

## Photometric Test Report

### Relevant Standards

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

Prepared For

**RAB Lighting Inc.**

Prepared By

**Dongguan New Testing Centre Co., Ltd.**

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Date: 2023-06-13

Review by:

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Issue Date: 2023-06-13

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		11905
Minimum Luminaire Efficacy (lm/W) (Goniophotometer – Section 4.2) (0°-180° zones)	IES LM-79-2008	N/A		169.1
Luminaire Output (lm) (Goniophotometer – Section 4.2) (0°-90° zones)	IES LM-79-2008	300		11469
Minimum Luminaire Efficacy (lm/W) (Goniophotometer – Section 4.2) (0°-90° zones)	IES LM-79-2008	Standard	Premium	162.9
		105	120	
Power (Input Wattage) (W) (Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Case		70.4
Total Harmonic Distortion (A%) (THD & PF – Section 4.3)	ANSI C82.77:2014	20.00%	120V	4.22
			277V	18.16
Power Factor (THD & PF – Section 4.3)	ANSI C82.77:2014	0.9	120V	0.989
			277V	0.831
Allowable CCTs* (K) (Integrating Sphere – Section 4.1)	IES LM-79-2008	7 steps	3985±275	3920
		4 steps	3985±154	
Minimum CRI (Integrating Sphere – Section 4.1)	IES LM-79-2008 CIE13.3-1995	≥70		75.3
Minimum R9 (Integrating Sphere – Section 4.1)	IES LM-79-2008 CIE13.3-1995	N/A		-23
Minimum Rf (Integrating Sphere – Section 4.1)	ANSI/IES TM-30-18	≥70		77
Minimum Rg (Integrating Sphere – Section 4.1)	ANSI/IES TM-30-18	≥89		93
IES Rcs,h1 (Integrating Sphere – Section 4.1)	ANSI/IES TM-30-18	-18%≤IES Rcs,h1≤+23%		-17%
Zonal Lumen Requirement (80°-90°) (Goniophotometer – Section 4.2)	IES LM-79-2008	≤10%		7.7%
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		0.593
(Goniophotometer – Section 4.2)		Non-Worst Case		0.303
Power (Input Wattage – W)				
(Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Case		70.4
(Goniophotometer – Section 4.2)		Non-Worst Case		69.7

## 2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2023-06-12	W34L @ 75W / 4000K	230612001-S1
2	Goniophotometer Test	2023-06-12	W34L @ 75W / 4000K	230612001-S1
3	THD and PF Test	2023-06-12	W34L @ 75W / 4000K	230612001-S1

### Remark (If any)

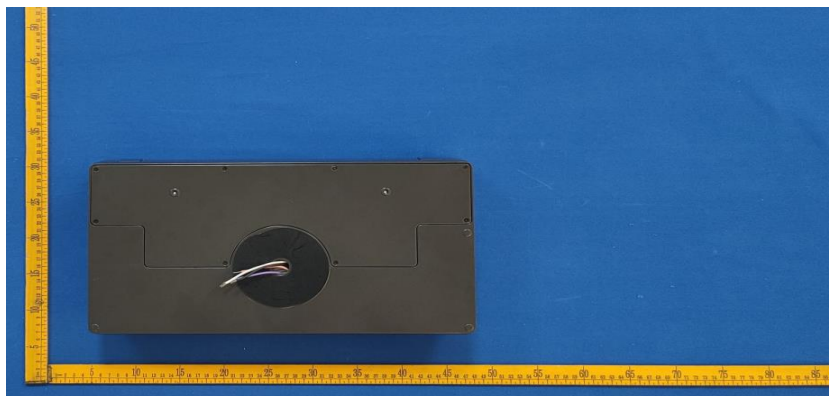
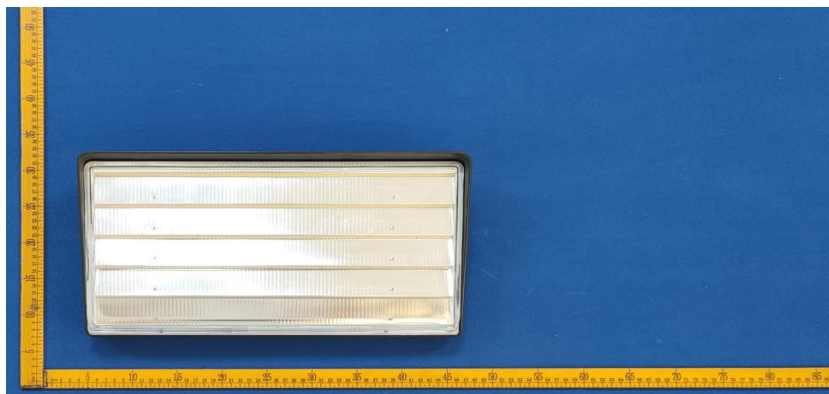
1. The results contained in this report pertain only to the tested samples.
2. This report shall not be reproduced, no limited part or full, without approval of Dongguan New Testing Centre Co., Ltd.
3. This report does not imply product certification, approval, or endorsement by NVLAP, or any agency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

## 3.0 Product Description

Luminaire Description: Model No. W34L @ 75W / 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

<b>Model No.</b>	W34L @ 75W / 4000K	<b>Sample ID</b>	230612001-S1
<b>Operate time (Min.)</b>	10	<b>Stabilization time (Min.)</b>	60
<b>Temperature (°C)</b>	25.4	<b>Humidity (%RH)</b>	41.0

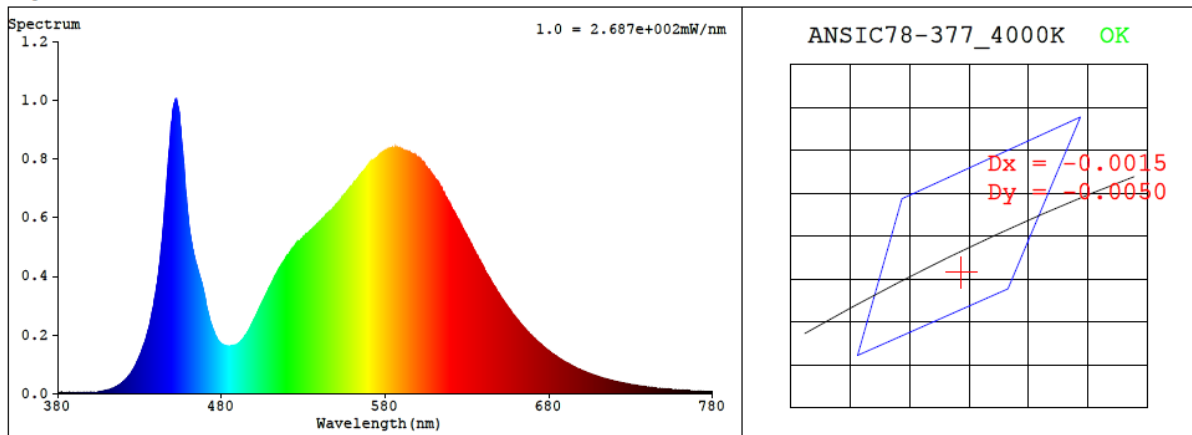
<b>Test Method</b>
<p>The Samples were tested according to the IES LM-79-2008.</p> <p>Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25±1°C.</p> <p>The sample measurements were made 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 4<math>\pi</math> 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	0.593	70.4	0.989
277.0	60	0.303	69.7	0.831

CCT (K)	CRI	R9	Duv	Rf	Rg	IES Rcs,h1
3920	75.3	-23	-0.0019	77	93	-17%

#### 4.1 Integrating Sphere Test



#### Colorimetric Parameters

Chromaticity Coordinate:  $x = 0.3826$   $y = 0.3740$  /  $u' = 0.2276$   $v' = 0.5007$  ( $duv = -1.92e-03$ )

CCT= 3920K Prcp WL:  $L_d = 580.4nm$  Purity=27.0%

Peak WL:  $L_p = 453nm$  FWHM:  $= 18.8nm$  Ratio:  $R = 17.5\%$   $G = 79.4\%$   $B = 3.0\%$

Render Index:  $R_a = 75.3$   $AvgR = 66.3$  TM30:  $R_f = 77$   $R_g = 93$

EEL: 0.08081 A++ Highest

R1 = 73 R2 = 84 R3 = 92 R4 = 72 R5 = 72 R6 = 77 R7 = 81

R8 = 52 R9 = -23 R10 = 62 R11 = 68 R12 = 49 R13 = 75 R14 = 95 R15 = 66

## 4.1 Integrating Sphere Test

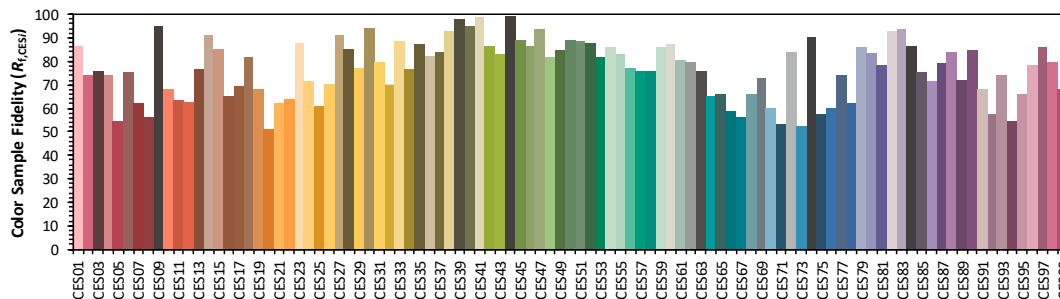
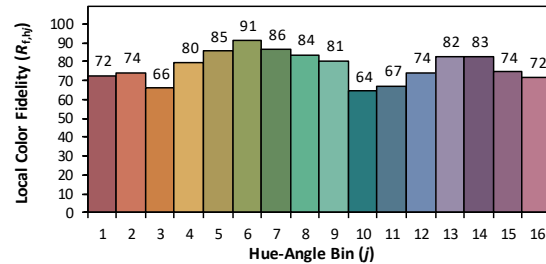
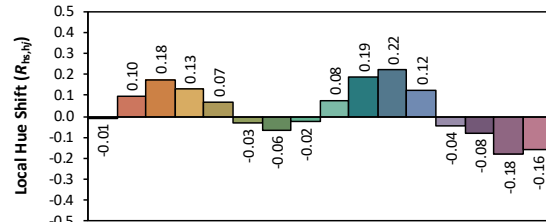
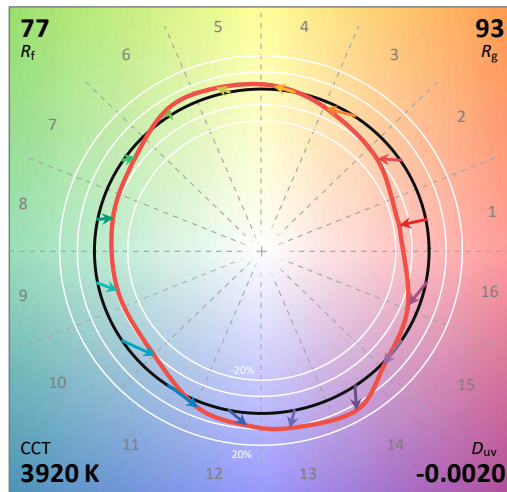
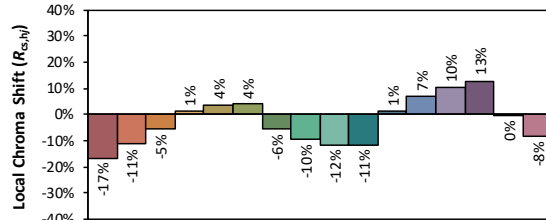
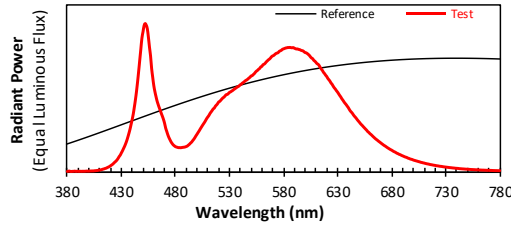
### ANSI/IES TM-30-18 Color Rendition Report

Source: 1 CIE F1

Manufacturer: RAB Lighting Inc.

Date: 2023/6/13

Model: W34L @ 75W / 4000K



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

$x$  0.3825  
 $y$  0.3738  
 $u'$  0.2277  
 $v'$  0.5006

CIE 13.3-1995  
(CRI)

$R_a$  75  
 $R_g$  -23

## 4.1 Integrating Sphere Test

Spectral Distribution over Visible Wavelength											
WL (nm)	Radiant (W/nm)	WL (nm)	Radiant (W/nm)	WL (nm)	Radiant (W/nm)	WL (nm)	Radiant (W/nm)	WL (nm)	Radiant (W/nm)	WL (nm)	Radiant (W/nm)
380	1.90E-06	447	7.51E-04	514	4.13E-04	581	8.30E-04	648	3.53E-04	715	5.00E-05
381	3.60E-06	448	8.24E-04	515	4.23E-04	582	8.33E-04	649	3.44E-04	716	4.82E-05
382	4.40E-06	449	8.99E-04	516	4.29E-04	583	8.35E-04	650	3.36E-04	717	4.70E-05
383	1.80E-06	450	9.42E-04	517	4.42E-04	584	8.37E-04	651	3.26E-04	718	4.56E-05
384	2.10E-06	451	9.83E-04	518	4.49E-04	585	8.37E-04	652	3.18E-04	719	4.40E-05
385	2.70E-06	452	9.98E-04	519	4.58E-04	586	8.38E-04	653	3.11E-04	720	4.29E-05
386	3.00E-06	453	9.87E-04	520	4.70E-04	587	8.36E-04	654	3.02E-04	721	4.14E-05
387	4.10E-06	454	9.64E-04	521	4.74E-04	588	8.35E-04	655	2.95E-04	722	4.01E-05
388	2.20E-06	455	9.08E-04	522	4.82E-04	589	8.36E-04	656	2.87E-04	723	3.92E-05
389	3.40E-06	456	8.40E-04	523	4.90E-04	590	8.33E-04	657	2.79E-04	724	3.77E-05
390	3.00E-06	457	7.81E-04	524	4.98E-04	591	8.29E-04	658	2.70E-04	725	3.65E-05
391	2.40E-06	458	6.96E-04	525	5.03E-04	592	8.27E-04	659	2.64E-04	726	3.59E-05
392	3.20E-06	459	6.37E-04	526	5.11E-04	593	8.27E-04	660	2.56E-04	727	3.46E-05
393	2.60E-06	460	5.81E-04	527	5.19E-04	594	8.24E-04	661	2.51E-04	728	3.34E-05
394	3.20E-06	461	5.41E-04	528	5.21E-04	595	8.23E-04	662	2.44E-04	729	3.23E-05
395	3.10E-06	462	5.08E-04	529	5.27E-04	596	8.19E-04	663	2.36E-04	730	3.14E-05
396	3.20E-06	463	4.78E-04	530	5.34E-04	597	8.16E-04	664	2.30E-04	731	3.06E-05
397	3.70E-06	464	4.54E-04	531	5.38E-04	598	8.14E-04	665	2.23E-04	732	2.96E-05
398	4.50E-06	465	4.33E-04	532	5.43E-04	599	8.08E-04	666	2.17E-04	733	2.86E-05
399	4.00E-06	466	4.13E-04	533	5.48E-04	600	8.03E-04	667	2.12E-04	734	2.78E-05
400	4.00E-06	467	3.92E-04	534	5.54E-04	601	8.01E-04	668	2.05E-04	735	2.71E-05
401	4.70E-06	468	3.73E-04	535	5.59E-04	602	7.96E-04	669	2.00E-04	736	2.61E-05
402	5.00E-06	469	3.52E-04	536	5.64E-04	603	7.90E-04	670	1.94E-04	737	2.53E-05
403	5.50E-06	470	3.26E-04	537	5.69E-04	604	7.83E-04	671	1.89E-04	738	2.47E-05
404	5.30E-06	471	2.94E-04	538	5.74E-04	605	7.74E-04	672	1.83E-04	739	2.36E-05
405	6.50E-06	472	2.72E-04	539	5.78E-04	606	7.66E-04	673	1.78E-04	740	2.31E-05
406	7.00E-06	473	2.49E-04	540	5.86E-04	607	7.62E-04	674	1.73E-04	741	2.26E-05
407	7.90E-06	474	2.31E-04	541	5.90E-04	608	7.51E-04	675	1.68E-04	742	2.18E-05
408	8.60E-06	475	2.15E-04	542	5.97E-04	609	7.45E-04	676	1.63E-04	743	2.06E-05
409	1.05E-05	476	2.01E-04	543	6.02E-04	610	7.37E-04	677	1.58E-04	744	2.02E-05
410	1.09E-05	477	1.90E-04	544	6.08E-04	611	7.28E-04	678	1.54E-04	745	1.95E-05
411	1.30E-05	478	1.81E-04	545	6.15E-04	612	7.24E-04	679	1.49E-04	746	1.90E-05
412	1.49E-05	479	1.75E-04	546	6.19E-04	613	7.15E-04	680	1.46E-04	747	1.85E-05
413	1.74E-05	480	1.69E-04	547	6.24E-04	614	7.03E-04	681	1.41E-04	748	1.78E-05
414	1.93E-05	481	1.66E-04	548	6.31E-04	615	6.91E-04	682	1.36E-04	749	1.74E-05
415	2.20E-05	482	1.64E-04	549	6.36E-04	616	6.83E-04	683	1.33E-04	750	1.69E-05
416	2.42E-05	483	1.62E-04	550	6.45E-04	617	6.70E-04	684	1.29E-04	751	1.63E-05
417	2.81E-05	484	1.63E-04	551	6.47E-04	618	6.61E-04	685	1.25E-04	752	1.59E-05
418	3.15E-05	485	1.62E-04	552	6.54E-04	619	6.50E-04	686	1.22E-04	753	1.53E-05
419	3.52E-05	486	1.63E-04	553	6.61E-04	620	6.42E-04	687	1.17E-04	754	1.49E-05
420	4.03E-05	487	1.64E-04	554	6.70E-04	621	6.29E-04	688	1.15E-04	755	1.46E-05
421	4.53E-05	488	1.65E-04	555	6.78E-04	622	6.20E-04	689	1.11E-04	756	1.40E-05
422	5.08E-05	489	1.67E-04	556	6.83E-04	623	6.10E-04	690	1.08E-04	757	1.38E-05
423	5.78E-05	490	1.70E-04	557	6.91E-04	624	5.98E-04	691	1.05E-04	758	1.31E-05
424	6.50E-05	491	1.73E-04	558	6.96E-04	625	5.89E-04	692	1.01E-04	759	1.30E-05
425	7.14E-05	492	1.79E-04	559	7.06E-04	626	5.76E-04	693	9.84E-05	760	1.26E-05
426	7.98E-05	493	1.85E-04	560	7.10E-04	627	5.65E-04	694	9.63E-05	761	1.19E-05
427	9.01E-05	494	1.93E-04	561	7.20E-04	628	5.57E-04	695	9.22E-05	762	1.17E-05
428	1.03E-04	495	2.00E-04	562	7.24E-04	629	5.46E-04	696	8.99E-05	763	1.13E-05
429	1.12E-04	496	2.10E-04	563	7.30E-04	630	5.37E-04	697	8.66E-05	764	1.09E-05
430	1.27E-04	497	2.19E-04	564	7.39E-04	631	5.25E-04	698	8.43E-05	765	1.09E-05
431	1.40E-04	498	2.30E-04	565	7.46E-04	632	5.14E-04	699	8.25E-05	766	1.03E-05
432	1.56E-04	499	2.42E-04	566	7.54E-04	633	5.04E-04	700	7.93E-05	767	1.02E-05
433	1.71E-04	500	2.53E-04	567	7.59E-04	634	4.92E-04	701	7.68E-05	768	9.70E-06
434	1.90E-04	501	2.65E-04	568	7.66E-04	635	4.82E-04	702	7.49E-05	769	9.30E-06
435	2.09E-04	502	2.76E-04	569	7.75E-04	636	4.70E-04	703	7.26E-05	770	9.40E-06
436	2.33E-04	503	2.88E-04	570	7.80E-04	637	4.61E-04	704	7.06E-05	771	9.00E-06
437	2.59E-04	504	3.00E-04	571	7.84E-04	638	4.52E-04	705	6.82E-05	772	8.90E-06
438	2.87E-04	505	3.12E-04	572	7.90E-04	639	4.41E-04	706	6.66E-05	773	8.50E-06
439	3.19E-04	506	3.23E-04	573	7.96E-04	640	4.32E-04	707	6.36E-05	774	8.10E-06
440	3.52E-04	507	3.34E-04	574	7.99E-04	641	4.19E-04	708	6.23E-05	775	7.90E-06
441	3.88E-04	508	3.46E-04	575	8.02E-04	642	4.08E-04	709	6.02E-05	776	7.60E-06
442	4.34E-04	509	3.59E-04	576	8.10E-04	643	4.00E-04	710	5.87E-05	777	7.60E-06
443	4.84E-04	510	3.69E-04	577	8.14E-04	644	3.91E-04	711	5.65E-05	778	7.30E-06
444	5.40E-04	511	3.79E-04	578	8.18E-04	645	3.80E-04	712	5.47E-05	779	7.20E-06
445	6.05E-04	512	3.92E-04	579	8.25E-04	646	3.71E-04	713	5.31E-05	780	7.20E-06
446	6.76E-04	513	4.03E-04	580	8.28E-04	647	3.63E-04	714	5.18E-05	N/A	N/A



## 4.0 LM-79 Measurement and Test Results

### 4.2 Goniophotometer Test

<b>Model No.</b>	W34L @ 75W / 4000K	<b>Sample ID</b>	230612001-S1
<b>Operate time (Min.)</b>	30	<b>Stabilization time (Min.)</b>	60
<b>Temperature (°C)</b>	25.0	<b>Humidity (%RH)</b>	42.1

<b>Test Method</b>
<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 <math>25 \pm 1^{\circ}\text{C}</math>, 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 <math>\pm 0.2</math> 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 <math>1.0^{\circ}</math> vertical intervals and <math>15^{\circ}</math> horizontal intervals.</p>

#### Test Conditions

Condition	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
<b>WORST CASE</b>	120.0	60	0.593	70.4	0.989
<b>NON-WORST CASE</b>	277.0	60	0.303	69.7	0.831

#### Test Result

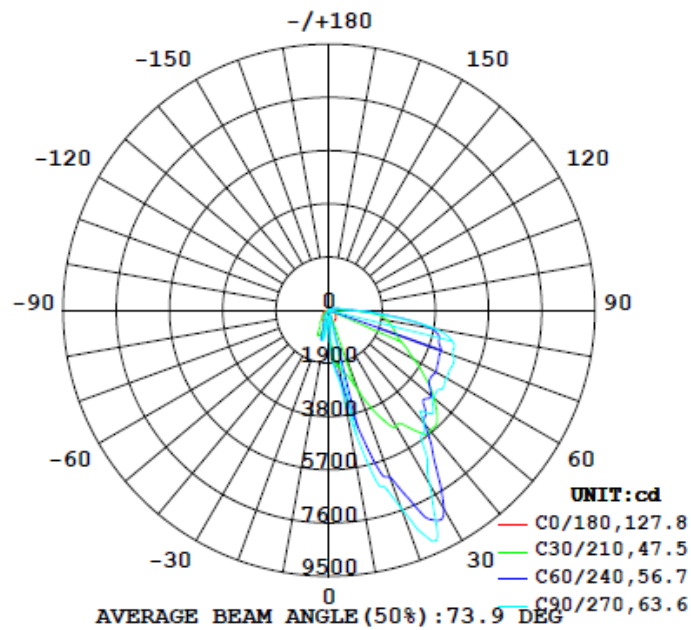
Result Type	Flux (lm)	Field Angle (10%)		Beam Angle (50%)		Luminous Efficacy (lm/W)	Zonal Lumen Requirement (80°-90°)	BUG
		C0-180	C90-270	C0-180	C90-270			
<b>0°-180° zones</b>	11905	104.1	134.2	63.1	83.9	169.1	7.4%	B1-U3-G5
<b>0°-90° zones</b>	11469	104.1	134.2	63.1	83.9	162.9	7.7%	B1-U3-G5



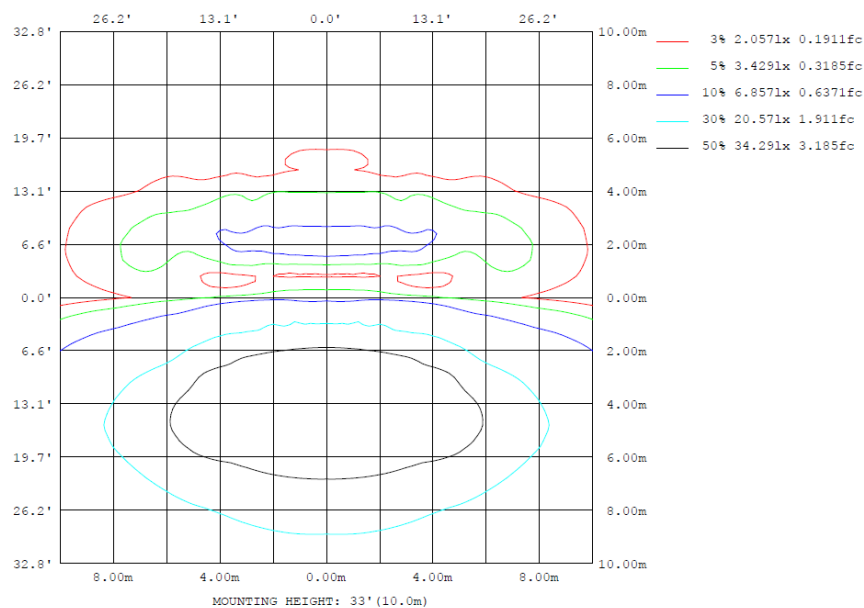
## 4.2 Goniophotometer Test

### Lighting Distribution Curve

LUMINOUS INTENSITY DISTRIBUTION DIAGRAM



### Isolux Plot



## 4.2 Goniophotometer Test

### Zonal Lumen Summary

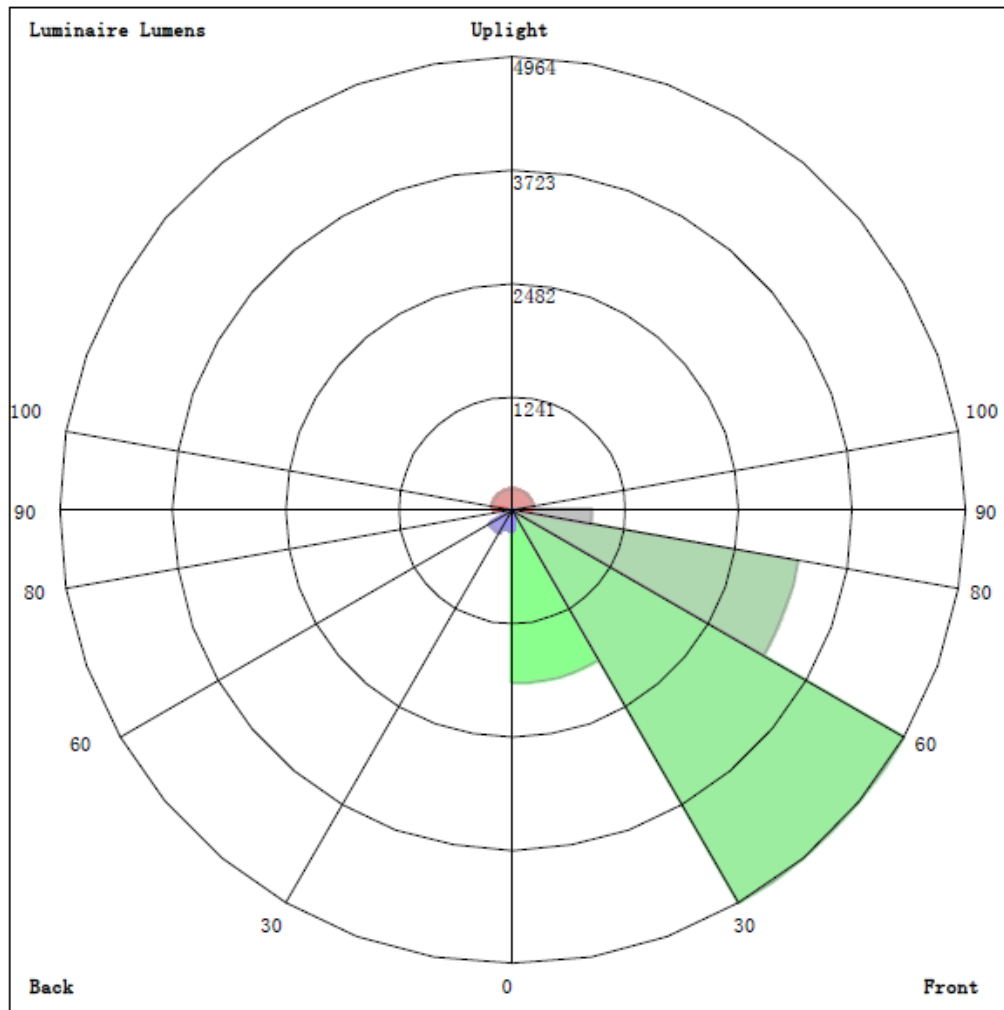
ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	± zone	± total	±lum, lamp
10	441.4	2348	3259	2348	441.4	344.9	944.7	344.9	0- 10	100.7	100.7	0.85,0.85
20	446.8	5175	7500	5175	446.8	879.0	536.4	879.0	10- 20	613.6	714.3	6,6
30	416.3	7515	7202	7515	416.3	402.9	297.3	402.9	20- 30	1397	2111	17.7,17.7
40	379.4	6352	5263	6352	379.4	291.4	92.67	291.4	30- 40	1741	3852	32.4,32.4
50	316.9	4562	4837	4562	316.9	119.5	15.70	119.5	40- 50	1767	5620	47.2,47.2
60	251.6	3919	4842	3919	251.6	40.19	3.755	40.19	50- 60	1738	7358	61.8,61.8
70	176.0	3615	4716	3615	176.0	16.90	1.098	16.90	60- 70	1679	9037	75.9,75.9
80	75.95	3219	3847	3219	75.95	13.72	2.525	13.72	70- 80	1554	10591	89,89
90	18.71	837.6	887.8	837.6	18.71	9.861	3.844	9.861	80- 90	877.6	11469	96.3,96.3
100	14.81	278.7	380.7	278.7	14.81	6.624	4.588	6.624	90-100	208.8	11677	98.1,98.1
110	10.96	126.0	178.2	126.0	10.96	6.103	4.736	6.103	100-110	96.72	11774	98.9,98.9
120	7.444	98.60	119.8	98.60	7.444	5.721	4.592	5.721	110-120	51.27	11825	99.3,99.3
130	5.737	65.24	116.7	65.24	5.737	5.601	5.127	5.601	120-130	35.85	11861	99.6,99.6
140	4.718	41.91	68.65	41.91	4.718	5.076	5.329	5.076	130-140	23.70	11885	99.8,99.8
150	3.721	28.06	44.86	28.06	3.721	4.446	4.885	4.446	140-150	11.82	11897	99.9,99.9
160	3.003	16.27	24.77	16.27	3.003	4.153	3.719	4.153	150-160	5.669	11903	100,100
170	2.573	1.797	5.393	1.797	2.573	3.258	2.172	3.258	160-170	1.816	11904	100,100
180	2.934	2.652	2.499	2.652	2.934	2.855	2.389	2.855	170-180	0.2397	11905	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

	Zonal (lm)		Total (lm)	Percent
0-10	100.72	0-10	100.72	0.85%
10-20	613.59	0-20	714.31	6.00%
20-30	1396.90	0-30	2111.21	17.73%
30-40	1741.09	0-40	3852.30	32.36%
40-50	1767.33	0-50	5619.63	47.21%
50-60	1738.21	0-60	7357.84	61.81%
60-70	1678.88	0-70	9036.72	75.91%
70-80	1554.36	0-80	10591.08	88.97%
80-90	877.61	0-90	11468.69	96.34%
90-100	208.80	0-100	11677.49	98.09%
100-110	96.72	0-110	11774.21	98.91%
110-120	51.27	0-120	11825.48	99.34%
120-130	35.85	0-130	11861.33	99.64%
130-140	23.70	0-140	11885.03	99.84%
140-150	11.82	0-150	11896.85	99.94%
150-160	5.67	0-160	11902.52	99.98%
160-170	1.82	0-170	11904.34	100.00%
170-180	0.24	0-180	11904.58	100.00%

## 4.2 Goniophotometer Test

LCS/BUG

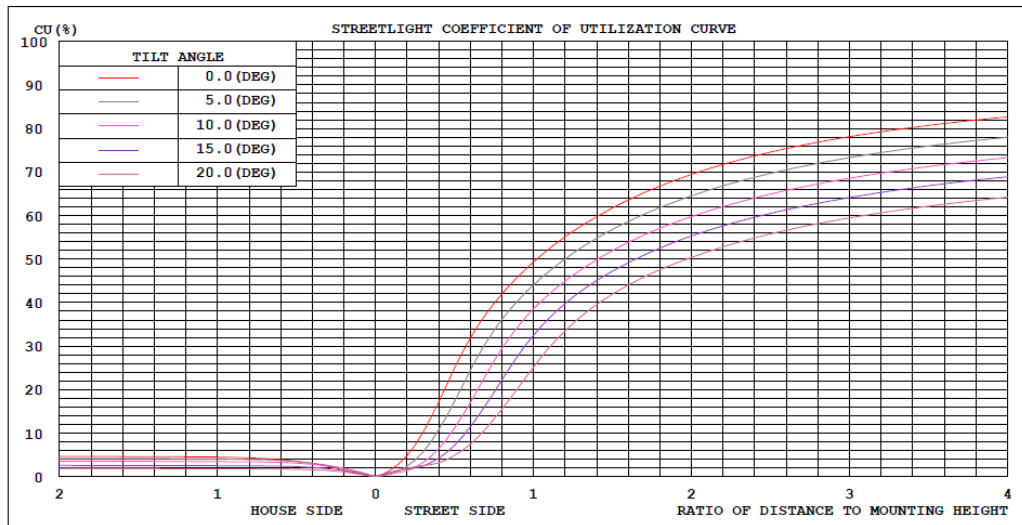


### LUMINAIRE CLASSIFICATION SYSTEM (LCS)

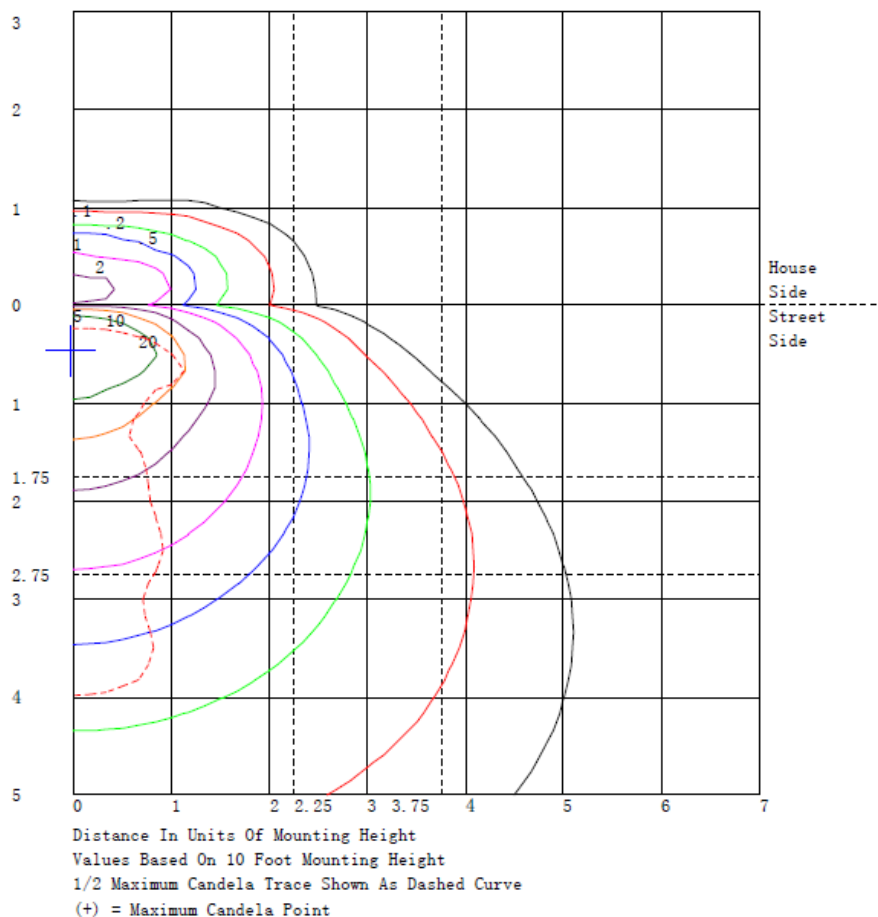
	Lumens	% Lamp	% Luminaire
FL - Front-Low (0-30)	1894.4	N.A.	15.9
FM - Front-Medium (30-60)	4964.0	N.A.	41.7
FH - Front-High (60-80)	3179.7	N.A.	26.7
FVH - Front-Very High (80-90)	869.0	N.A.	7.3
BL - Back-Low (0-30)	216.8	N.A.	1.8
BM - Back-Medium (30-60)	282.6	N.A.	2.4
BH - Back-High (60-80)	53.5	N.A.	0.4
BVH - Back-Very High (80-90)	8.6	N.A.	0.1
UL - Uplight-Low (90-100)	208.8	N.A.	1.8
UH - Uplight-High (100-180)	227.1	N.A.	1.9
Total	11904.5	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) γ (DEG)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
0	441	441	442	442	442	443	443	444	446	447	448	449	450	451	452	453	454	457	458
5	442	519	653	852	1091	1369	1620	1757	1840	1899	1935	1958	1968	1962	1952	1946	1945	1953	1960
10	441	959	1365	1650	1841	1938	2006	2120	2241	2348	2453	2551	2660	2811	2964	3090	3187	3241	3259
15	446	1110	1618	1954	2168	2265	2377	2666	3040	3463	3919	4393	4840	5203	5505	5749	5930	6046	6090
20	447	1070	1600	2019	2379	2676	3060	3770	4541	5175	5704	6056	6343	6679	6985	7219	7387	7476	7500
25	436	978	1551	2159	2793	3454	4125	4780	5444	6150	6854	7558	8164	8542	8789	8954	9044	9077	9073
30	416	903	1492	2191	2981	3852	4787	5829	6796	7515	8007	8205	8198	8022	7769	7539	7345	7238	7202
35	399	949	1612	2401	3278	4230	5194	6177	6970	7334	7374	7013	6560	6361	6233	6100	5988	5887	5835
40	379	994	1743	2654	3642	4701	5618	6143	6388	6352	6120	5704	5320	5266	5315	5334	5344	5300	5263
45	355	1013	1786	2709	3677	4693	5463	5563	5388	5190	4978	4851	4793	4842	4937	5033	5123	5187	5216
50	317	852	1516	2347	3235	4188	4899	4907	4685	4562	4498	4615	4760	4797	4803	4812	4819	4830	4837
55	278	879	1521	2226	2933	3646	4193	4318	4280	4253	4233	4288	4377	4485	4601	4711	4806	4878	4911
60	252	788	1339	1918	2489	3054	3512	3705	3801	3919	4047	4229	4408	4539	4642	4727	4788	4828	4842
65	212	649	1102	1575	2052	2531	2964	3284	3543	3772	3971	4151	4310	4451	4572	4671	4747	4798	4819
70	176	441	768	1164	1606	2092	2567	2965	3313	3615	3870	4079	4252	4400	4520	4610	4672	4706	4716
75	131	277	523	881	1318	1831	2344	2768	3133	3442	3699	3899	4069	4237	4383	4492	4568	4606	4616
80	76.0	166	367	690	1102	1599	2106	2542	2919	3219	3447	3595	3691	3762	3807	3835	3847	3850	3847
85	38.0	93.8	254	535	890	1319	1707	1910	2021	2083	2102	2094	2074	2069	2065	2058	2048	2034	2025
90	18.7	68.5	150	267	406	565	706	774	811	838	855	870	881	888	892	894	894	891	888
95	14.4	40.3	77.1	126	183	248	306	340	364	387	409	432	452	465	474	480	483	485	484
100	14.8	32.6	54.6	81.0	111	145	179	214	248	279	307	330	349	362	370	375	379	380	381
105	12.5	25.4	40.8	59.0	78.9	101	121	136	150	169	190	216	241	263	281	293	301	303	302
110	11.0	20.8	32.8	47.1	62.8	79.9	95.7	106	115	126	138	151	162	170	175	178	179	179	178
115	9.18	16.4	25.8	37.6	50.9	65.7	79.4	88.9	96.5	104	111	118	125	134	142	147	150	151	150
120	7.44	13.4	20.7	29.6	39.8	51.1	63.3	77.3	90.0	98.6	104	106	106	111	115	118	120	120	120
125	6.37	11.0	16.8	23.8	32.1	41.4	51.8	63.8	76.0	87.0	96.5	104	109	111	111	111	110	108	108
130	5.74	9.46	14.3	20.3	27.2	35.1	42.9	48.7	55.2	65.2	77.2	91.9	105	114	118	120	120	118	117
135	5.24	8.33	12.3	17.3	23.1	29.5	35.7	40.6	45.1	50.2	55.9	62.5	70.2	80.4	90.7	99.1	106	109	110
140	4.72	6.91	9.94	13.9	18.5	23.7	29.0	33.4	37.6	41.9	46.2	50.5	54.7	58.6	62.1	64.9	67.0	68.2	68.6
145	4.18	2.93	3.72	6.78	11.5	17.7	24.0	27.9	31.2	34.8	38.3	42.1	45.6	48.3	50.5	52.2	53.4	54.2	54.5
150	3.72	2.14	2.45	4.85	8.74	14.1	19.4	22.7	25.3	28.1	30.8	33.7	36.5	39.0	41.1	42.7	43.9	44.6	44.9
155	3.32	1.99	2.12	3.85	6.77	10.8	15.0	18.1	20.6	22.8	24.7	26.2	27.5	28.8	30.0	31.1	32.0	32.7	33.1
160	3.00	2.87	2.74	2.49	2.44	2.53	3.76	7.86	12.6	16.3	19.1	20.4	21.2	22.2	23.0	23.7	24.2	24.6	24.8
165	2.70	2.69	2.60	2.40	2.21	2.05	2.23	3.10	4.55	6.70	9.25	12.2	14.7	15.8	16.3	16.7	16.9	17.1	17.2
170	2.57	2.53	2.47	2.40	2.32	2.23	2.14	2.06	1.97	1.80	1.65	1.51	1.70	2.76	3.99	4.84	5.40	5.48	5.39
175	2.72	2.69	2.66	2.62	2.57	2.53	2.47	2.42	2.36	2.29	2.23	2.17	2.11	2.06	2.02	1.98	1.95	1.96	1.97
180	2.93	2.92	2.91	2.89	2.86	2.83	2.79	2.75	2.70	2.65	2.60	2.54	2.49	2.44	2.41	2.40	2.41	2.46	2.50

UNIT: cd																			
C (DEG) γ (DEG)	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185
0	457	454	453	452	451	450	449	448	447	446	444	443	443	442	442	441	441	441	454
5	1953	1945	1946	1952	1962	1968	1958	1935	1899	1840	1757	1620	1369	1091	852	653	519	442	416
10	3241	3187	3090	2964	2811	2660	2551	2453	2348	2241	2120	2006	1938	1841	1650	1365	959	441	388
15	6046	5930	5749	5505	5203	4840	4393	3919	3463	3040	2666	2377	2265	2168	1954	1618	1110	446	324
20	7476	7387	7219	6985	6679	6343	6056	5704	5175	4541	3770	3060	2676	2379	2019	1600	1070	447	253
25	9077	9044	8954	8789	8542	8164	7558	6854	6150	5444	4780	4125	3454	2793	2159	1551	978	436	287
30	7238	7345	7539	7769	8022	8198	8205	8007	7515	6796	5829	4787	3852	2981	2191	1492	903	416	438
35	5887	5988	6100	6233	6361	6560	7013	7374	7334	6970	6177	5194	4230	3278	2401	1612	949	399	559
40	5300	5344	5334	5315	5266	5320	5704	6120	6352	6388	6143	5618	4701	3642	2654	1743	994	379	579
45	5187	5123	5033	4937	4842	4793	4851	4978	5190	5388	5563	5463	4693	3677	2709	1786	1013	355	500
50	4830	4819	4812	4803	4797	4760	4615	4498	4562	4685	4907	4899	4188	3235	2347	1516	852	317	406
55	4878	4806	4711	4601	4485	4377	4288	4233	4253	4280	4318	4193	3646	2933	2226	1521	879	278	341
60	4828	4788	4727	4642	4539	4408	4229	4047	3919	3801	3705	3512	3054	2489	1918	1339	788	252	287
65	4798	4747	4671	4572	4451	4310	4151	3971	3772	3543	3284	2964	2531	2052	1575	1102	649	212	226
70	4706	4672	4610	4520	4400	4252	4079	3870	3615	3313	2965	2567	2092	1606	1164	768	441	176	171
75	4606	4568	4492	4383	4237	4069	3899	3699	3442	3133	2768	2344	1831	1318	881	523	277	131	118
80	3850	3847	3835	3807	3762	3691	3595	3447	3219	2919	2542	2106	1599	1102	690	367	166	76.0	65.2
85	2034	2048	2058	2065	2069	2074	2094	2102	2083	2021	1910	1707	1319	890	535	254	93.8	38.0	36.5
90	891	894	894	892	888	881	870	855	838	811	774	706	565	406	267	150	68.5	18.7	19.9
95	485	483	480	474	465	452	432	409	387	364	340	306	248	183	126	77.1	40.3	14.4	14.9
100	380	379	375	370	362	349	330	307	279	248	214	179	145	111	81.0	54.6	32.6	14.8	14.0
105	303	301	293	281	263	241	216	190	169	150	136	121	101	78.9	59.0	40.8	25.4	12.5	11.9
110	179	179	178	175	170	162	151	138	126	115	106	95.7	79.9	62.8	47.1	32.8	20.8	11.0	10.5
115	151	150	147	142	134	125	118	111	104	96.5	88.9	79.4	65.7	50.9	37.6	25.8	16.4	9.18	9.07
120	120	120	118	115	111	106	106	104	98.6	90.0	77.3	63.3	51.1	39.8	29.6	20.7	13.4	7.44	7.96
125	108	110	111	111	111	109	104	96.5	87.0	76.0	63.8	51.8	41.4	32.1	23.8	16.8	11.0	6.37	7.34
130	118	120	120	118	114	105	91.9	77.2	65.2	55.2	48.7	42.9	35.1	27.2	20.3	14.3	9.46	5.74	6.57
135	109	106	99.1	90.7	80.4	70.2	62.5	55.9	50.2	45.1	40.6	35.7	29.5	23.1	17.3	12.3	8.33	5.24	5.89
140	68.2	67.0	64.9	62.1	58.6	54.7	50.5	46.2	41.9	37.6	33.4	29.0	23.7	18.5	13.9	9.94	6.91	4.72	4.54
145	54.2	53.4	52.2	50.5	48.3	45.6	42.1	38.3	34.8	31.2	27.9	24.0	17.7	11.5	6.78	3.72	2.93	4.18	4.75
150	44.6	43.9	42.7	41.1	39.0	36.5	33.7	30.8	28.1	25.3	22.7	19.4	14.1	8.74	4.85	2.45	2.14	3.72	4.34
155	32.7	32.2	31.1	30.0	28.9	27.5	26.2	24.7	22.8	20.6	18.1	15.0	10.8	6.77	3.85	2.12	1.99	3.32	3.94
160	24.6	24.2	23.7	23.0	22.2	21.2	20.4	19.1	16.3	12.6	7.86	3.76	2.53	2.44	2.49	2.74	2.87	3.00	3.61
165	17.1	16.9	16.7	16.3	15.8	14.7	12.2	9.25	6.70	4.55	3.10	2.23	2.05	2.21	2.40	2.60	2.69	2.70	3.21
170	5.48	5.40	5.48	3.99	2.76	1.70	1.51	1.65	1.80	1.97	2.06	2.14	2.23	2.32	2.40	2.47	2.53	2.57	2.95
175	1.96	1.95	1.98	2.02	2.06	2.11	2.17	2.23	2.29	2.36	2.42	2.47	2.53	2.57	2.62	2.66	2.69	2.72	2.95
180	2.46	2.41	2.40	2.41	2.44	2.49	2.54	2.60	2.65	2.70	2.75	2.79	2.83	2.86	2.89	2.91	2.92	2.93	2.85



Table--3

UNIT: °C

C (DEG) y	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280
0	464	469	472	471	470	469	469	468	467	467	466	465	465	463	462	460	458	460	462
5	391	367	344	322	301	280	259	241	225	212	202	198	197	198	199	201	202	201	199
10	338	290	249	215	200	220	268	345	442	558	670	749	811	863	902	932	945	932	902
15	249	220	238	300	416	623	840	999	1103	1126	1101	1050	978	897	818	750	714	750	818
20	184	256	423	681	914	980	959	879	760	613	495	490	523	544	558	548	536	548	558
25	252	350	525	781	972	896	733	596	479	420	384	346	315	296	285	283	285	283	285
30	468	512	557	605	624	562	476	403	342	309	293	291	297	301	303	300	297	300	303
35	664	709	705	654	572	472	376	316	282	287	298	280	256	235	216	203	197	203	216
40	691	706	650	525	396	348	324	291	256	210	166	140	122	109	99.9	94.5	92.7	94.5	99.9
45	578	583	534	432	325	275	241	203	167	127	91.2	70.0	56.5	47.2	41.8	38.9	38.3	38.9	41.8
50	454	456	423	357	279	218	165	120	83.6	58.6	41.4	30.1	23.4	19.3	17.1	15.9	15.7	15.9	17.1
55	371	364	329	268	199	146	102	68.2	43.6	29.9	22.2	15.7	11.4	9.11	8.15	7.99	8.24	7.99	8.15
60	297	279	241	183	125	87.4	60.5	40.2	26.2	17.8	12.8	8.64	5.86	4.35	3.70	3.60	3.75	3.60	3.70
65	222	200	165	116	70.5	47.0	33.1	23.0	16.6	12.1	9.03	5.93	3.51	2.08	1.35	1.30	1.51	1.30	1.35
70	158	135	107	73.5	43.5	29.5	22.3	16.9	13.4	10.1	7.23	4.60	2.53	1.31	0.72	0.82	1.10	0.82	0.72
75	103	85.0	66.0	45.8	28.9	21.2	17.4	14.4	12.2	9.57	7.09	4.85	3.05	1.96	1.42	1.52	1.77	1.52	1.42
80	55.1	45.7	37.1	29.3	22.9	19.0	16.3	13.7	11.4	9.05	6.85	4.98	3.52	2.64	2.22	2.31	2.52	2.31	2.22
85	34.2	30.9	27.0	22.5	18.3	15.8	14.0	12.1	10.2	8.28	6.47	5.02	3.92	3.26	2.96	3.04	3.21	3.04	2.96
90	20.2	19.4	17.9	15.6	13.4	12.1	11.1	9.86	8.60	7.17	5.85	4.90	4.21	3.82	3.66	3.73	3.84	3.73	3.66
95	14.9	14.2	13.0	11.4	9.87	9.02	8.36	7.56	6.74	5.78	4.95	4.51	4.27	4.16	4.15	4.21	4.27	4.21	4.15
100	13.1	12.0	10.8	9.55	8.43	7.75	7.21	6.62	6.04	5.39	4.84	4.59	4.49	4.46	4.49	4.55	4.59	4.55	4.49
105	11.3	10.5	9.57	8.59	7.71	7.19	6.79	6.34	5.88	5.36	4.93	4.75	4.69	4.68	4.72	4.76	4.79	4.76	4.72
110	9.95	9.30	8.61	7.85	7.18	6.79	6.48	6.10	5.71	5.25	4.86	4.70	4.66	4.65	4.68	4.71	4.74	4.71	4.68
115	8.81	8.39	7.86	7.22	6.65	6.35	6.14	5.84	5.51	5.11	4.77	4.64	4.60	4.59	4.61	4.63	4.65	4.63	4.61
120	8.16	8.02	7.64	7.01	6.39	6.13	5.97	5.72	5.44	5.08	4.76	4.64	4.59	4.58	4.58	4.59	4.59	4.59	4.58
125	7.86	7.88	7.54	6.84	6.15	5.94	5.85	5.68	5.48	5.19	4.94	4.85	4.83	4.82	4.83	4.82	4.81	4.82	4.83
130	7.05	7.14	6.96	6.50	6.02	5.84	5.74	5.60	5.45	5.25	5.09	5.07	5.10	5.12	5.14	5.14	5.13	5.14	5.14
135	6.29	6.42	6.36	6.10	5.80	5.65	5.54	5.42	5.30	5.18	5.10	5.14	5.21	5.27	5.32	5.33	5.32	5.33	5.32
140	5.87	6.04	5.99	5.74	5.44	5.28	5.17	5.08	5.02	4.98	4.99	5.07	5.17	5.25	5.31	5.33	5.33	5.33	5.31
145	5.19	5.38	5.40	5.26	5.06	4.92	4.81	4.74	4.71	4.74	4.80	4.90	5.01	5.09	5.16	5.18	5.19	5.18	5.16
150	4.76	4.96	4.99	4.86	4.67	4.56	4.48	4.45	4.46	4.52	4.61	4.67	4.73	4.80	4.85	4.88	4.88	4.88	4.85
155	4.36	4.57	4.61	4.50	4.34	4.26	4.22	4.21	4.23	4.28	4.33	4.35	4.35	4.35	4.35	4.32	4.30	4.32	4.35
160	4.03	4.24	4.29	4.19	4.06	4.08	4.13	4.15	4.16	4.15	4.11	4.08	4.04	3.97	3.90	3.79	3.72	3.79	3.90
165	3.58	3.78	3.87	3.84	3.78	3.82	3.87	3.88	3.85	3.77	3.66	3.54	3.43	3.31	3.21	3.10	3.04	3.10	3.21
170	3.22	3.38	3.44	3.41	3.35	3.35	3.33	3.26	3.14	2.98	2.79	2.59	2.40	2.27	2.19	2.16	2.17	2.16	2.19
175	3.12	3.21	3.25	3.22	3.16	3.14	3.10	3.01	2.89	2.73	2.57	2.45	2.36	2.30	2.27	2.28	2.30	2.28	2.27
180	2.84	2.82	2.82	2.82	2.84	2.86	2.87	2.86	2.82	2.77	2.70	2.62	2.54	2.48	2.43	2.40	2.39	2.40	2.43

C (DEG) y	285	290	295	300	305	310	315	320	325	330	335	340	345	350	355				
0	463	465	465	466	467	467	468	469	469	470	471	472	469	464	454				
5	198	197	198	202	212	225	241	259	280	301	322	344	367	391	416				
10	863	811	749	670	558	442	345	268	220	200	215	249	290	338	388				
15	897	978	1050	1101	1126	1103	999	840	623	416	300	238	220	249	324				
20	544	523	490	495	613	760	879	959	980	914	681	423	256	184	253				
25	296	315	346	384	420	479	596	733	896	972	781	525	350	252	287				
30	301	297	291	293	309	342	403	476	562	624	605	557	512	468	438				
35	235	256	280	298	287	282	316	376	472	572	654	705	709	664	559				
40	109	122	140	166	210	256	291	324	348	396	525	650	706	691	579				
45	47.2	56.5	70.0	91.2	127	167	203	241	275	325	432	534	583	578	500				
50	19.3	23.4	30.1	41.4	58.6	83.6	120	165	218	279	357	423	456	454	406				
55	9.11	11.4	15.7	22.2	29.9	43.6	68.2	102	146	199	268	329	364	371	341				
60	4.35	5.86	8.64	12.8	17.8	26.2	40.2	60.5	87.4	125	183	241	279	297	287				
65	2.08	3.51	5.93	9.03	12.1	16.6	23.0	33.1	47.0	70.5	116	165	200	222	226				
70	1.31	2.53	4.60	7.23	10.1	13.4	16.9	22.3	29.5	43.5	73.5	107	135	158	171				
75	1.96	3.05	4.85	7.09	9.57	12.2	14.4	17.4	21.2	28.9	45.8	66.0	85.0	103	118				
80	2.64	3.52	4.98	6.85	9.05	11.4	13.7	16.3	19.0	22.9	29.3	37.1	45.7	55.1	65.2				
85	3.26	3.92	5.02	6.47	8.28	10.2	12.1	14.0	15.8	18.3	22.5	27.0	30.9	34.2	36.5				
90	3.82	4.21	4.90	5.85	7.17	8.60	9.86	11.1	12.1	13.4	15.6	17.9	19.4	20.2	19.9				
95	4.16	4.27	4.51	4.95	5.78	6.74	7.56	8.36	9.02	9.87	11.4	13.0	14.2	14.9	14.9				
100	4.46	4.49	4.59	4.84	5.39	6.04	6.62	7.21	7.75	8.43	9.55	10.8	12.0	13.1	14.0				
105	4.68	4.69	4.75	4.93	5.36	5.88	6.34	6.79	7.19	7.71	8.59	9.57	10.5	11.3	11.9				
110	4.65	4.66	4.70	4.86	5.25	5.71	6.10	6.48	6.79	7.18	7.85	8.61	9.30	9.95	10.5				
115	4.59	4.60	4.64	4.77	5.11	5.51	5.84	6.14	6.35	6.65	7.22	7.86	8.39	8.81	9.07				
120	4.58	4.59	4.64	4.76	5.08	5.44	5.72	5.97	6.13	6.39	7.01	7.64	8.02	8.16	7.96				
125	4.82	4.83	4.85	4.94	5.19	5.48	5.68	5.85	5.94	6.15	6.84	7.54	7.88	7.86	7.34				
130	5.12	5.10	5.07	5.09	5.25	5.45	5.60	5.74	5.84	6.02	6.50	6.96	7.14	7.05	6.57				
135	5.27	5.21	5.14	5.10	5.18	5.30	5.42	5.54	5.65	5.80	6.10	6.36	6.42	6.29	5.89				
140	5.25	5.17	5.07	4.99	4.98	5.02	5.08	5.17	5.28	5.44	5.74	5.99	6.04	5.87	5.42				
145	5.09	5.01	4.90	4.80	4.74	4.71	4.74	4.81	4.92	5.06	5.26	5.40	5.38	5.19	4.79				
150	4.80	4.73	4.67	4.61	4.52	4.46	4.45	4.48	4.56	4.67	4.86	4.99	4.96	4.76	4.34				
155	4.35	4.35	4.35	4.33	4.28	4.23	4.21	4.22	4.26	4.34	4.50	4.61	4.57	4.36	3.94				
160	3.97	4.04	4.08	4.11	4.15	4.16	4.15	4.13	4.08	4.06	4.19	4.29	4.24	4.03	3.61				
165	3.31	3.43	3.54	3.66	3.77	3.85	3.88	3.87	3.82	3.78	3.84	3.87	3.78	3.58	3.21				
170	2.27	2.40	2.59	2.79	2.98	3.14	3.26	3.33	3.35	3.35	3.41	3.44	3.38	3.22	2.95				
175	2.30	2.36	2.45	2.57	2.73	2.89	3.01	3.10	3.14	3.16	3.22	3.25	3.21	3.12	2.95				
180	2.48	2.54	2.62	2.70	2.77	2.82	2.86	2.87	2.86	2.84	2.82	2.82	2.82	2.82	2.88				

## 4.0 LM-79 Measurement and Test Results

### 4.3 THD and PF Test

<b>Model No.</b>	W34L @ 75W / 4000K	<b>Sample ID</b>	230612001-S1
<b>Temperature (°C)</b>	25.4	<b>Humidity (%RH)</b>	41.0

<b>Test Method</b>
<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 <math>25 \pm 1^{\circ}\text{C}</math>. 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	0.593	70.4	0.989	4.22
277.0	60	0.303	69.7	0.831	18.16



## 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\*\*\*\*\*