

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

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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		12272
Minimum Luminaire Efficacy (lm/W) (Goniophotometer – Section 4.2) (0°-180° zones)	IES LM-79-2008	N/A		138.0
Luminaire Output (lm) (Goniophotometer – Section 4.2) (0°-90° zones)	IES LM-79-2008	300		11851
Minimum Luminaire Efficacy (lm/W) (Goniophotometer – Section 4.2) (0°-90° zones)	IES LM-79-2008	Standard	Premium	133.3
		105	120	
Power (Input Wattage) (W) (Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Case		88.9
Total Harmonic Distortion (A%) (THD & PF – Section 4.3)	ANSI C82.77:2014	20.00%	120V	2.95
			277V	5.03
Power Factor (THD & PF – Section 4.3)	ANSI C82.77:2014	0.9	120V	0.996
			277V	0.951
Allowable CCTs* (K) (Integrating Sphere – Section 4.1)	IES LM-79-2008	7 steps	5029±283	5112
		4 steps	5029±220	
Minimum CRI (Integrating Sphere – Section 4.1)	IES LM-79-2008 CIE13.3-1995	≥70		75.0
Minimum R9 (Integrating Sphere – Section 4.1)	IES LM-79-2008 CIE13.3-1995	N/A		-25
Minimum Rf (Integrating Sphere – Section 4.1)	ANSI/IES TM-30-18	≥70		76
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%		-18%
Zonal Lumen Requirement (80°-90°) (Goniophotometer – Section 4.2)	IES LM-79-2008	≤10%		7.0%
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		0.744
(Goniophotometer – Section 4.2)		Non-Worst Case		0.333
Power (Input Wattage – W)				
(Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Case		88.9
(Goniophotometer – Section 4.2)		Non-Worst Case		87.8

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2023-06-13	W34M @ 80W / 5000K	230612002-S1
2	Goniophotometer Test	2023-06-13	W34M @ 80W / 5000K	230612002-S1
3	THD and PF Test	2023-06-13	W34M @ 80W / 5000K	230612002-S1

Remark (If any)

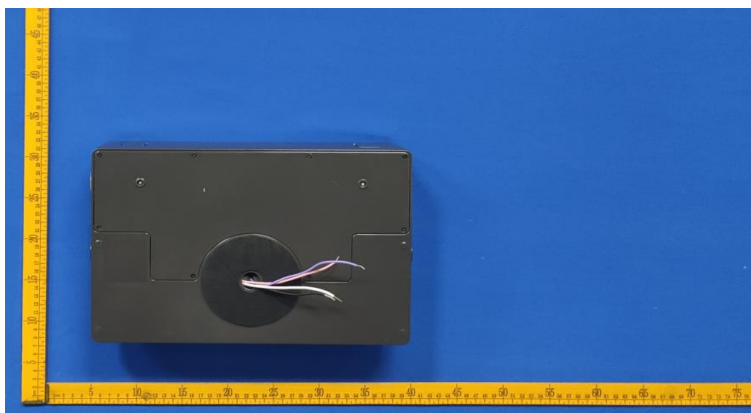
1. The results contained in this report pertain only to the tested samples.
2. This report shall not be reproduced, no limited part or full, without approval of Dongguan New Testing Centre Co., Ltd.
3. This report does not imply product certification, approval, or endorsement by NVLAP, or any agency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

3.0 Product Description

Luminaire Description: Model No. W34M @ 80W / 5000K, 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 / 5000K	Sample ID	230612002-S1
Operate time (Min.)	10	Stabilization time (Min.)	60
Temperature (°C)	25.4	Humidity (%RH)	41.0

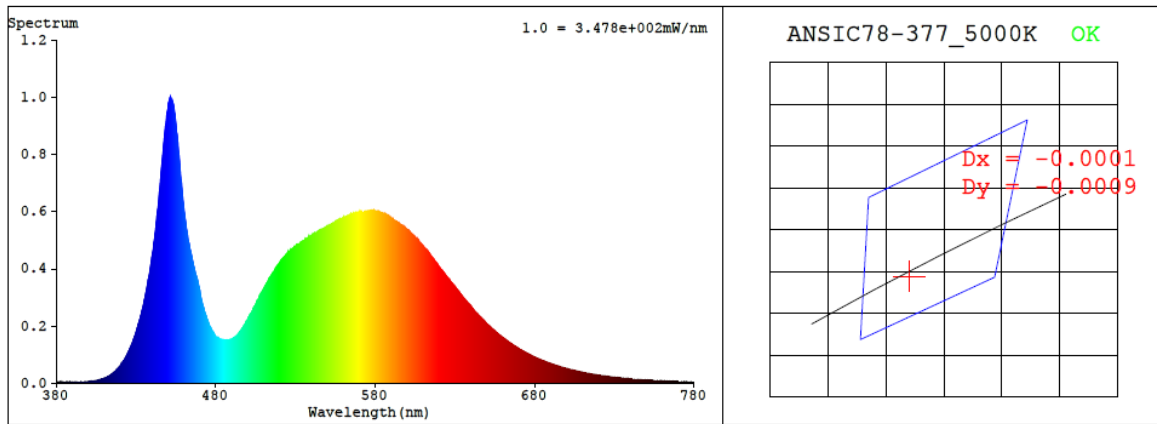
Test Method
<p>The Samples were tested according to the IES LM-79-2008.</p> <p>Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25±1°C.</p> <p>The sample measurements were made using 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	0.744	88.9	0.996
277.0	60	0.333	87.8	0.951

CCT (K)	CRI	R9	Duv	Rf	Rg	IES Rcs,h1
5112	75.0	-25	-0.0004	76	94	-18%

4.1 Integrating Sphere Test



Colorimetric Parameters

Chromaticity Coordinate: $x = 0.3420$ $y = 0.3483$ / $u' = 0.2106$ $v' = 0.4826$ ($duv = -4.16e-04$)

CCT= 5112K Prcp WL: $L_d = 571.6\text{nm}$ Purity=7.1%

Peak WL: $L_p = 452\text{nm}$ FWHM: $\approx 21.5\text{nm}$ Ratio: R=14.5% G=81.7% B=3.8%

Render Index: $R_a = 75.0$ AvgR = 65.4 TM30: $R_f = 75$ $R_g = 93$

EEL: 0.09995 A++ Highest

R1 =72	R2 =81	R3 =86	R4 =74	R5 =73	R6 =73	R7 =82
R8 =57	R9 =-25	R10=54	R11=70	R12=48	R13=74	R14=92
						R15=67

4.1 Integrating Sphere Test

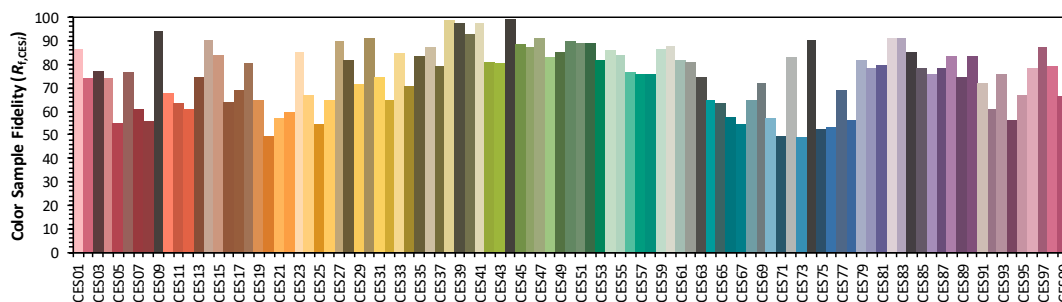
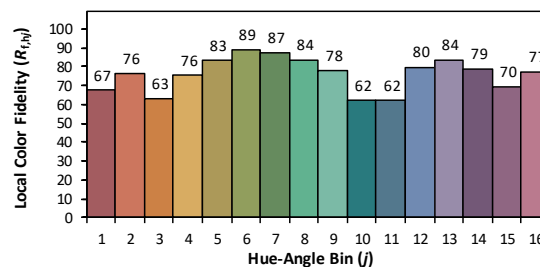
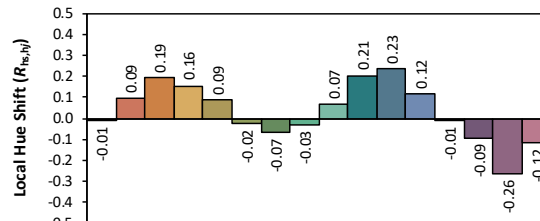
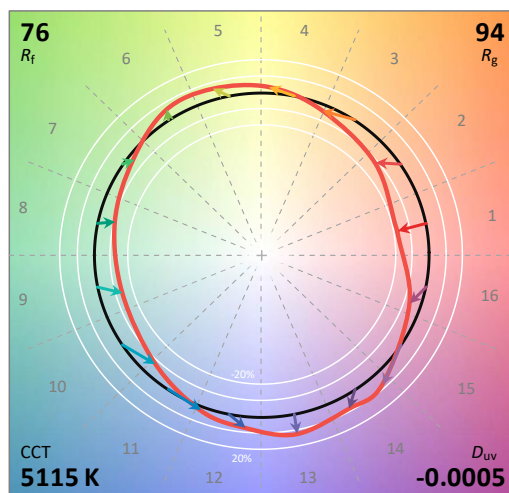
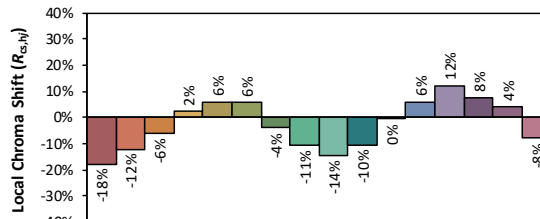
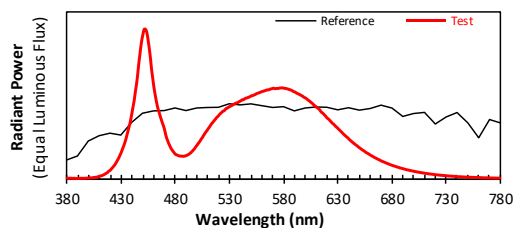
ANSI/IES TM-30-18 Color Rendition Report

Source: 1 CIE F1

Manufacturer: RAB Lighting Inc.

Date: 2023/6/14

Model: W34M @ 80W / 5000K



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

x 0.3419
 y 0.3481
 u' 0.2106
 v' 0.4825

CIE 13.3-1995
(CRI)

R_a 75
 R_g -25

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	6.00E-06	447	8.17E-04	514	3.70E-04	581	6.01E-04	648	2.20E-04	715	3.28E-05
381	3.20E-06	448	8.75E-04	515	3.78E-04	582	6.00E-04	649	2.14E-04	716	3.22E-05
382	4.40E-06	449	9.25E-04	516	3.88E-04	583	5.98E-04	650	2.08E-04	717	3.13E-05
383	4.80E-06	450	9.60E-04	517	3.96E-04	584	5.97E-04	651	2.03E-04	718	3.05E-05
384	3.80E-06	451	9.91E-04	518	4.06E-04	585	5.93E-04	652	1.97E-04	719	2.93E-05
385	3.70E-06	452	9.94E-04	519	4.13E-04	586	5.92E-04	653	1.92E-04	720	2.83E-05
386	4.00E-06	453	9.84E-04	520	4.20E-04	587	5.89E-04	654	1.88E-04	721	2.75E-05
387	4.10E-06	454	9.56E-04	521	4.29E-04	588	5.86E-04	655	1.83E-04	722	2.68E-05
388	2.60E-06	455	9.08E-04	522	4.36E-04	589	5.80E-04	656	1.77E-04	723	2.61E-05
389	2.90E-06	456	8.56E-04	523	4.42E-04	590	5.78E-04	657	1.73E-04	724	2.53E-05
390	3.10E-06	457	7.95E-04	524	4.49E-04	591	5.75E-04	658	1.69E-04	725	2.44E-05
391	3.10E-06	458	7.24E-04	525	4.52E-04	592	5.69E-04	659	1.64E-04	726	2.38E-05
392	4.40E-06	459	6.70E-04	526	4.59E-04	593	5.67E-04	660	1.60E-04	727	2.31E-05
393	3.80E-06	460	6.15E-04	527	4.67E-04	594	5.63E-04	661	1.55E-04	728	2.25E-05
394	4.00E-06	461	5.70E-04	528	4.69E-04	595	5.60E-04	662	1.52E-04	729	2.18E-05
395	4.10E-06	462	5.30E-04	529	4.76E-04	596	5.55E-04	663	1.47E-04	730	2.13E-05
396	4.10E-06	463	4.93E-04	530	4.78E-04	597	5.52E-04	664	1.43E-04	731	2.05E-05
397	4.20E-06	464	4.63E-04	531	4.84E-04	598	5.47E-04	665	1.39E-04	732	2.00E-05
398	5.20E-06	465	4.41E-04	532	4.86E-04	599	5.41E-04	666	1.36E-04	733	1.92E-05
399	5.40E-06	466	4.15E-04	533	4.91E-04	600	5.38E-04	667	1.32E-04	734	1.87E-05
400	6.30E-06	467	3.93E-04	534	4.95E-04	601	5.34E-04	668	1.28E-04	735	1.84E-05
401	6.80E-06	468	3.70E-04	535	4.98E-04	602	5.28E-04	669	1.25E-04	736	1.75E-05
402	6.90E-06	469	3.51E-04	536	5.04E-04	603	5.22E-04	670	1.21E-04	737	1.72E-05
403	7.50E-06	470	3.26E-04	537	5.05E-04	604	5.17E-04	671	1.18E-04	738	1.65E-05
404	8.20E-06	471	2.94E-04	538	5.07E-04	605	5.11E-04	672	1.15E-04	739	1.61E-05
405	9.50E-06	472	2.70E-04	539	5.13E-04	606	5.04E-04	673	1.12E-04	740	1.58E-05
406	1.05E-05	473	2.51E-04	540	5.16E-04	607	4.99E-04	674	1.09E-04	741	1.51E-05
407	1.17E-05	474	2.32E-04	541	5.21E-04	608	4.90E-04	675	1.05E-04	742	1.46E-05
408	1.33E-05	475	2.17E-04	542	5.25E-04	609	4.86E-04	676	1.03E-04	743	1.43E-05
409	1.49E-05	476	2.02E-04	543	5.25E-04	610	4.80E-04	677	9.97E-05	744	1.41E-05
410	1.77E-05	477	1.91E-04	544	5.31E-04	611	4.73E-04	678	9.66E-05	745	1.35E-05
411	1.93E-05	478	1.81E-04	545	5.35E-04	612	4.68E-04	679	9.39E-05	746	1.31E-05
412	2.21E-05	479	1.72E-04	546	5.37E-04	613	4.62E-04	680	9.12E-05	747	1.27E-05
413	2.51E-05	480	1.63E-04	547	5.40E-04	614	4.53E-04	681	8.87E-05	748	1.22E-05
414	2.84E-05	481	1.60E-04	548	5.42E-04	615	4.43E-04	682	8.63E-05	749	1.22E-05
415	3.32E-05	482	1.57E-04	549	5.45E-04	616	4.38E-04	683	8.41E-05	750	1.17E-05
416	3.70E-05	483	1.54E-04	550	5.51E-04	617	4.31E-04	684	8.17E-05	751	1.14E-05
417	4.17E-05	484	1.52E-04	551	5.52E-04	618	4.23E-04	685	7.94E-05	752	1.11E-05
418	4.85E-05	485	1.51E-04	552	5.54E-04	619	4.16E-04	686	7.72E-05	753	1.06E-05
419	5.37E-05	486	1.50E-04	553	5.58E-04	620	4.07E-04	687	7.49E-05	754	1.04E-05
420	5.96E-05	487	1.50E-04	554	5.60E-04	621	4.00E-04	688	7.25E-05	755	1.00E-05
421	6.82E-05	488	1.50E-04	555	5.66E-04	622	3.95E-04	689	7.10E-05	756	9.90E-06
422	7.61E-05	489	1.53E-04	556	5.68E-04	623	3.87E-04	690	6.89E-05	757	9.50E-06
423	8.48E-05	490	1.54E-04	557	5.70E-04	624	3.79E-04	691	6.68E-05	758	9.20E-06
424	9.41E-05	491	1.58E-04	558	5.74E-04	625	3.71E-04	692	6.47E-05	759	9.00E-06
425	1.06E-04	492	1.62E-04	559	5.76E-04	626	3.65E-04	693	6.28E-05	760	8.70E-06
426	1.19E-04	493	1.66E-04	560	5.79E-04	627	3.58E-04	694	6.07E-05	761	8.50E-06
427	1.31E-04	494	1.72E-04	561	5.81E-04	628	3.51E-04	695	5.95E-05	762	8.20E-06
428	1.45E-04	495	1.79E-04	562	5.83E-04	629	3.44E-04	696	5.78E-05	763	8.00E-06
429	1.62E-04	496	1.86E-04	563	5.86E-04	630	3.38E-04	697	5.59E-05	764	7.70E-06
430	1.77E-04	497	1.95E-04	564	5.88E-04	631	3.30E-04	698	5.44E-05	765	7.40E-06
431	1.98E-04	498	2.03E-04	565	5.91E-04	632	3.23E-04	699	5.30E-05	766	7.10E-06
432	2.15E-04	499	2.15E-04	566	5.90E-04	633	3.16E-04	700	5.16E-05	767	7.20E-06
433	2.36E-04	500	2.23E-04	567	5.93E-04	634	3.09E-04	701	4.97E-05	768	6.80E-06
434	2.59E-04	501	2.34E-04	568	5.97E-04	635	3.01E-04	702	4.84E-05	769	6.90E-06
435	2.86E-04	502	2.43E-04	569	5.98E-04	636	2.94E-04	703	4.71E-05	770	6.40E-06
436	3.14E-04	503	2.54E-04	570	6.00E-04	637	2.87E-04	704	4.56E-05	771	6.40E-06
437	3.42E-04	504	2.65E-04	571	6.02E-04	638	2.81E-04	705	4.44E-05	772	6.10E-06
438	3.70E-04	505	2.75E-04	572	5.99E-04	639	2.75E-04	706	4.30E-05	773	5.80E-06
439	4.05E-04	506	2.88E-04	573	5.99E-04	640	2.69E-04	707	4.18E-05	774	5.90E-06
440	4.45E-04	507	2.98E-04	574	6.01E-04	641	2.61E-04	708	4.06E-05	775	5.60E-06
441	4.86E-04	508	3.09E-04	575	6.00E-04	642	2.55E-04	709	3.98E-05	776	5.50E-06
442	5.26E-04	509	3.19E-04	576	6.02E-04	643	2.48E-04	710	3.85E-05	777	5.20E-06
443	5.81E-04	510	3.29E-04	577	6.03E-04	644	2.43E-04	711	3.71E-05	778	5.10E-06
444	6.27E-04	511	3.39E-04	578	6.03E-04	645	2.36E-04	712	3.60E-05	779	5.20E-06
445	6.86E-04	512	3.50E-04	579	6.04E-04	646	2.31E-04	713	3.49E-05	780	5.20E-06
446	7.56E-04	513	3.61E-04	580	6.02E-04	647	2.25E-04	714	3.40E-05	N/A	N/A

4.0 LM-79 Measurement and Test Results

4.2 Goniophotometer Test

Model No.	W34M @ 80W / 5000K	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	0.744	88.9	0.996
NON-WORST CASE	277.0	60	0.333	87.8	0.951

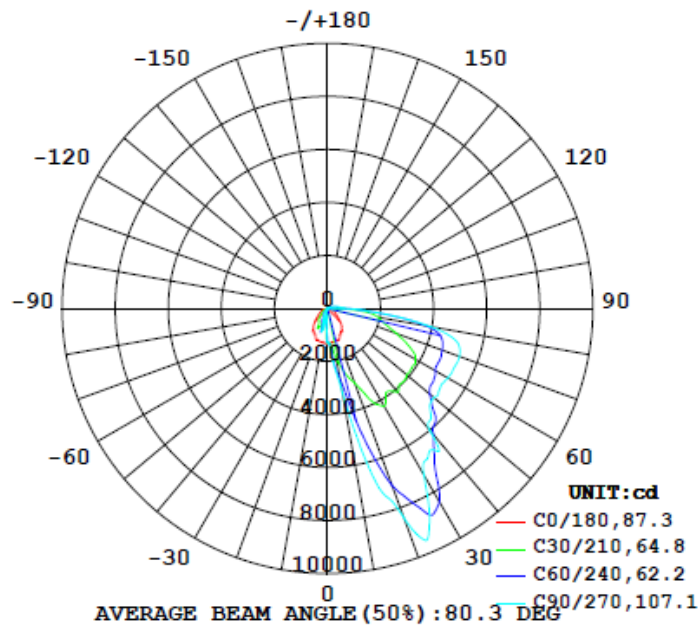
Test Result

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	12272	90.8	123.8	63.7	61.4	138.0	6.7%	B1-U3-G5
0°-90° zones	11851	90.8	123.8	63.7	61.4	133.3	7.0%	B1-U3-G5

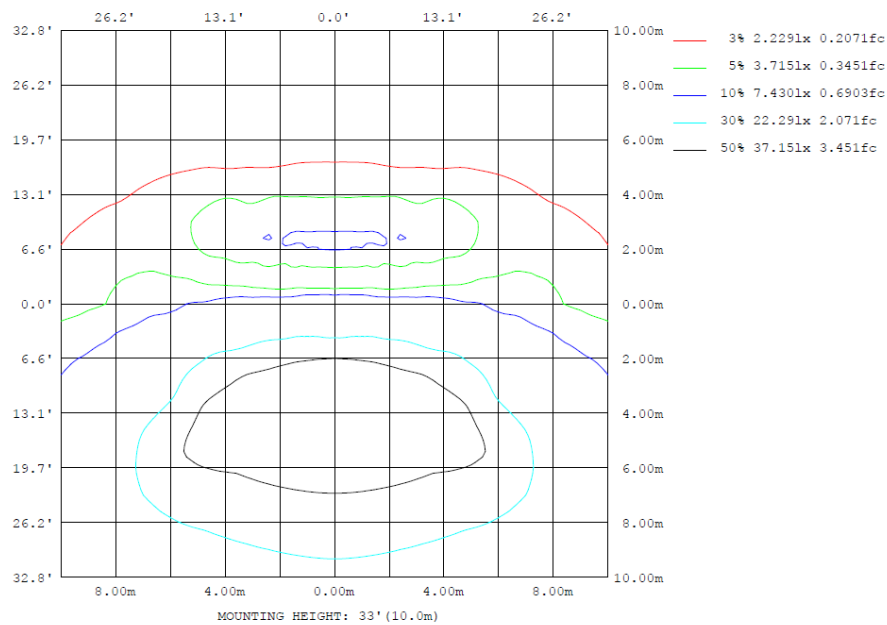
4.2 Goniophotometer Test

Lighting Distribution Curve

LUMINOUS INTENSITY DISTRIBUTION DIAGRAM



Isolux Plot



4.2 Goniophotometer Test

Zonal Lumen Summary

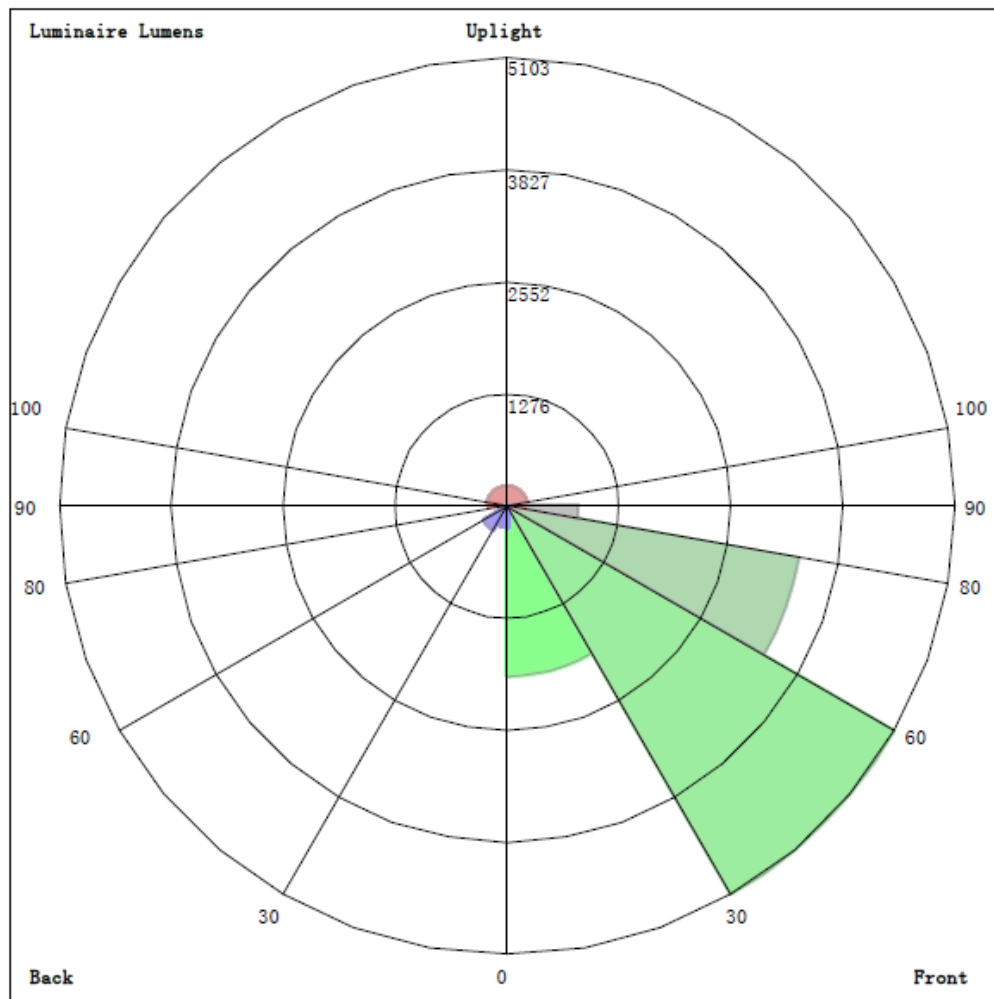
ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	ℓlum, lamp
10	1308	2405	3183	2405	1308	304.7	607.1	304.7	0- 10	110.4	110.4	0.90,0.90
20	1263	4819	8384	4819	1263	886.8	456.3	886.8	10- 20	624.6	734.9	5.99,5.99
30	1005	7202	7272	7202	1005	512.3	236.4	512.3	20- 30	1435	2170	17.7,17.7
40	821.5	7275	5974	7275	821.5	289.5	84.82	289.5	30- 40	1782	3951	32.2,32.2
50	514.3	5324	5231	5324	514.3	118.9	15.85	118.9	40- 50	1836	5788	47.2,47.2
60	335.9	4184	5236	4184	335.9	50.03	3.779	50.03	50- 60	1794	7582	61.8,61.8
70	209.8	3903	5286	3903	209.8	27.68	1.071	27.68	60- 70	1791	9373	76.4,76.4
80	80.55	3503	3939	3503	80.55	20.78	2.601	20.78	70- 80	1653	11026	89.8,89.8
90	23.49	776.9	820.5	776.9	23.49	14.09	4.101	14.09	80- 90	825.8	11851	96.6,96.6
100	16.23	263.9	406.4	263.9	16.23	7.758	4.929	7.758	90-100	194.8	12046	98.2,98.2
110	12.41	127.3	181.7	127.3	12.41	7.062	5.109	7.062	100-110	92.61	12139	98.9,98.9
120	9.530	103.9	131.4	103.9	9.530	6.630	5.028	6.630	110-120	52.36	12191	99.3,99.3
130	7.475	73.29	106.6	73.29	7.475	6.327	5.621	6.327	120-130	36.60	12228	99.6,99.6
140	5.799	41.65	92.61	41.65	5.799	5.630	5.761	5.630	130-140	25.57	12253	99.8,99.8
150	4.461	23.16	42.31	23.16	4.461	4.887	5.211	4.887	140-150	11.84	12265	99.9,99.9
160	3.375	11.18	18.94	11.18	3.375	4.496	3.838	4.496	150-160	5.122	12270	100,100
170	2.670	1.989	2.159	1.989	2.670	3.294	2.285	3.294	160-170	1.451	12272	100,100
180	3.045	2.750	2.567	3.045	2.917	2.465	2.917	2.465	170-180	0.2448	12272	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

	Zonal (lm)		Total (lm)	Percent
0-10	110.37	0-10	110.37	0.90%
10-20	624.58	0-20	734.95	5.99%
20-30	1434.56	0-30	2169.51	17.68%
30-40	1781.92	0-40	3951.43	32.20%
40-50	1836.42	0-50	5787.85	47.16%
50-60	1793.91	0-60	7581.76	61.78%
60-70	1791.00	0-70	9372.76	76.38%
70-80	1652.74	0-80	11025.50	89.85%
80-90	825.75	0-90	11851.25	96.57%
90-100	194.83	0-100	12046.08	98.16%
100-110	92.61	0-110	12138.69	98.92%
110-120	52.36	0-120	12191.05	99.34%
120-130	36.60	0-130	12227.65	99.64%
130-140	25.57	0-140	12253.22	99.85%
140-150	11.84	0-150	12265.06	99.95%
150-160	5.12	0-160	12270.18	99.99%
160-170	1.45	0-170	12271.63	100.00%
170-180	0.24	0-180	12271.87	100.00%

4.2 Goniophotometer Test

LCS/BUG

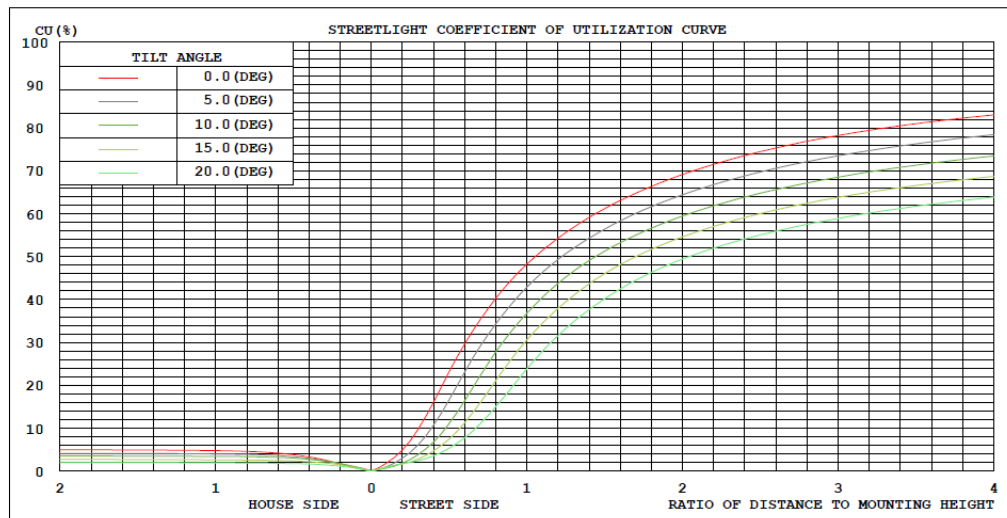


LUMINAIRE CLASSIFICATION SYSTEM (LCS)

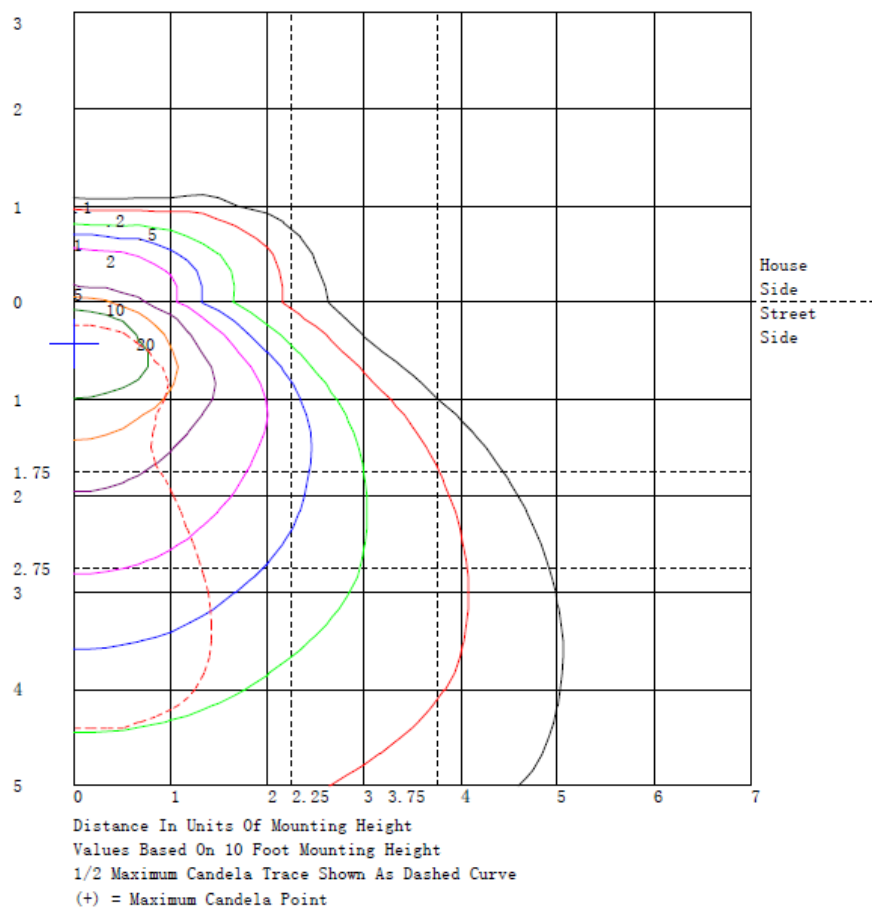
	Lumens	% Lamp	% Luminaire
FL - Front-Low (0-30)	1935.3	N.A.	15.8
FM - Front-Medium (30-60)	5103.2	N.A.	41.6
FH - Front-High (60-80)	3376.9	N.A.	27.5
FVH - Front-Very High (80-90)	813.6	N.A.	6.6
BL - Back-Low (0-30)	234.2	N.A.	1.9
BM - Back-Medium (30-60)	309.1	N.A.	2.5
BH - Back-High (60-80)	66.8	N.A.	0.5
BVH - Back-Very High (80-90)	12.2	N.A.	0.1
UL - Uplight-Low (90-100)	194.8	N.A.	1.6
UH - Uplight-High (100-180)	225.8	N.A.	1.8
Total	12271.9	N.A.	100.0
BUG Rating	B1-U3-G5		

4.2 Goniophotometer Test

Coefficients of Utilization



Isolines



4.2 Goniophotometer Test

Luminous Distribution Intensity Data

Table--1

UNIT: cd

C (DEG) y (DEG)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
0	1287	1287	1287	1288	1289	1290	1290	1291	1291	1292	1292	1292	1292	1292	1293	1293	1293	1293	1293
5	1317	1296	1286	1287	1302	1327	1362	1411	1465	1519	1564	1605	1643	1679	1711	1738	1758	1773	1782
10	1308	1291	1323	1403	1556	1738	1933	2103	2262	2405	2509	2601	2689	2802	2912	3013	3094	3153	3183
15	1277	1360	1491	1671	1927	2211	2505	2718	2952	3239	3705	4219	4742	5211	5633	5991	6249	6419	6498
20	1263	1537	1817	2102	2349	2634	2991	3521	4136	4819	5616	6395	7090	7503	7796	8000	8198	8329	8384
25	1076	1449	1854	2291	2731	3225	3794	4544	5351	6174	6974	7709	8339	8752	9032	9191	9198	9142	9069
30	1005	1325	1734	2231	2811	3484	4256	5266	6281	7202	7816	8226	8423	8256	7955	7615	7442	7326	7272
35	965	1368	1803	2270	2678	3186	3863	5183	6502	7582	7647	7403	7020	6889	6786	6711	6677	6662	6659
40	822	1254	1733	2259	2787	3394	4113	5296	6418	7275	7117	6691	6202	6218	6306	6394	6251	6093	5974
45	669	1205	1746	2293	2824	3378	3970	4789	5551	6142	6164	6003	5760	5674	5604	5552	5509	5484	5479
50	514	981	1487	2032	2656	3289	3902	4488	4977	5324	5313	5190	5035	5054	5102	5160	5193	5217	5231
55	416	724	1140	1664	2420	3193	3891	4250	4479	4617	4726	4799	4853	4936	5014	5082	5132	5168	5187
60	336	563	932	1442	2258	3092	3825	4062	4155	4184	4348	4519	4684	4825	4948	5053	5142	5205	5236
65	270	434	742	1194	1933	2708	3412	3712	3894	4019	4235	4449	4653	4845	5012	5147	5222	5260	5266
70	210	304	532	892	1481	2131	2770	3215	3589	3903	4168	4395	4596	4813	5005	5159	5242	5282	5286
75	139	200	376	667	1124	1659	2233	2807	3348	3820	4097	4300	4460	4664	4845	4989	5061	5093	5090
80	80.6	128	280	538	941	1420	1945	2520	3057	3503	3671	3739	3752	3819	3874	3916	3935	3941	3939
85	45.9	96.9	217	406	710	1049	1386	1663	1885	2036	2026	1963	1883	1882	1894	1911	1914	1916	1919
90	23.5	59.1	114	187	292	407	522	626	714	777	778	762	741	757	779	801	811	817	821
95	17.1	35.2	63.0	100	153	211	271	326	375	413	422	424	423	441	461	479	486	490	491
100	16.2	30.4	49.0	72.0	101	134	167	201	234	264	286	306	325	349	371	390	399	405	406
105	15.0	28.2	42.8	58.7	76.8	95.5	114	132	148	164	177	191	206	229	253	273	283	289	291
110	12.4	21.1	31.3	43.0	57.2	72.3	87.5	102	115	127	136	144	151	161	170	177	180	182	182
115	11.0	19.0	27.8	37.5	48.0	59.4	71.5	85.6	99.4	112	119	125	130	138	145	150	151	151	150
120	9.53	16.9	24.5	32.3	39.4	47.4	57.1	73.3	89.7	104	108	109	110	117	123	129	131	132	131
125	8.30	13.9	19.9	26.2	32.2	39.2	47.5	60.6	74.1	86.7	94.2	99.8	104	108	111	113	113	113	113
130	7.47	10.2	14.2	19.3	25.9	33.6	42.3	52.2	62.6	73.3	84.8	95.4	104	107	108	108	108	107	107
135	6.68	7.30	9.77	14.1	21.3	29.5	38.2	45.1	51.9	59.0	67.2	76.0	85.0	95.7	105	113	113	112	110
140	5.80	5.20	6.65	10.1	17.3	25.3	32.9	36.3	38.9	41.7	46.8	52.6	58.8	65.0	71.1	77.1	83.8	89.2	92.6
145	5.11	3.25	3.48	5.78	11.8	18.6	25.1	27.2	28.6	30.1	34.6	39.4	44.0	46.7	48.7	50.3	52.3	53.8	54.9
150	4.46	3.22	3.21	4.44	7.64	11.5	15.6	18.1	20.5	23.2	27.5	31.8	35.5	37.0	37.8	38.3	39.9	41.3	42.3
155	3.89	3.23	3.17	3.70	4.89	6.61	8.80	11.4	14.4	17.6	21.6	25.3	28.2	28.6	28.1	27.4	27.8	28.3	28.7
160	3.38	3.27	3.19	3.15	2.77	2.71	3.24	5.47	8.23	11.2	13.7	16.0	17.8	18.6	18.9	19.0	19.0	19.0	18.9
165	2.87	2.85	2.80	2.73	2.53	2.38	2.34	2.51	2.92	3.62	5.00	6.53	8.03	9.01	9.77	10.3	10.7	11.0	11.1
170	2.67	2.62	2.57	2.50	2.42	2.34	2.25	2.16	2.07	1.99	1.91	1.84	1.78	1.73	1.70	1.71	1.85	2.01	2.16
175	2.82	2.79	2.76	2.73	2.68	2.63	2.58	2.52	2.46	2.40	2.33	2.27	2.21	2.16	2.11	2.08	2.05	2.03	2.05
180	3.04	3.04	3.03	3.01	2.98	2.94	2.90	2.86	2.80	2.75	2.69	2.64	2.59	2.54	2.50	2.48	2.50	2.53	2.57

UNIT: cd																			
C (DEG) y	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185
0	1293	1293	1293	1293	1292	1292	1292	1292	1292	1291	1291	1290	1290	1289	1288	1287	1287	1287	1292
5	1773	1758	1738	1711	1679	1643	1605	1564	1519	1465	1411	1362	1327	1302	1287	1286	1296	1317	1228
10	3153	3094	3013	2912	2802	2689	2601	2509	2405	2262	2103	1933	1738	1556	1403	1323	1291	1308	945
15	6419	6249	5991	5633	5211	4742	4219	3705	3239	2952	2718	2505	2211	1927	1671	1491	1360	1277	833
20	8329	8198	8000	7796	7503	7090	6395	5616	4819	4136	3521	2991	2634	2349	2102	1817	1537	1263	779
25	9142	9198	9191	9032	8752	8339	7709	6974	6174	5351	4544	3794	3225	2731	2291	1854	1449	1076	680
30	7326	7442	7615	7955	8256	8423	8226	7816	7202	6281	5266	4256	3484	2811	2231	1734	1325	1005	738
35	6662	6677	6711	6786	6889	7020	7403	7647	7582	6502	5183	3863	3186	2678	2270	1803	1368	965	793
40	6093	6251	6394	6306	6218	6202	6691	7117	7275	6418	5296	4113	3394	2787	2259	1733	1254	822	757
45	5484	5509	5552	5604	5674	5760	6003	6164	6142	5551	4789	3970	3378	2824	2293	1746	1205	669	679
50	5217	5193	5160	5102	5054	5035	5190	5313	5324	4977	4488	3902	3289	2656	2032	1487	981	514	528
55	5168	5132	5082	5014	4936	4853	4799	4726	4617	4479	4250	3891	3193	2420	1664	1140	724	416	427
60	5205	5142	5053	4948	4825	4684	4519	4348	4184	4155	4062	3825	3092	2258	1442	932	563	336	351
65	5260	5222	5147	5012	4845	4653	4449	4235	4019	3894	3712	3412	2708	1933	1194	742	434	270	273
70	5282	5242	5159	5005	4813	4596	4395	4168	3903	3589	3215	2770	2131	1481	892	532	304	210	198
75	5093	5061	4989	4845	4664	4460	4300	4097	3820	3348	2807	2233	1659	1124	667	376	200	139	124
80	3941	3935	3916	3874	3819	3752	3739	3671	3503	3057	2520	1945	1420	941	538	280	128	80.6	75.4
85	1916	1914	1911	1894	1882	1883	1963	2026	2036	1885	1663	1386	1049	710	406	217	96.9	45.9	48.8
90	817	811	801	779	757	741	762	778	777	714	626	522	407	292	187	114	59.1	23.5	25.2
95	490	486	479	461	441	423	424	422	413	375	326	271	211	153	100	63.0	35.2	17.1	18.1
100	405	399	390	371	349	325	306	286	264	234	201	167	134	101	72.0	49.0	30.4	16.2	15.6
105	289	283	273	253	229	206	191	177	164	148	132	114	95.5	76.8	58.7	42.8	28.2	15.0	14.2
110	182	180	177	170	161	151	144	136	127	115	102	87.5	72.3	57.2	43.0	31.3	21.1	12.4	12.3
115	151	151	150	145	138	130	125	119	112	99.4	85.6	71.5	59.4	48.0	37.5	27.8	19.0	11.0	11.3
120	132	131	129	123	117	110	109	108	104	89.7	73.3	57.1	47.4	39.4	32.3	24.5	16.9	9.53	11.3
125	113	113	113	111	108	104	99.8	94.2	86.7	74.1	60.6	47.5	39.2	32.2	26.2	19.9	13.9	8.30	9.91
130	107	108	108	108	107	104	95.4	84.8	73.3	62.6	52.2	42.3	33.6	25.9	19.3	14.2	10.2	7.47	7.82
135	112	113	113	105	95.7	85.0	76.0	67.2	59.0	51.9	45.1	38.2	29.5	21.3	14.1	9.77	7.30	6.68	7.22
140	89.2	83.8	77.1	71.1	65.0	58.0	52.6	46.8	41.7	38.9	36.3	32.9	25.3	17.3	10.1	6.65	5.20	5.80	6.23
145	53.8	52.3	50.3	48.7	46.4	44.0	39.4	34.8	30.1	28.6	27.2	25.1	18.6	11.8	5.78	3.48	3.25	5.11	5.63
150	41.3	39.9	38.3	37.8	37.0	35.5	31.8	27.5	23.2	20.5	18.1	15.6	11.5	7.64	4.44	3.21	3.22	4.46	5.06
155	28.3	27.7	27.4	28.1	28.6	28.2	25.3	21.6	17.6	14.4	11.4	8.80	6.61	4.89	3.70	3.17	3.23	3.89	4.52
160	19.0	19.0	19.0	18.9	18.6	17.8	16.0	13.7	11.2	8.23	5.47	3.24	2.71	2.77	3.15	3.19	3.27	3.38	4.01
165	11.0	10.7	10.3	9.77	9.01	8.03	6.53	5.00	3.62	2.92	2.51	2.34	2.38	2.53	2.73	2.80	2.85	2.87	3.47
170	2.01	1.85	1.71	1.70	1.73	1.78	1.84	1.91	1.99	2.07	2.16	2.25	2.34	2.42	2.50	2.57	2.62	2.67	3.14
175	2.03	2.05	2.08	2.11	2.16	2.21	2.27	2.33	2.40	2.46	2.52	2.58	2.63	2.68	2.73	2.76	2.79	2.82	3.09
180	2.53	2.50	2.48	2.50	2.54	2.59	2.64	2.69	2.75	2.80	2.86	2.90	2.94	2.98	3.01	3.03	3.04	3.04	3.01

Table--3 UNIT: °cd

C (DEG) γ	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280
0	1295	1297	1298	1298	1297	1297	1297	1296	1297	1297	1297	1295	1294	1292	1293	1293	1293	1293	1293
5	1120	993	824	654	501	416	361	326	303	290	284	277	273	271	268	267	266	267	268
10	659	448	336	283	270	261	274	305	364	428	488	509	521	531	561	589	607	589	561
15	508	301	254	295	395	507	630	745	802	838	859	881	892	891	857	822	797	822	857
20	449	271	322	469	656	770	852	887	801	684	564	519	494	483	468	459	456	459	468
25	426	313	443	638	823	772	671	555	516	489	468	427	389	357	347	345	349	345	347
30	555	454	489	567	649	626	576	512	453	394	340	301	272	251	240	236	236	236	240
35	665	579	563	570	578	531	472	406	343	285	237	216	205	201	196	193	192	193	196
40	695	637	587	538	486	420	353	289	239	196	159	130	107	91.3	84.8	83.3	84.8	83.3	84.8
45	666	630	558	473	386	322	264	212	162	119	85.2	66.9	56.4	51.2	45.6	42.5	41.8	42.5	45.6
50	522	497	443	377	305	237	174	119	84.2	59.6	43.0	31.3	24.2	20.4	17.3	15.9	15.9	15.9	17.3
55	420	395	345	284	219	162	111	68.3	45.9	32.3	24.8	17.1	12.0	8.95	7.52	7.28	7.80	7.28	7.52
60	347	326	274	214	152	110	76.3	50.0	33.9	23.7	17.6	11.5	7.24	4.64	3.52	3.36	3.78	3.36	3.52
65	264	241	194	143	93.1	67.1	49.1	36.9	26.6	19.2	13.9	8.60	4.55	1.76	0.84	0.83	1.31	0.83	0.84
70	181	160	130	98.1	68.9	50.9	37.5	27.7	20.3	15.1	11.2	6.92	3.51	1.09	0.46	0.58	1.07	0.58	0.46
75	109	94.4	78.7	63.7	50.1	39.4	30.5	23.4	17.9	13.7	10.3	6.73	3.85	1.77	1.25	1.35	1.77	1.35	1.25
80	69.7	63.3	55.8	48.1	40.4	33.3	26.7	20.8	16.2	12.4	9.27	6.41	4.15	2.58	2.17	2.27	2.60	2.27	2.17
85	49.6	48.4	44.0	38.3	32.1	27.0	22.3	18.0	14.3	11.2	8.45	6.22	4.50	3.33	3.03	3.11	3.37	3.11	3.03
90	26.0	25.9	24.5	22.4	20.0	18.1	16.2	14.1	11.5	9.02	6.81	5.46	4.56	4.03	3.89	3.95	4.10	3.95	3.89
95	18.4	18.0	16.5	14.6	12.5	11.2	10.0	8.88	7.54	6.30	5.28	4.80	4.56	4.50	4.48	4.52	4.58	4.52	4.48
100	14.9	14.1	13.0	11.9	10.8	9.74	8.72	7.76	6.78	5.91	5.22	4.94	4.83	4.84	4.85	4.89	4.93	4.89	4.85
105	13.3	12.4	11.4	10.3	9.34	8.59	7.92	7.31	6.58	5.91	5.37	5.16	5.08	5.08	5.09	5.13	5.16	5.13	5.09
110	11.9	11.4	10.5	9.55	8.61	8.02	7.52	7.06	6.43	5.85	5.36	5.16	5.07	5.07	5.07	5.09	5.11	5.09	5.07
115	11.3	11.0	10.2	9.19	8.23	7.71	7.28	6.88	6.32	5.78	5.34	5.15	5.06	5.04	5.04	5.05	5.06	5.05	5.04
120	12.2	12.3	11.1	9.43	7.76	7.18	6.85	6.63	6.15	5.69	5.31	5.15	5.07	5.05	5.03	5.03	5.03	5.03	5.03
125	10.8	11.0	10.1	8.87	7.54	7.03	6.71	6.48	6.09	5.74	5.45	5.34	5.31	5.31	5.29	5.27	5.26	5.27	5.29
130	8.02	8.08	7.95	7.71	7.39	7.05	6.68	6.33	6.02	5.76	5.57	5.54	5.57	5.62	5.63	5.63	5.62	5.63	5.63
135	7.55	7.66	7.45	7.11	6.72	6.47	6.24	6.04	5.82	5.64	5.53	5.56	5.64	5.73	5.78	5.80	5.80	5.80	5.78
140	6.53	6.70	6.71	6.61	6.43	6.17	5.89	5.63	5.48	5.38	5.35	5.42	5.53	5.64	5.71	5.76	5.76	5.76	5.71
145	5.98	6.15	6.07	5.88	5.64	5.47	5.32	5.21	5.14	5.12	5.14	5.23	5.34	5.45	5.53	5.58	5.58	5.58	5.53
150	5.47	5.69	5.64	5.46	5.23	5.09	4.97	4.89	4.87	4.89	4.94	5.01	5.08	5.15	5.21	5.23	5.21	5.23	5.21
155	4.96	5.21	5.17	5.01	4.81	4.72	4.66	4.62	4.59	4.57	4.57	4.61	4.66	4.69	4.65	4.58	4.49	4.58	4.65
160	4.46	4.74	4.74	4.64	4.49	4.49	4.50	4.50	4.42	4.34	4.25	4.23	4.20	4.17	4.07	3.96	3.84	3.96	4.07
165	3.91	4.21	4.28	4.25	4.17	4.15	4.12	4.07	3.97	3.86	3.73	3.60	3.47	3.35	3.25	3.17	3.10	3.17	3.25
170	3.48	3.70	3.75	3.71	3.61	3.53	3.43	3.29	3.11	2.91	2.72	2.55	2.41	2.30	2.26	2.26	2.26	2.26	2.26
175	3.29	3.42	3.47	3.46	3.39	3.25	3.08	2.91	2.78	2.66	2.55	2.45	2.37	2.31	2.30	2.32	2.35	2.32	2.30
180	2.99	2.98	2.98	2.99	3.00	2.98	2.96	2.92	2.84	2.74	2.65	2.58	2.52	2.47	2.46	2.45	2.46	2.45	2.46

C (DEG) γ	285	290	295	300	305	310	315	320	325	330	335	340	345	350	355				
0	1292	1294	1295	1297	1297	1297	1296	1297	1297	1297	1298	1298	1297	1295	1292				
5	271	273	277	284	290	303	326	361	416	501	654	824	993	1120	1228				
10	531	521	509	488	428	364	305	274	261	270	283	336	448	659	945				
15	891	892	881	859	838	802	745	630	507	395	295	254	301	508	833				
20	483	494	519	564	684	801	887	852	770	656	469	322	271	449	779				
25	357	389	427	468	489	516	555	671	772	823	638	443	313	426	680				
30	251	272	301	340	394	453	512	576	626	649	567	489	454	555	738				
35	201	205	216	237	285	343	406	472	531	578	570	563	579	665	793				
40	91.3	107	130	159	196	239	289	353	420	486	538	587	637	695	757				
45	51.2	56.4	66.9	85.2	119	162	212	264	322	386	473	558	630	666	679				
50	20.4	24.2	31.3	43.0	59.6	84.2	119	174	237	305	377	443	497	522	528				
55	8.95	12.0	17.1	24.8	32.3	45.9	68.3	111	162	219	284	345	395	420	427				
60	4.64	7.24	11.5	17.6	23.7	33.9	50.0	76.3	110	152	214	274	326	347	351				
65	1.76	4.55	8.60	13.9	19.2	26.6	36.9	49.1	67.1	93.1	143	194	241	264	273				
70	1.09	3.51	6.92	11.2	15.1	20.3	27.7	37.5	50.9	68.9	98.1	130	160	181	198				
75	1.77	3.85	6.73	10.3	13.7	17.9	23.4	30.5	39.4	50.1	63.7	78.7	94.4	109	124				
80	2.58	4.15	6.41	9.27	12.4	16.2	20.8	26.7	33.3	40.4	48.1	55.8	63.3	69.7	75.4				
85	3.33	4.50	6.22	8.45	11.2	14.3	18.0	22.3	27.0	32.1	38.3	44.0	48.4	49.6	48.8				
90	4.03	4.56	5.46	6.81	9.02	11.5	14.1	16.2	18.1	20.0	22.4	24.5	25.9	26.0	25.2				
95	4.50	4.56	4.80	5.28	6.30	7.54	8.88	10.0	11.2	12.5	14.6	16.5	18.0	18.4	18.1				
100	4.84	4.83	4.94	5.22	5.91	6.78	7.76	8.72	9.74	10.8	11.9	13.0	14.1	14.9	15.6				
105	5.08	5.08	5.16	5.37	5.91	6.58	7.31	7.92	8.59	9.34	10.3	11.4	12.4	13.3	14.2				
110	5.07	5.07	5.16	5.36	5.85	6.43	7.06	7.52	8.02	8.61	9.55	10.5	11.4	11.9	12.3				
115	5.04	5.06	5.15	5.34	5.78	6.32	6.88	7.28	7.71	8.23	9.19	10.2	11.0	11.3	11.3				
120	5.05	5.07	5.15	5.31	5.69	6.15	6.63	6.85	7.18	7.76	8.43	11.1	12.3	12.2	11.3				
125	5.31	5.31	5.34	5.45	5.74	6.09	6.48	6.71	7.03	7.54	8.07	10.1	11.0	10.8	9.91				
130	5.62	5.57	5.54	5.57	5.76	6.02	6.33	6.68	7.05	7.39	7.71	7.95	8.08	8.02	7.82				
135	5.73	5.64	5.56	5.53	5.64	5.82	6.04	6.24	6.47	6.72	7.11	7.45	7.66	7.55	7.22				
140	5.64	5.53	5.42	5.35	5.38	5.48	5.63	5.89	6.17	6.43	6.61	6.71	6.70	6.53	6.23				
145	5.45	5.34	5.23	5.14	5.12	5.14	5.21	5.32	5.47	5.64	5.88	6.07	6.15	5.98	5.63				
150	5.15	5.08	5.01	4.94	4.89	4.87	4.89	4.97	5.09	5.23	5.46	5.64	5.69	5.47	5.06				
155	4.69	4.66	4.61	4.57	4.57	4.59	4.62	4.66	4.72	4.81	5.01	5.17	5.21	4.96	4.52				
160	4.17	4.20	4.23	4.25	4.34	4.42	4.50	4.50	4.49	4.49	4.64	4.74	4.74	4.46	4.01				
165	3.35	3.47	3.60	3.73	3.86	3.97	4.07	4.12	4.15	4.17	4.25	4.28	4.21	3.91	3.47				
170	2.30	2.41	2.55	2.72	2.91	3.11	3.29	3.43	3.53	3.61	3.71	3.75	3.70	3.48	3.14				
175	2.31	2.37	2.45	2.55	2.66	2.78	2.91	3.08	3.25	3.39	3.46	3.47	3.42	3.29	3.09				
180	2.47	2.52	2.58	2.65	2.74	2.84	2.92	2.96	2.98	3.00	2.99	2.98	2.98	2.99	3.01				

4.0 LM-79 Measurement and Test Results

4.3 THD and PF Test

Model No.	W34M @ 80W / 5000K	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	0.744	88.9	0.996	2.95
277.0	60	0.333	87.8	0.951	5.03

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*****