21.4	18.1	16.1	14.2	12.2	9.05	5.97	4.3	2.46	2.47	3.46	3.94	
155	22.1	21.1	20.4	22.0	22.3	22.0	19.7	16.8	13.7	11.2	8.86	6.81	5.11	3.78	2.86	2.46	2.51	3.02	3.52	
160	14.8	14.8	14.8	14.8	14.6	14.0	12.5	10.7	8.72	6.42	4.29	2.56	2.14	2.17	2.45	2.48	2.54	2.63	3.13	
165	8.52	8.34	8.06	7.7	7.02	6.26	5.11	3.92	2.86	2.20	1.97	1.83	1.86	1.98	2.13	2.19	2.23	2.25	2.72	
170	1.61	1.48	1.37	1.35	1.36	1.40	1.44	1.50	1.56	1.63	1.70	1.77	1.84	1.91	1.97	2.02	2.06	2.10	2.46	
175	1.59	1.60	1.63	1.66	1.69	1.73	1.78	1.83	1.88	1.93	1.98	2.02	2.07	2.11	2.14	2.17	2.19	2.21	2.42	
180	2.02	1.99	1.98	2.00	2.02	2.06	2.10	2.14	2.17	2.20	2.23	2.26	2.28	2.29	2.31	2.34	2.37	2.40	2.42	

Table--3

UNIT: °C

C (DBG)	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280
0	1025	1028	1028	1028	1027	1027	1027	1026	1026	1026	1026	1026	1026	1025	1025	1025	1024	1025	1025
5	864	761	626	492	373	310	271	249	233	224	221	216	214	212	211	210	209	210	211
10	516	348	262	222	215	207	215	236	275	320	363	383	397	410	435	458	471	458	435
15	404	237	194	222	299	392	493	587	627	648	658	674	682	682	657	631	612	631	657
20	354	216	257	372	518	601	659	683	620	535	447	411	390	378	367	361	360	361	367
25	340	242	338	488	634	599	525	439	408	385	365	333	302	277	270	270	273	270	270
30	428	345	374	438	505	488	449	399	354	309	267	237	214	197	189	186	187	186	189
35	520	453	442	449	456	417	369	316	267	224	189	178	176	177	170	163	160	163	170
40	537	490	453	418	382	332	282	233	194	159	130	105	86.5	73.2	68.3	67.4	68.9	67.4	68.3
45	514	488	434	371	305	257	213	173	133	97.5	68.9	53.9	45.3	41.0	36.4	33.9	33.3	33.9	36.4
50	404	383	342	294	240	189	140	97.0	68.7	48.0	33.6	24.1	18.4	15.6	13.3	12.4	12.5	12.4	13.3
55	330	311	272	224	174	129	88.1	54.3	36.4	25.7	19.7	13.6	9.51	7.10	5.94	5.73	6.12	5.73	5.94
60	271	254	215	168	121	88.0	60.6	39.2	26.4	18.4	13.7	8.91	5.65	3.65	2.77	2.64	2.95	2.64	2.77
65	210	193	155	114	73.7	52.8	38.5	28.8	20.7	14.9	10.8	6.66	3.52	1.37	0.66	0.64	1.02	0.64	0.66
70	142	125	101	76.1	53.3	39.4	29.2	21.8	16.0	11.8	8.65	5.33	2.70	0.84	0.36	0.45	0.83	0.45	0.36
75	86.4	74.4	61.8	49.7	38.9	30.5	23.7	18.1	13.9	10.6	7.98	5.23	3.00	1.38	0.97	1.06	1.38	1.06	0.97
80	53.5	48.5	42.8	36.8	30.9	25.6	20.7	16.3	12.8	9.75	7.22	4.98	3.23	2.01	1.70	1.77	2.03	1.77	1.70
85	39.4	38.4	34.6	29.9	24.7	20.9	17.5	14.3	11.4	8.81	6.61	4.85	3.51	2.61	2.37	2.44	2.64	2.44	2.37
90	21.6	21.6	20.0	17.8	15.3	13.8	12.4	11.0	8.98	7.02	5.28	4.24	3.55	3.15	3.04	3.09	3.20	3.09	3.04
95	14.5	14.1	12.9	11.4	9.84	8.77	7.80	6.90	5.85	4.89	4.11	3.74	3.56	3.51	3.50	3.53	3.58	3.53	3.50
100	11.8	11.0	10.1	9.23	8.32	7.51	6.76	6.04	5.28	4.61	4.08	3.86	3.77	3.78	3.79	3.82	3.85	3.82	3.79
105	10.5	9.74	8.91	8.08	7.31	6.72	6.20	5.71	5.14	4.62	4.19	4.02	3.96	3.97	3.98	4.00	4.03	4.00	3.98
110	9.39	8.96	8.26	7.49	6.74	6.28	5.88	5.50	5.01	4.56	4.18	4.02	3.96	3.96	3.96	3.97	3.99	3.97	3.96
115	8.84	8.59	7.95	7.18	6.42	6.01	5.67	5.37	4.92	4.51	4.16	4.01	3.94	3.93	3.93	3.94	3.95	3.94	3.93
120	9.15	9.19	8.34	7.21	6.07	5.64	5.37	5.17	4.79	4.44	4.14	4.01	3.95	3.94	3.93	3.92	3.92	3.92	3.93
125	8.46	8.64	7.93	6.93	5.89	5.49	5.24	5.06	4.75	4.48	4.25	4.17	4.14	4.15	4.13	4.12	4.11	4.12	4.13
130	6.24	6.28	6.18	5.99	5.74	5.48	5.21	4.94	4.70	4.50	4.35	4.33	4.36	4.40	4.41	4.41	4.40	4.41	4.41
135	5.72	5.80	5.70	5.51	5.27	5.08	4.89	4.71	4.55	4.41	4.32	4.35	4.41	4.49	4.53	4.55	4.55	4.55	4.53
140	5.07	5.20	5.18	5.08	4.93	4.75	4.57	4.40	4.29	4.21	4.19	4.25	4.33	4.42	4.48	4.51	4.51	4.51	4.48
145	4.65	4.80	4.75	4.62	4.44	4.30	4.17	4.07	4.02	4.00	4.02	4.09	4.18	4.27	4.33	4.37	4.37	4.37	4.33
150	4.26	4.43	4.39	4.25	4.08	3.97	3.88	3.82	3.81	3.83	3.87	3.92	3.98	4.03	4.08	4.10	4.08	4.10	4.08
155	3.87	4.07	4.04	3.91	3.75	3.69	3.64	3.61	3.58	3.57	3.57	3.61	3.65	3.67	3.64	3.58	3.51	3.58	3.64
160	3.49	3.71	3.71	3.62	3.51	3.51	3.51	3.51	3.46	3.39	3.33	3.31	3.29	3.26	3.18	3.10	3.00	3.10	3.18
165	3.07	3.29	3.35	3.32	3.25	3.24	3.22	3.18	3.11	3.02	2.92	2.82	2.71	2.62	2.54	2.48	2.43	2.48	2.54
170	2.72	2.88	2.92	2.89	2.82	2.75	2.67	2.57	2.43	2.27	2.12	1.99	1.88	1.80	1.77	1.77	1.79	1.77	1.77
175	2.58	2.68	2.72	2.71	2.65	2.54	2.41	2.28	2.18	2.09	2.01	1.93	1.86	1.82	1.81	1.82	1.85	1.82	1.81
180	2.35	2.34	2.34	2.34	2.35	2.34	2.32	2.29	2.22	2.15	2.08	2.03	1.98	1.94	1.93	1.93	1.93	1.93	1.93

																UNIT: °cd				
y	C (DBG)	285	290	295	300	305	310	315	320	325	330	335	340	345	350	355				
		0	1025	1026	1026	1026	1026	1026	1026	1027	1027	1027	1028	1028	1028	1025	1021			
	5	212	214	216	221	224	233	249	271	310	373	492	626	761	864	955				
	10	410	397	383	363	320	275	236	215	207	215	222	262	348	516	745				
	15	682	682	674	658	648	627	587	493	392	299	222	194	237	404	666				
	20	378	390	411	447	535	620	683	659	601	518	372	257	216	354	612				
	25	277	302	333	365	385	408	439	525	599	634	488	338	242	340	554				
	30	197	214	237	267	309	354	399	449	488	505	438	374	345	428	580				
	35	177	176	178	189	224	267	316	369	417	456	449	442	453	520	620				
	40	73.2	86.5	105	130	159	194	233	282	332	382	418	453	490	537	589				
	45	41.0	45.3	53.9	68.9	97.5	133	173	213	257	305	371	434	488	514	524				
	50	15.6	18.4	24.1	33.6	48.0	68.7	97.0	140	189	240	294	342	383	404	412				
	55	7.10	9.51	13.6	19.7	25.7	36.4	54.3	88.1	129	174	224	272	311	330	335				
	60	3.65	5.65	8.91	13.7	18.4	26.4	39.2	60.6	88.0	121	168	215	254	271	275				
	65	1.37	3.52	6.66	10.8	14.9	20.7	28.8	38.5	52.8	73.7	114	155	193	210	217				
	70	0.84	2.70	5.33	8.65	11.8	16.0	21.8	29.2	39.4	53.3	76.1	101	125	142	156				
	75	1.38	3.00	5.23	7.98	10.6	13.9	18.1	23.7	30.5	38.9	49.7	61.8	74.4	86.4	98.5				
	80	2.01	3.23	4.98	7.22	9.75	12.8	16.3	20.7	25.6	30.9	36.8	42.8	48.5	53.5	58.0				
	85	2.61	3.51	4.85	6.61	8.81	11.4	14.3	17.5	20.9	24.7	29.9	34.6	38.4	39.4	38.6				
	90	3.15	3.55	4.24	5.28	7.02	8.98	11.0	12.4	13.8	15.3	17.8	20.0	21.6	21.6	20.6				
	95	3.51	3.56	3.74	4.11	4.89	5.85	6.90	7.80	8.77	9.84	11.4	12.9	14.1	14.5	14.3				
	100	3.78	3.77	3.86	4.08	4.61	5.28	6.04	6.76	7.51	8.32	9.23	10.1	11.0	11.8	12.4				
	105	3.97	3.96	4.02	4.19	4.62	5.14	5.71	6.20	6.72	7.31	8.08	8.91	9.74	10.5	11.2				
	110	3.96	3.96	4.02	4.18	4.56	5.01	5.50	5.88	6.28	6.74	7.49	8.26	8.96	9.39	9.67				
	115	3.93	3.94	4.01	4.16	4.51	4.92	5.37	5.67	6.01	6.42	7.18	7.95	8.59	8.84	8.85				
	120	3.94	3.95	4.01	4.14	4.44	4.79	5.17	5.37	5.64	6.07	7.21	8.34	9.19	9.15	8.57				
	125	4.15	4.14	4.17	4.25	4.48	4.75	5.06	5.24	5.49	5.89	6.93	7.93	8.64	8.46	7.73				
	130	4.40	4.36	4.33	4.35	4.50	4.70	4.94	5.21	5.48	5.74	5.99	6.18	6.28	6.24	6.07				
	135	4.49	4.41	4.35	4.32	4.41	4.55	4.71	4.89	5.08	5.27	5.51	5.70	5.80	5.72	5.51				
	140	4.42	4.33	4.25	4.19	4.21	4.29	4.40	4.57	4.75	4.93	5.08	5.18	5.20	5.07	4.84				
	145	4.27	4.18	4.09	4.02	4.00	4.02	4.07	4.17	4.30	4.44	4.62	4.75	4.80	4.65	4.37				
	150	4.03	3.98	3.92	3.87	3.83	3.81	3.82	3.88	3.97	4.08	4.25	4.39	4.43	4.26	3.94				
	155	3.67	3.65	3.61	3.57	3.57	3.58	3.61	3.64	3.69	3.75	3.91	4.04	4.07	3.87	3.52				
	160	3.26	3.29	3.31	3.33	3.39	3.46	3.51	3.51	3.51	3.51	3.62	3.71	3.71	3.49	3.13				
	165	2.62	2.71	2.82	2.92	3.02	3.11	3.18	3.22	3.24	3.25	3.32	3.35	3.29	3.07	2.72				
	170	1.80	1.88	1.99	2.12	2.27	2.43	2.57	2.67	2.75	2.82	2.89	2.92	2.88	2.72	2.46				
	175	1.82	1.86	1.93	2.01	2.09	2.18	2.28	2.41	2.54	2.65	2.71	2.72	2.68	2.58	2.42				
	180	1.84	1.98	2.03	2.08	2.15	2.22	2.28	2.32	2.34	2.35	2.42	2.34	2.24	2.35	2.37				

4.0 LM-79 Measurement and Test Results

4.3 THD and PF Test

Model No.	W34M @ 60W / 4000K	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	0.528	63.1	0.995	2.26
277.0	60	0.246	62.4	0.915	7.55

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*****