

## 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: 2023-06-14

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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		2861
Minimum Luminaire Efficacy (lm/W) (Goniophotometer – Section 4.2) (0°-180° zones)	IES LM-79-2008	N/A		153.0
Luminaire Output (lm) (Goniophotometer – Section 4.2) (0°-90° zones)	IES LM-79-2008	300		2781
Minimum Luminaire Efficacy (lm/W) (Goniophotometer – Section 4.2) (0°-90° zones)	IES LM-79-2008	Standard	Premium	148.7
		105	120	
Power (Input Wattage) (W) (Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Case		18.7
Total Harmonic Distortion (A%) (THD & PF – Section 4.3)	ANSI C82.77:2014	20.00%	120V	2.88
			277V	15.80
Power Factor (THD & PF – Section 4.3)	ANSI C82.77:2014	0.9	120V	0.986
			277V	0.782
Allowable CCTs* (K) (Integrating Sphere – Section 4.1)	IES LM-79-2008	7 steps	3985±275	4053
		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		-22
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		94
IES Rcs,h1 (Integrating Sphere – Section 4.1)	ANSI/IES TM-30-18	-18%≤IES Rcs,h1≤+23%		-16%
Zonal Lumen Requirement (80°-90°) (Goniophotometer – Section 4.2)	IES LM-79-2008	≤10%		4.6%
Input Voltage (V)				
(Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Cast		277.0
(Goniophotometer – Section 4.2)		Non-Worst Case		120.0
Input Current (A)				
(Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Case		0.086
(Goniophotometer – Section 4.2)		Non-Worst Case		0.155
Power (Input Wattage – W)				
(Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Case		18.7
(Goniophotometer – Section 4.2)		Non-Worst Case		18.4

## 2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2023-06-13	W34S @ 17W / 4000K	230612003-S1
2	Goniophotometer Test	2023-06-13	W34S @ 17W / 4000K	230612003-S1
3	THD and PF Test	2023-06-13	W34S @ 17W / 4000K	230612003-S1

### Remark (If any)

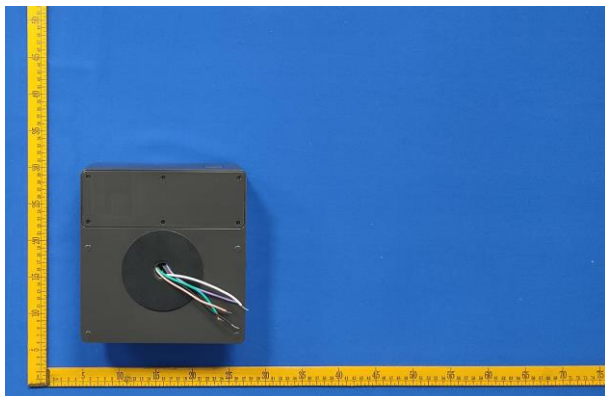
1. The results contained in this report pertain only to the tested samples.
2. This report shall not be reproduced, no limited part or full, without approval of Dongguan New Testing Centre Co., Ltd.
3. This report does not imply product certification, approval, or endorsement by NVLAP, or any agency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

## 3.0 Product Description

Luminaire Description: Model No. W34S @ 17W / 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>	W34S @ 17W / 4000K	<b>Sample ID</b>	230612003-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

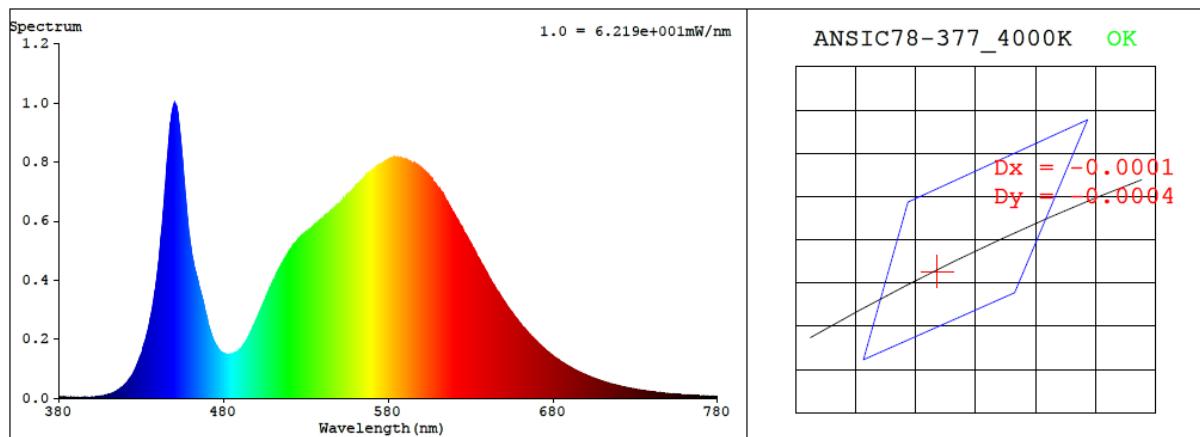
<b>Test Method</b>
<p>The Samples were tested according to the IES LM-79-2008.</p> <p>Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25±1°C.</p> <p>The sample measurements were made 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	0.155	18.4	0.986
277.0	60	0.086	18.7	0.782

CCT (K)	CRI	R9	Duv	Rf	Rg	IES Rcs,h1
4053	75.3	-22	-0.0002	77	94	-16%

## 4.1 Integrating Sphere Test



### Colorimetric Parameters

Chromaticity Coordinate:  $x = 0.3780$   $y = 0.3749$  /  $u' = 0.2243$   $v' = 0.5004$  ( $duv = -1.51e-04$ )

CCT= 4053K Prcp WL: Ld=579.0nm Purity=26.0%

Peak WL: Lp=450nm FWHM: =19.3nm Ratio:R=17.1% G=80.0% B=2.9%

Render Index: Ra = 75.3 AvgR = 66.1 TM30:Rf=77 Rg=94

EEL: 0.09133 A++ Highest

R1 =73 R2 =83 R3 =90 R4 =74 R5 =72 R6 =75 R7 =82

R8 =55 R9 =-22 R10=58 R11=70 R12=47 R13=75 R14=94 R15=66

## 4.1 Integrating Sphere Test

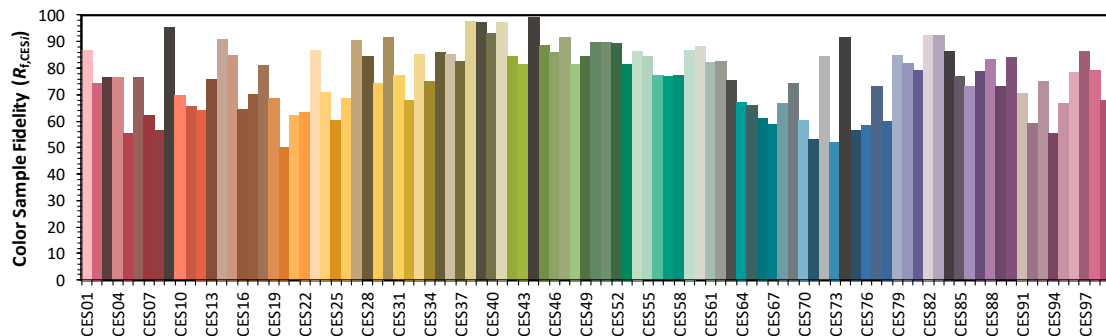
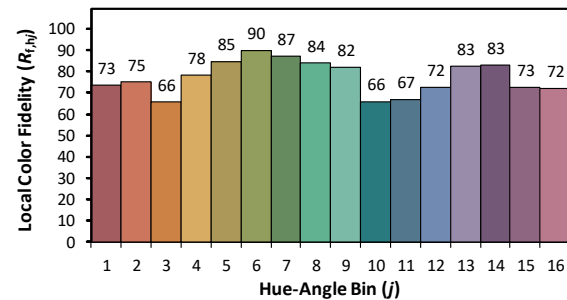
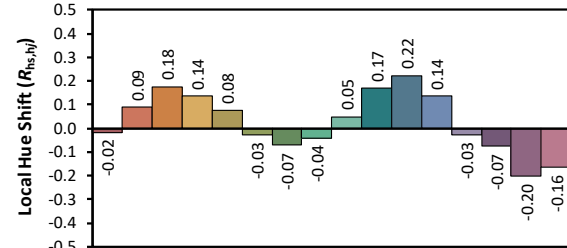
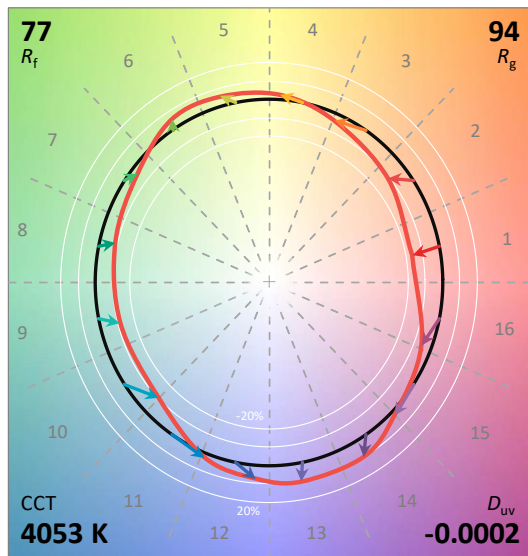
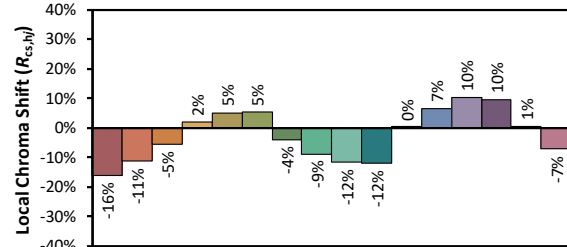
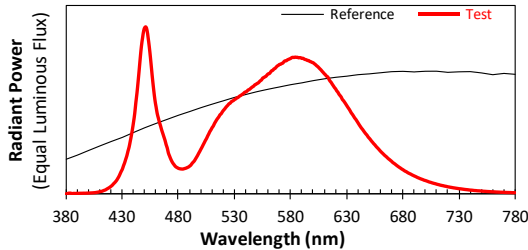
### ANSI/IES TM-30-18 Color Rendition Report

Source: 1 CIE F1

Manufacturer: RAB Lighting Inc.

Date: 2023/6/14

Model: W34S @ 17W / 4000K



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

$x$  0.3780

$y$  0.3748

$u'$  0.2243

$v'$  0.5003

CIE 13.3-1995  
(CRI)

$R_a$  75

$R_g$  -22

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.

## 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	7.00E-07	447	8.81E-04	514	4.41E-04	581	8.12E-04	648	3.49E-04	715	4.96E-05
381	1.80E-06	448	9.30E-04	515	4.51E-04	582	8.13E-04	649	3.39E-04	716	4.84E-05
382	3.80E-06	449	9.72E-04	516	4.60E-04	583	8.12E-04	650	3.32E-04	717	4.65E-05
383	4.10E-06	450	9.91E-04	517	4.71E-04	584	8.15E-04	651	3.23E-04	718	4.54E-05
384	4.10E-06	451	9.94E-04	518	4.77E-04	585	8.13E-04	652	3.14E-04	719	4.39E-05
385	1.60E-06	452	9.73E-04	519	4.88E-04	586	8.14E-04	653	3.07E-04	720	4.21E-05
386	2.30E-06	453	9.28E-04	520	4.97E-04	587	8.11E-04	654	2.99E-04	721	4.11E-05
387	3.00E-06	454	8.75E-04	521	5.05E-04	588	8.12E-04	655	2.92E-04	722	3.97E-05
388	2.20E-06	455	8.12E-04	522	5.13E-04	589	8.11E-04	656	2.83E-04	723	3.86E-05
389	3.10E-06	456	7.43E-04	523	5.22E-04	590	8.07E-04	657	2.76E-04	724	3.74E-05
390	3.30E-06	457	6.75E-04	524	5.28E-04	591	8.08E-04	658	2.69E-04	725	3.61E-05
391	3.10E-06	458	6.15E-04	525	5.37E-04	592	8.03E-04	659	2.62E-04	726	3.51E-05
392	3.50E-06	459	5.59E-04	526	5.40E-04	593	8.00E-04	660	2.54E-04	727	3.40E-05
393	3.50E-06	460	5.19E-04	527	5.48E-04	594	7.99E-04	661	2.47E-04	728	3.30E-05
394	3.60E-06	461	4.80E-04	528	5.53E-04	595	7.94E-04	662	2.41E-04	729	3.20E-05
395	3.90E-06	462	4.53E-04	529	5.56E-04	596	7.94E-04	663	2.34E-04	730	3.08E-05
396	4.10E-06	463	4.27E-04	530	5.62E-04	597	7.89E-04	664	2.28E-04	731	3.02E-05
397	3.80E-06	464	4.05E-04	531	5.66E-04	598	7.87E-04	665	2.23E-04	732	2.94E-05
398	4.40E-06	465	3.81E-04	532	5.72E-04	599	7.83E-04	666	2.16E-04	733	2.84E-05
399	4.40E-06	466	3.61E-04	533	5.74E-04	600	7.81E-04	667	2.10E-04	734	2.75E-05
400	5.00E-06	467	3.39E-04	534	5.80E-04	601	7.75E-04	668	2.05E-04	735	2.65E-05
401	5.00E-06	468	3.19E-04	535	5.85E-04	602	7.70E-04	669	1.99E-04	736	2.57E-05
402	5.60E-06	469	2.93E-04	536	5.89E-04	603	7.64E-04	670	1.93E-04	737	2.51E-05
403	5.80E-06	470	2.73E-04	537	5.94E-04	604	7.59E-04	671	1.87E-04	738	2.43E-05
404	6.40E-06	471	2.44E-04	538	5.99E-04	605	7.52E-04	672	1.82E-04	739	2.34E-05
405	6.90E-06	472	2.26E-04	539	6.05E-04	606	7.45E-04	673	1.77E-04	740	2.25E-05
406	7.60E-06	473	2.09E-04	540	6.08E-04	607	7.38E-04	674	1.72E-04	741	2.21E-05
407	8.90E-06	474	1.95E-04	541	6.12E-04	608	7.30E-04	675	1.67E-04	742	2.15E-05
408	9.90E-06	475	1.83E-04	542	6.19E-04	609	7.23E-04	676	1.62E-04	743	2.05E-05
409	1.14E-05	476	1.74E-04	543	6.21E-04	610	7.15E-04	677	1.57E-04	744	1.98E-05
410	1.34E-05	477	1.65E-04	544	6.27E-04	611	7.09E-04	678	1.53E-04	745	1.95E-05
411	1.45E-05	478	1.60E-04	545	6.33E-04	612	7.01E-04	679	1.48E-04	746	1.86E-05
412	1.61E-05	479	1.56E-04	546	6.38E-04	613	6.96E-04	680	1.44E-04	747	1.82E-05
413	1.89E-05	480	1.52E-04	547	6.42E-04	614	6.84E-04	681	1.39E-04	748	1.79E-05
414	2.15E-05	481	1.50E-04	548	6.49E-04	615	6.72E-04	682	1.35E-04	749	1.74E-05
415	2.39E-05	482	1.49E-04	549	6.53E-04	616	6.64E-04	683	1.32E-04	750	1.67E-05
416	2.83E-05	483	1.48E-04	550	6.58E-04	617	6.53E-04	684	1.28E-04	751	1.61E-05
417	3.21E-05	484	1.48E-04	551	6.61E-04	618	6.44E-04	685	1.24E-04	752	1.55E-05
418	3.60E-05	485	1.50E-04	552	6.68E-04	619	6.33E-04	686	1.21E-04	753	1.53E-05
419	4.05E-05	486	1.52E-04	553	6.74E-04	620	6.25E-04	687	1.17E-04	754	1.47E-05
420	4.58E-05	487	1.54E-04	554	6.79E-04	621	6.14E-04	688	1.14E-04	755	1.42E-05
421	5.14E-05	488	1.57E-04	555	6.89E-04	622	6.06E-04	689	1.10E-04	756	1.38E-05
422	5.92E-05	489	1.60E-04	556	6.93E-04	623	5.94E-04	690	1.07E-04	757	1.35E-05
423	6.58E-05	490	1.66E-04	557	6.97E-04	624	5.85E-04	691	1.04E-04	758	1.30E-05
424	7.32E-05	491	1.71E-04	558	7.01E-04	625	5.77E-04	692	1.01E-04	759	1.26E-05
425	8.20E-05	492	1.81E-04	559	7.09E-04	626	5.63E-04	693	9.73E-05	760	1.21E-05
426	9.31E-05	493	1.88E-04	560	7.15E-04	627	5.55E-04	694	9.48E-05	761	1.20E-05
427	1.05E-04	494	1.95E-04	561	7.17E-04	628	5.46E-04	695	9.17E-05	762	1.16E-05
428	1.20E-04	495	2.06E-04	562	7.25E-04	629	5.36E-04	696	8.90E-05	763	1.11E-05
429	1.34E-04	496	2.17E-04	563	7.33E-04	630	5.25E-04	697	8.66E-05	764	1.09E-05
430	1.47E-04	497	2.29E-04	564	7.36E-04	631	5.15E-04	698	8.41E-05	765	1.06E-05
431	1.68E-04	498	2.42E-04	565	7.44E-04	632	5.05E-04	699	8.11E-05	766	1.03E-05
432	1.85E-04	499	2.54E-04	566	7.47E-04	633	4.94E-04	700	7.95E-05	767	9.70E-06
433	2.07E-04	500	2.67E-04	567	7.55E-04	634	4.82E-04	701	7.70E-05	768	9.60E-06
434	2.27E-04	501	2.79E-04	568	7.62E-04	635	4.73E-04	702	7.47E-05	769	9.30E-06
435	2.55E-04	502	2.92E-04	569	7.66E-04	636	4.63E-04	703	7.18E-05	770	9.10E-06
436	2.79E-04	503	3.05E-04	570	7.71E-04	637	4.52E-04	704	6.98E-05	771	8.70E-06
437	3.13E-04	504	3.19E-04	571	7.72E-04	638	4.44E-04	705	6.80E-05	772	8.50E-06
438	3.47E-04	505	3.30E-04	572	7.77E-04	639	4.34E-04	706	6.56E-05	773	8.20E-06
439	3.86E-04	506	3.45E-04	573	7.79E-04	640	4.23E-04	707	6.37E-05	774	8.10E-06
440	4.30E-04	507	3.58E-04	574	7.88E-04	641	4.12E-04	708	6.18E-05	775	7.80E-06
441	4.79E-04	508	3.72E-04	575	7.92E-04	642	4.02E-04	709	6.02E-05	776	7.80E-06
442	5.44E-04	509	3.82E-04	576	7.93E-04	643	3.92E-04	710	5.80E-05	777	7.30E-06
443	6.00E-04	510	3.95E-04	577	7.98E-04	644	3.84E-04	711	5.62E-05	778	7.00E-06
444	6.68E-04	511	4.04E-04	578	8.01E-04	645	3.75E-04	712	5.46E-05	779	7.10E-06
445	7.40E-04	512	4.18E-04	579	8.04E-04	646	3.65E-04	713	5.26E-05	780	7.10E-06
446	8.15E-04	513	4.30E-04	580	8.07E-04	647	3.57E-04	714	5.11E-05	N/A	N/A



## 4.0 LM-79 Measurement and Test Results

### 4.2 Goniophotometer Test

<b>Model No.</b>	W34S @ 17W / 4000K	<b>Sample ID</b>	230612003-S1
<b>Operate time (Min.)</b>	30	<b>Stabilization time (Min.)</b>	60
<b>Temperature (°C)</b>	25.0	<b>Humidity (%RH)</b>	40.1

<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>	277.0	60	0.086	18.7	0.782
<b>NON-WORST CASE</b>	120.0	60	0.155	18.4	0.986

#### Test Result

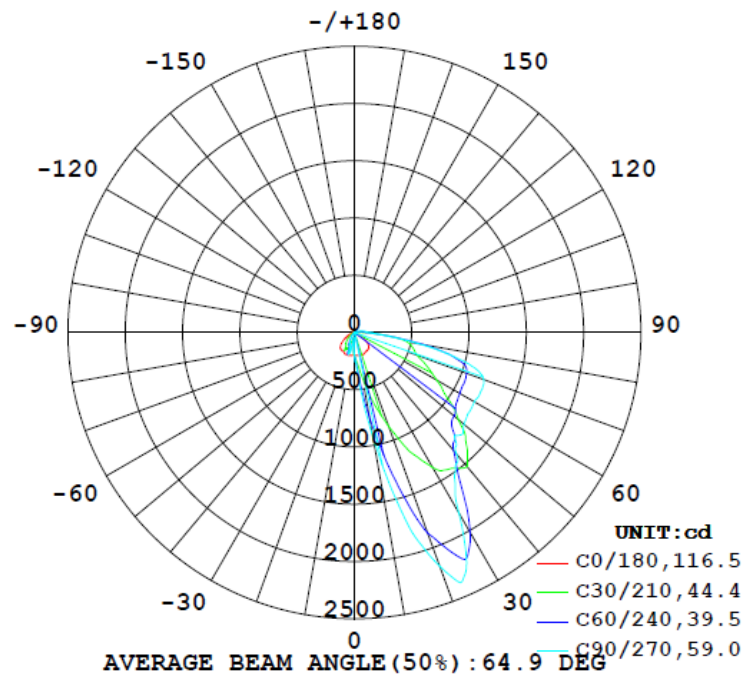
Result Type	Flux (lm)	Field Angle (10%)		Beam Angle (50%)		Luminous Efficacy (lm/W)	Zonal Lumen Requirement (80°-90°)	BUG
		C0-180	C90-270	C0-180	C90-270			
<b>0°-180° zones</b>	2861	84.0	131.7	55.1	79.7	153.0	4.5%	B0-U2-G2
<b>0°-90° zones</b>	2781	84.0	131.7	55.1	79.7	148.7	4.6%	B0-U2-G2



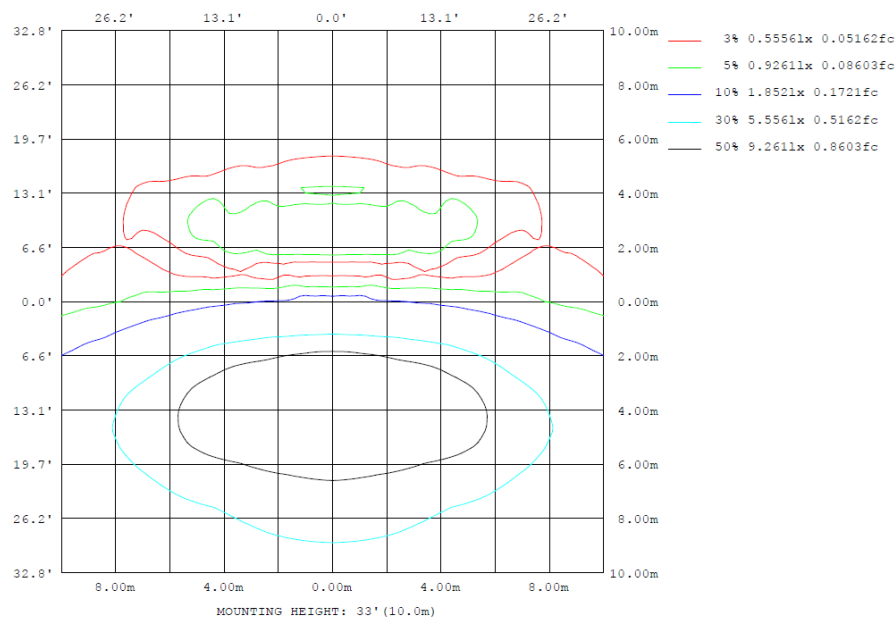
## 4.2 Goniophotometer Test

### Lighting Distribution Curve

#### LUMINOUS INTENSITY DISTRIBUTION DIAGRAM



### Isolux Plot



## 4.2 Goniophotometer Test

### Zonal Lumen Summary

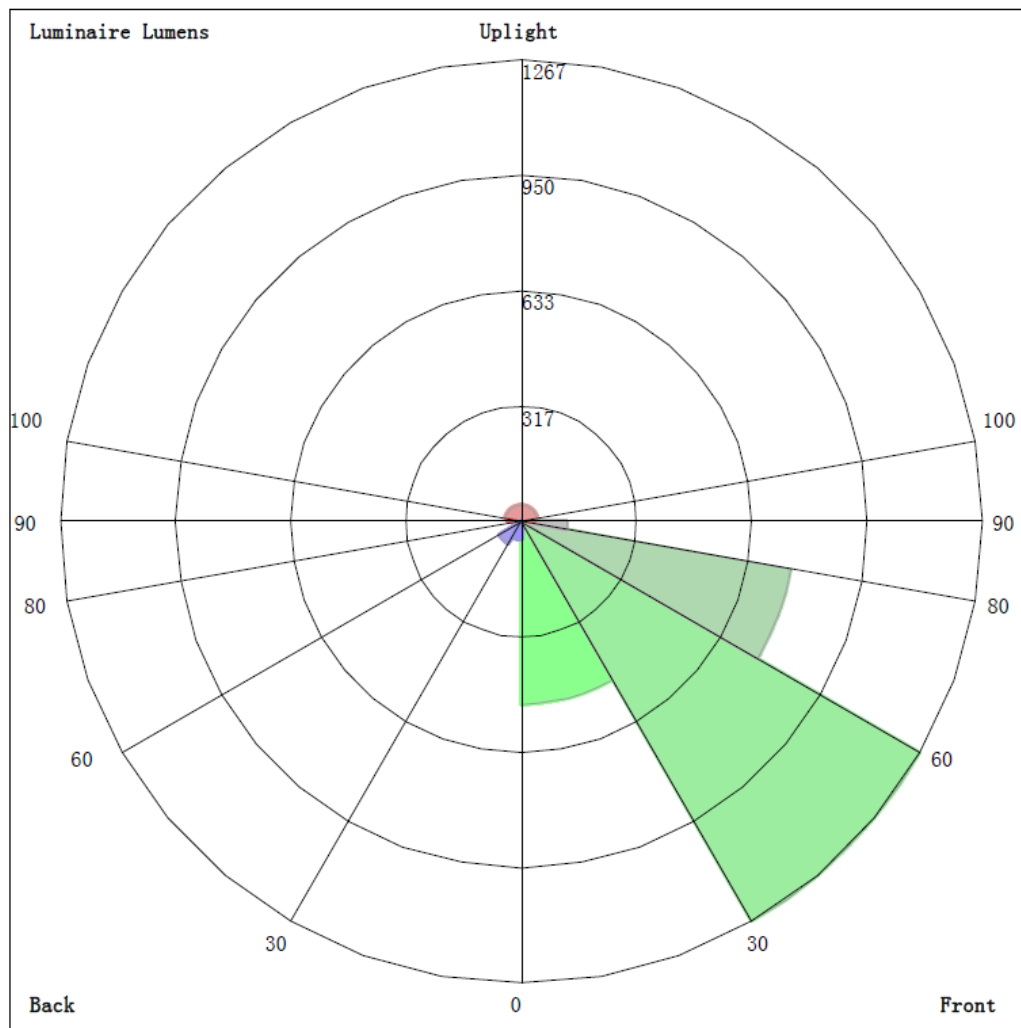
ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%lum, lamp
10	201.5	580.6	919.6	580.6	201.5	45.89	104.7	45.89	0- 10	23.84	23.84	0.83,0.83
20	210.1	1360	2169	1360	210.1	166.8	110.6	166.8	10- 20	157.2	181.1	6.33,6.33
30	196.7	1966	1821	1966	196.7	123.4	59.61	123.4	20- 30	369.1	550.2	19.2,19.2
40	187.6	1610	1382	1610	187.6	65.35	20.83	65.35	30- 40	447.4	997.6	34.9,34.9
50	151.5	1132	1248	1132	151.5	29.17	2.869	29.17	40- 50	452.0	1450	50.7,50.7
60	91.32	965.5	1208	965.5	91.32	10.23	0.7910	10.23	50- 60	436.7	1886	65.9,65.9
70	48.08	906.1	1199	906.1	48.08	5.724	0.1675	5.724	60- 70	418.2	2305	80.6,80.6
80	15.37	650.3	574.1	650.3	15.37	3.689	0.4438	3.689	70- 80	348.4	2653	92.7,92.7
90	4.946	114.9	123.6	114.9	4.946	2.150	0.7988	2.150	80- 90	128.0	2781	97.2,97.2
100	3.385	51.02	81.31	51.02	3.385	1.536	1.040	1.536	90-100	35.55	2817	98.5,98.5
110	2.750	22.66	35.26	22.66	2.750	1.462	1.098	1.462	100-110	17.94	2834	99.1,99.1
120	2.014	19.40	25.71	19.40	2.014	1.444	1.088	1.444	110-120	10.28	2845	99.4,99.4
130	1.671	13.12	21.36	13.12	1.671	1.482	1.283	1.482	120-130	7.342	2852	99.7,99.7
140	1.330	7.509	12.97	7.509	1.330	1.365	1.384	1.365	130-140	4.955	2857	99.9,99.9
150	1.024	4.593	7.449	4.593	1.024	1.183	1.282	1.183	140-150	2.233	2859	100,100
160	0.8042	2.059	3.589	2.059	0.8042	1.072	0.9872	1.072	150-160	1.004	2860	100,100
170	0.6905	0.5095	0.4194	0.5095	0.6905	0.8292	0.5615	0.8292	160-170	0.3104	2861	100,100
180	0.7761	0.6972	0.6619	0.6972	0.7761	0.7332	0.6217	0.7332	170-180	0.0611	2861	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

0-10	23.84	0-10	23.84	0.83%
10-20	157.23	0-20	181.07	6.33%
20-30	369.14	0-30	550.21	19.23%
30-40	447.43	0-40	997.64	34.88%
40-50	451.98	0-50	1449.62	50.68%
50-60	436.74	0-60	1886.36	65.94%
60-70	418.22	0-70	2304.58	80.56%
70-80	348.42	0-80	2653.00	92.74%
80-90	127.98	0-90	2780.98	97.22%
90-100	35.55	0-100	2816.53	98.46%
100-110	17.94	0-110	2834.47	99.09%
110-120	10.28	0-120	2844.75	99.45%
120-130	7.34	0-130	2852.09	99.70%
130-140	4.96	0-140	2857.05	99.88%
140-150	2.23	0-150	2859.28	99.95%
150-160	1.00	0-160	2860.28	99.99%
160-170	0.31	0-170	2860.59	100.00%
170-180	0.06	0-180	2860.65	100.00%

## 4.2 Goniophotometer Test

LCS/BUG

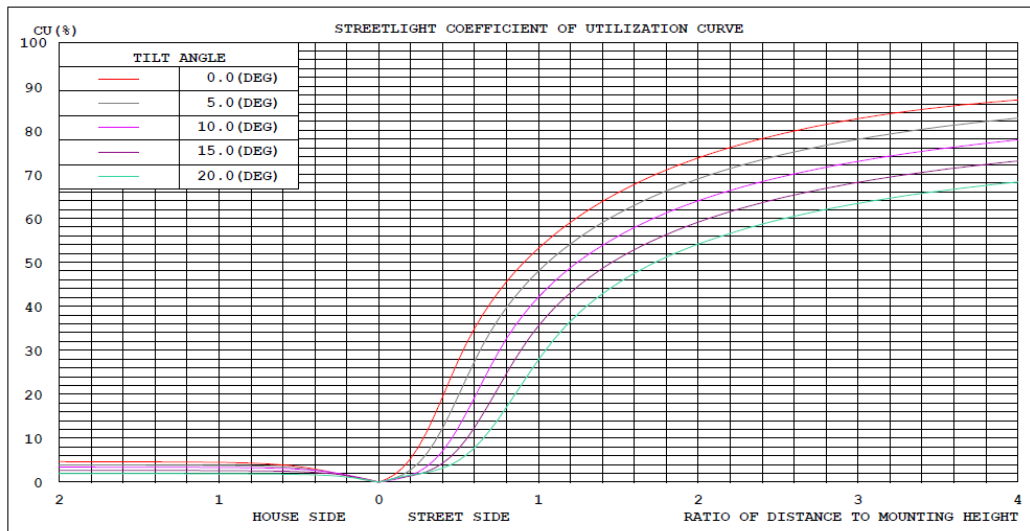


### LUMINAIRE CLASSIFICATION SYSTEM (LCS)

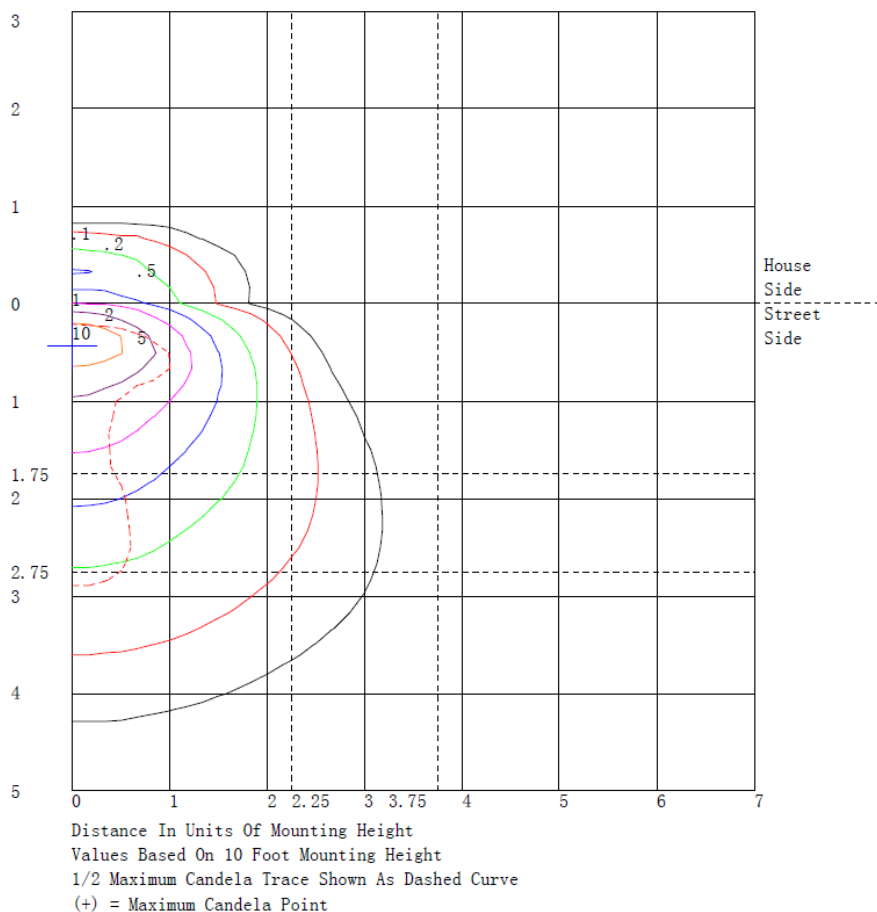
	Lumens	% Lamp	% Luminaire
FL - Front-Low (0-30)	501.0	N.A.	17.5
FM - Front-Medium (30-60)	1266.5	N.A.	44.3
FH - Front-High (60-80)	751.4	N.A.	26.3
FVH - Front-Very High (80-90)	125.8	N.A.	4.4
BL - Back-Low (0-30)	49.2	N.A.	1.7
BM - Back-Medium (30-60)	69.6	N.A.	2.4
BH - Back-High (60-80)	15.3	N.A.	0.5
BVH - Back-Very High (80-90)	2.2	N.A.	0.1
UL - Uplight-Low (90-100)	35.5	N.A.	1.2
UH - Uplight-High (100-180)	44.1	N.A.	1.5
Total	2860.6	N.A.	100.0
BUG Rating	B0-U2-G2		

## 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	199	200	200	200	200	200	200	201	201	201	201	202	202	202	202	203	203	203	203
5	201	208	217	227	239	253	266	279	291	303	317	332	346	360	372	383	391	396	399
10	201	220	245	275	310	352	399	457	518	581	640	697	750	797	838	872	897	913	920
15	207	233	277	338	423	520	626	730	837	947	1063	1178	1287	1384	1470	1542	1600	1640	1658
20	210	266	343	442	570	715	872	1030	1194	1360	1540	1710	1860	1958	2031	2083	2129	2157	2169
25	206	289	402	545	730	935	1149	1355	1554	1740	1907	2050	2164	2229	2268	2288	2299	2303	2300
30	197	300	439	614	849	1103	1358	1597	1805	1966	2028	2040	2018	1974	1920	1866	1839	1824	1821
35	196	303	451	640	906	1185	1453	1664	1821	1910	1847	1737	1614	1566	1537	1522	1515	1516	1520
40	188	295	449	649	955	1263	1527	1621	1643	1610	1529	1433	1348	1348	1368	1396	1393	1387	1382
45	177	322	489	678	937	1183	1379	1404	1371	1309	1275	1244	1220	1217	1223	1235	1249	1262	1272
50	152	311	475	645	851	1039	1184	1200	1175	1132	1125	1125	1134	1162	1195	1225	1239	1247	1248
55	119	286	443	592	744	877	982	1019	1031	1030	1045	1062	1083	1118	1154	1187	1205	1216	1219
60	91.3	247	389	519	637	740	827	886	930	965	999	1029	1061	1104	1146	1182	1199	1207	1208
65	68.5	184	296	403	507	606	698	784	862	929	977	1017	1054	1104	1150	1189	1208	1216	1216
70	48.1	106	176	259	361	471	585	701	811	906	963	1006	1041	1090	1135	1172	1191	1199	1199
75	29.4	54.9	104	175	282	403	530	653	764	858	903	930	946	970	991	1005	1008	1007	1003
80	15.4	30.2	69.0	132	236	352	464	546	609	650	650	634	611	602	594	588	581	576	574
85	9.78	25.9	52.0	88.1	146	205	257	278	287	286	276	262	249	245	244	244	242	241	240
90	4.95	9.69	17.8	29.3	46.9	65.8	84.0	97.6	108	115	115	112	110	113	117	121	123	123	124
95	3.81	5.78	9.72	15.6	24.1	34.1	45.2	57.9	69.9	79.9	83.1	84.5	85.4	90.0	94.8	99.2	102	103	103
100	3.38	5.43	8.14	11.5	15.3	19.9	25.6	34.0	42.8	51.0	56.1	60.3	64.1	69.2	73.9	77.9	80.0	81.1	81.3
105	3.30	4.96	7.03	9.52	12.6	16.0	19.5	22.6	25.8	29.3	33.4	37.9	42.5	47.6	52.4	56.3	58.1	58.9	58.9
110	2.75	3.95	5.63	7.80	10.9	14.1	17.2	19.2	20.9	22.7	25.2	27.7	30.1	32.1	33.7	34.9	35.3	35.4	35.3
115	2.29	3.26	4.71	6.65	9.49	12.5	15.3	17.0	18.4	19.8	21.5	23.3	25.1	27.0	28.6	29.8	30.0	29.9	29.6
120	2.01	2.93	4.10	5.52	7.18	9.10	11.3	14.1	16.9	19.4	20.5	21.3	21.9	23.2	24.5	25.6	25.8	25.8	25.7
125	1.84	2.38	3.22	4.35	5.68	7.36	9.45	12.6	15.9	18.7	20.0	20.6	21.0	21.7	22.2	22.6	22.5	22.3	22.1
130	1.67	1.90	2.46	3.36	4.72	6.32	8.05	9.52	11.2	13.1	16.3	19.5	22.2	22.7	22.5	21.9	21.7	21.5	21.4
135	1.49	1.53	1.90	2.60	3.84	5.26	6.68	7.51	8.36	9.39	10.9	12.8	15.2	18.7	22.3	25.4	27.1	28.1	28.4
140	1.33	1.24	1.45	1.95	2.94	4.09	5.26	6.05	6.78	7.51	8.45	9.41	10.3	11.2	11.9	12.5	12.8	13.0	13.0
145	1.17	0.85	0.84	1.15	1.96	2.95	3.98	4.64	5.24	5.84	6.58	7.33	8.03	8.64	9.15	9.52	9.64	9.65	9.58
150	1.02	0.71	0.65	0.83	1.37	2.07	2.83	3.44	4.03	4.59	5.15	5.67	6.15	6.59	6.96	7.25	7.39	7.46	7.45
155	0.89	0.71	0.67	0.75	1.00	1.35	1.79	2.33	2.89	3.44	3.88	4.26	4.57	4.78	4.92	5.00	5.03	5.03	5.01
160	0.80	0.77	0.75	0.74	0.69	0.70	0.81	1.16	1.60	2.06	2.42	2.74	3.02	3.25	3.44	3.57	3.61	3.61	3.59
165	0.73	0.72	0.71	0.69	0.66	0.64	0.62	0.62	0.65	0.73	0.93	1.16	1.39	1.57	1.72	1.84	1.91	1.95	1.98
170	0.69	0.68	0.66	0.65	0.63	0.61	0.58	0.56	0.53	0.51	0.49	0.46	0.44	0.43	0.42	0.41	0.41	0.41	0.42
175	0.72	0.72	0.71	0.70	0.69	0.67	0.66	0.64	0.63	0.61	0.59	0.57	0.56	0.54	0.53	0.52	0.51	0.51	0.52
180	0.78	0.78	0.77	0.77	0.76	0.75	0.74	0.73	0.71	0.70	0.68	0.67	0.65	0.64	0.63	0.62	0.63	0.64	0.66

Table--2

UNIT: cd

C (DEG) y (DEG)	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185
0	203	203	203	202	202	202	202	201	201	201	201	200	200	200	200	200	200	199	202
5	396	391	383	372	360	346	332	317	303	291	279	266	253	239	227	217	208	201	204
10	913	897	872	838	797	750	697	640	581	518	457	399	352	310	275	245	220	201	167
15	1640	1600	1542	1470	1384	1287	1178	1063	947	837	730	626	520	423	338	277	233	207	150
20	2157	2129	2083	2031	1958	1860	1710	1540	1360	1194	1030	872	715	570	442	343	266	210	140
25	2303	2299	2288	2268	2229	2164	2050	1907	1740	1554	1355	1149	935	730	545	402	289	206	129
30	1824	1839	1866	1920	1974	2018	2040	2028	1966	1805	1597	1358	1103	849	614	439	300	197	126
35	1516	1515	1522	1537	1566	1614	1737	1847	1910	1821	1664	1453	1185	906	640	451	303	196	146
40	1387	1393	1396	1368	1348	1348	1433	1529	1610	1643	1621	1527	1263	955	649	449	295	188	157
45	1262	1249	1235	1223	1217	1220	1244	1275	1309	1371	1404	1379	1183	937	678	489	322	177	160
50	1247	1239	1225	1195	1162	1134	1125	1125	1132	1175	1200	1184	1039	851	645	475	311	152	143
55	1216	1205	1187	1154	1118	1083	1062	1045	1030	1031	1019	982	877	744	592	443	286	119	114
60	1207	1199	1182	1146	1104	1061	1029	999	965	930	886	827	740	637	519	389	247	91.3	94.7
65	1216	1208	1189	1150	1104	1054	1017	977	929	862	784	698	606	507	403	296	184	68.5	71.8
70	1199	1191	1172	1135	1090	1041	1006	963	906	811	701	585	471	361	259	176	106	48.1	45.7
75	1007	1008	1005	991	970	946	930	903	858	764	653	530	403	282	175	104	54.9	29.4	27.3
80	576	581	588	594	602	611	634	650	650	609	546	464	352	236	132	69.0	30.2	15.4	14.7
85	241	242	244	244	245	249	262	276	286	287	278	257	205	146	88.1	52.0	25.9	9.78	9.99
90	123	123	121	117	113	110	112	115	115	108	97.6	84.0	65.8	46.9	29.3	17.8	9.69	4.95	4.78
95	103	102	99.2	94.8	90.0	85.4	84.5	83.1	79.9	69.9	57.9	45.2	34.1	24.1	15.6	9.72	5.78	3.81	3.83
100	81.1	80.0	77.9	73.9	69.2	64.1	60.3	56.1	51.0	42.8	34.0	25.6	19.9	15.3	11.5	8.14	5.43	3.38	3.26
105	58.9	58.1	56.3	52.4	47.6	42.5	37.9	33.4	29.3	25.8	22.6	19.5	16.0	12.6	9.52	7.03	4.96	3.30	3.23
110	35.4	35.3	34.9	33.7	32.1	30.1	27.7	25.2	22.7	20.9	19.2	17.2	14.1	10.9	7.80	5.63	3.95	2.75	2.93
115	29.9	30.0	29.8	28.6	27.0	25.1	23.3	21.5	19.8	18.4	17.0	15.3	12.5	9.49	6.65	4.71	3.26	2.29	2.81
120	25.8	25.8	25.6	24.5	23.2	21.9	21.3	20.5	19.4	16.9	14.1	11.3	9.10	7.18	5.52	4.10	2.93	2.01	2.83
125	22.3	22.5	22.6	22.2	21.7	21.0	20.6	20.0	18.7	15.9	12.6	9.45	7.36	5.68	4.35	3.22	2.38	1.84	2.49
130	21.5	21.7	21.9	22.5	22.7	22.2	19.5	16.3	13.1	11.2	9.52	8.05	6.32	4.72	3.36	2.46	1.90	1.67	1.97
135	28.1	27.1	25.4	22.3	18.7	15.2	12.8	10.9	9.39	8.36	7.51	6.68	5.26	3.84	2.60	1.90	1.53	1.49	1.72
140	13.0	12.8	12.5	11.9	11.2	10.3	9.41	8.45	7.51	6.78	6.05	5.26	4.09	2.94	1.95	1.45	1.24	1.33	1.47



Table--3

UNIT: cd

C (DEG) y (DEG)	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280
0	204	205	206	205	205	205	205	205	204	204	204	204	204	204	204	203	203	203	204
5	200	190	169	145	121	103	87.2	75.2	69.2	66.1	64.8	63.1	62.0	61.3	60.6	60.2	60.0	60.2	60.6
10	137	111	90.6	74.3	62.0	52.9	47.5	45.9	49.1	55.3	63.7	74.3	85.1	94.8	100	103	105	103	100
15	105	73.0	54.3	47.5	52.1	73.1	99.8	127	145	158	166	168	167	166	171	177	180	177	171
20	91.7	64.6	68.1	86.1	112	134	153	167	162	151	138	128	120	114	111	110	111	110	111
25	78.9	56.5	79.5	116	153	150	139	126	123	122	120	112	103	95.0	91.2	89.3	89.0	89.3	91.2
30	81.9	65.2	96.2	139	179	170	149	123	108	95.3	84.5	77.1	71.6	67.5	63.6	60.9	59.6	60.9	63.6
35	112	92.3	98.3	112	125	118	105	90.1	77.0	64.8	54.7	50.1	47.6	46.6	45.0	44.1	43.8	44.1	45.0
40	135	121	121	124	125	108	86.5	65.3	53.5	44.4	37.5	31.0	25.9	22.4	20.9	20.5	20.8	20.5	20.9
45	143	129	116	105	93.0	78.2	63.4	49.4	38.2	28.7	21.1	16.1	12.7	10.5	8.97	8.24	8.15	8.24	8.97
50	133	120	103	85.8	68.5	53.7	40.5	29.2	20.5	13.7	8.83	5.93	4.32	3.59	3.01	2.80	2.87	2.80	3.01
55	106	95.8	81.4	65.8	50.1	36.5	24.5	14.8	9.82	6.93	5.42	3.68	2.50	1.77	1.45	1.40	1.51	1.40	1.45
60	92.8	85.4	68.6	49.5	31.0	21.3	14.6	10.2	7.03	5.03	3.82	2.51	1.56	0.94	0.71	0.69	0.79	0.69	0.71
65	70.3	64.2	49.4	32.8	17.4	11.6	8.66	7.49	5.48	3.94	2.77	1.72	0.93	0.39	0.21	0.20	0.28	0.20	0.21
70	41.9	36.7	28.6	20.3	12.7	9.19	7.02	5.72	4.21	3.01	2.07	1.24	0.60	0.18	0.06	0.08	0.17	0.08	0.06
75	24.8	21.6	17.3	12.9	8.88	6.76	5.33	4.35	3.31	2.47	1.77	1.14	0.64	0.28	0.19	0.21	0.28	0.21	0.19
80	13.8	12.5	10.6	8.58	6.67	5.45	4.48	3.69	2.92	2.24	1.66	1.15	0.74	0.44	0.37	0.38	0.44	0.38	0.37
85	9.80	9.19	7.86	6.35	4.88	4.08	3.47	2.98	2.42	1.92	1.48	1.11	0.82	0.62	0.56	0.58	0.62	0.58	0.56
90	4.55	4.26	3.85	3.42	2.99	2.69	2.42	2.15	1.82	1.51	1.23	1.03	0.88	0.79	0.77	0.78	0.80	0.78	0.77
95	3.75	3.56	3.20	2.78	2.37	2.10	1.88	1.68	1.46	1.26	1.10	1.00	0.95	0.92	0.92	0.93	0.94	0.93	0.92
100	3.10	2.92	2.70	2.46	2.22	1.98	1.75	1.54	1.36	1.21	1.10	1.05	1.02	1.02	1.02	1.03	1.04	1.03	1.02
105	3.10	2.91	2.61	2.29	1.98	1.79	1.63	1.50	1.36	1.23	1.13	1.09	1.08	1.08	1.09	1.09	1.10	1.09	1.09
110	2.98	2.90	2.60	2.24	1.88	1.70	1.56	1.46	1.33	1.22	1.13	1.10	1.08	1.08	1.09	1.09	1.10	1.09	1.09
115	3.09	3.12	2.77	2.29	1.80	1.62	1.52	1.45	1.33	1.22	1.14	1.10	1.08	1.08	1.08	1.09	1.09	1.09	1.08
120	3.30	3.42	2.99	2.37	1.74	1.56	1.47	1.44	1.34	1.24	1.16	1.12	1.10	1.09	1.09	1.09	1.09	1.09	1.09
125	2.87	2.99	2.68	2.22	1.75	1.59	1.51	1.47	1.38	1.29	1.23	1.20	1.18	1.18	1.17	1.17	1.16	1.17	1.17
130	2.16	2.22	2.11	1.93	1.72	1.62	1.55	1.48	1.41	1.35	1.31	1.30	1.29	1.30	1.29	1.29	1.28	1.29	1.29
135	1.86	1.93	1.88	1.78	1.66	1.58	1.51	1.44	1.40	1.36	1.34	1.34	1.35	1.37	1.37	1.37	1.37	1.37	1.37
140	1.57	1.63	1.64	1.61	1.56	1.49	1.43	1.36	1.33	1.32	1.31	1.33	1.35	1.37	1.38	1.39	1.38	1.39	1.38
145	1.35	1.40	1.40	1.38	1.35	1.32	1.29	1.26	1.25	1.25	1.26	1.29	1.31	1.34	1.35	1.35	1.35	1.35	1.35
150	1.24	1.29	1.29	1.27	1.24	1.21	1.20	1.18	1.19	1.20	1.22	1.23	1.25	1.27	1.28	1.28	1.28	1.28	1.28
155	1.14	1.21	1.20	1.17	1.13	1.12	1.11	1.10	1.11	1.13	1.14	1.14	1.15	1.15	1.15	1.15	1.14	1.15	1.15
160	1.05	1.12	1.12	1.09	1.06	1.06	1.07	1.07	1.07	1.08	1.07	1.07	1.06	1.04	1.03	1.01	0.99	1.01	1.03
165	0.93	0.99	1.00	0.99	0.97	0.98	0.99	0.99	0.98	0.97	0.95	0.92	0.90	0.87	0.84	0.82	0.80	0.82	0.84
170	0.81	0.84	0.85	0.84	0.83	0.84	0.84	0.83	0.80	0.77	0.72	0.68	0.63	0.59	0.57	0.56	0.56	0.56	0.57
175	0.79	0.81	0.81	0.81	0.80	0.79	0.78	0.77	0.73	0.69	0.65	0.62	0.60	0.58	0.58	0.58	0.59	0.58	0.58
180	0.73	0.72	0.72	0.72	0.72	0.73	0.73	0.73	0.73	0.72	0.70	0.68	0.66	0.64	0.63	0.62	0.62	0.62	0.63

																UNIT: cd				
y	C (DEG)																			
	(DEG)		285	290	295	300	305	310	315	320	325	330	335	340	345	350	355			
0		204	204	204	204	204	204	205	205	205	205	205	206	205	204	202				
5		61.3	62.0	63.1	64.8	66.1	69.2	75.2	87.2	103	121	145	169	190	200	204				
10		94.8	85.1	74.3	63.7	55.3	49.1	45.9	47.5	52.9	62.0	74.3	90.6	111	137	167				
15		166	167	168	166	158	145	127	99.8	73.1	52.1	47.5	54.3	73.0	105	150				
20		114	120	128	138	151	162	167	153	134	112	86.1	68.1	64.6	91.7	140				
25		95.0	103	112	120	122	123	126	139	150	153	116	79.5	56.5	78.9	129				
30		67.5	71.6	77.1	84.5	95.3	108	123	149	170	179	139	96.2	65.2	81.9	126				
35		46.6	47.6	50.1	54.7	64.8	77.0	90.1	105	118	125	112	98.3	92.3	112	146				
40		22.4	25.9	31.0	37.5	44.4	53.5	65.3	86.5	108	125	124	121	121	135	157				
45		10.5	12.7	16.1	21.1	28.7	38.2	49.4	63.4	78.2	93.0	105	116	129	143	160				
50		3.59	4.32	5.93	8.83	13.7	20.5	29.2	40.5	53.7	68.5	85.8	103	120	133	143				
55		1.77	2.50	3.68	5.42	6.93	9.82	14.8	24.5	36.5	50.1	65.8	81.4	95.8	106	114				
60		0.94	1.56	2.51	3.82	5.03	7.03	10.2	14.6	21.3	31.0	49.5	68.6	85.4	92.8	94.7				
65		0.39	0.93	1.72	2.77	3.94	5.48	7.49	8.66	11.6	17.4	32.8	49.4	64.2	70.3	71.8				
70		0.18	0.60	1.24	2.07	3.01	4.21	5.72	7.02	9.19	12.7	20.3	28.6	36.7	41.9	45.7				
75		0.28	0.64	1.14	1.77	2.47	3.31	4.35	5.33	6.76	8.88	12.9	17.3	21.6	24.8	27.3				
80		0.44	0.74	1.15	1.66	2.24	2.92	3.69	4.48	5.45	6.67	8.58	10.6	12.5	13.8	14.7				
85		0.62	0.82	1.11	1.48	1.92	2.42	2.98	3.47	4.08	4.88	6.35	7.86	9.19	9.80	9.99				
90		0.79	0.88	1.03	1.23	1.51	1.82	2.15	2.42	2.69	2.99	3.42	3.85	4.26	4.55	4.78				
95		0.92	0.95	1.00	1.10	1.26	1.46	1.68	1.88	2.10	2.37	2.78	3.20	3.56	3.75	3.83				
100		1.02	1.02	1.05	1.10	1.21	1.36	1.54	1.75	1.98	2.22	2.46	2.70	2.92	3.10	3.26				
105		1.08	1.08	1.09	1.13	1.23	1.36	1.50	1.63	1.79	1.98	2.29	2.61	2.91	3.10	3.23				
110		1.08	1.08	1.10	1.13	1.22	1.33	1.46	1.56	1.70	1.88	2.24	2.60	2.90	2.98	2.93				
115		1.08	1.08	1.10	1.14	1.22	1.33	1.45	1.52	1.62	1.80	2.29	2.77	3.12	3.09	2.81				
120		1.09	1.10	1.12	1.16	1.24	1.34	1.44	1.47	1.56	1.74	2.37	2.99	3.42	3.30	2.83				
125		1.18	1.18	1.20	1.23	1.29	1.38	1.47	1.51	1.59	1.75	2.22	2.68	2.99	2.87	2.49				
130		1.30	1.29	1.30	1.31	1.35	1.41	1.48	1.55	1.62	1.72	1.93	2.11	2.22	2.16	1.97				
135		1.37	1.35	1.34	1.34	1.36	1.40	1.44	1.51	1.58	1.66	1.78	1.88	1.93	1.86	1.72				
140		1.37	1.35	1.33	1.31	1.32	1.33	1.36	1.43	1.49	1.56	1.61	1.64	1.63	1.57	1.47				
145		1.34	1.31	1.29	1.26	1.25	1.25	1.26	1.29	1.32	1.35	1.38	1.40	1.40	1.35	1.28				
150		1.27	1.25	1.23	1.22	1.20	1.19	1.18	1.20	1.21	1.24	1.27	1.29	1.29	1.24	1.15				
155		1.15	1.15	1.14	1.14	1.13	1.11	1.10	1.11	1.12	1.13	1.17	1.20	1.21	1.14	1.04				
160		1.04	1.06	1.07	1.07	1.08	1.07	1.07	1.07	1.06	1.06	1.09	1.12	1.12	1.05	0.95				
165		0.87	0.90	0.92	0.95	0.97	0.98	0.99	0.99	0.98	0.97	0.99	1.00	0.99	0.93	0.85				
170		0.59	0.63	0.68	0.72	0.77	0.80	0.83	0.84	0.84	0.83	0.84	0.85	0.84	0.81	0.76				
175		0.58	0.60	0.62	0.65	0.69	0.73	0.77	0.78	0.79	0.80	0.81	0.81	0.81	0.79	0.76				
180		0.64	0.66	0.68	0.70	0.72	0.73	0.73	0.73	0.73	0.72	0.72	0.72	0.72	0.73	0.75				

## 4.0 LM-79 Measurement and Test Results

### 4.3 THD and PF Test

<b>Model No.</b>	W34S @ 17W / 4000K	<b>Sample ID</b>	230612003-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 25±1°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	0.155	18.4	0.986	2.88
277.0	60	0.086	18.7	0.782	15.80



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