

Photometric Test Report

Relevant Standards

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

Prepared For

RAB Lighting Inc.

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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		12495
Minimum Luminaire Efficacy (lm/W) (Goniophotometer – Section 4.2) (0°-180° zones)	IES LM-79-2008	N/A		146.1
Luminaire Output (lm) (Goniophotometer – Section 4.2) (0°-90° zones)	IES LM-79-2008	300		12070
Minimum Luminaire Efficacy (lm/W) (Goniophotometer – Section 4.2) (0°-90° zones)	IES LM-79-2008	Standard	Premium	141.2
		105	120	
Power (Input Wattage) (W) (Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Case		85.5
Total Harmonic Distortion (A%) (THD & PF – Section 4.3)	ANSI C82.77:2014	20.00%	120V	2.97
			277V	5.18
Power Factor (THD & PF – Section 4.3)	ANSI C82.77:2014	0.9	120V	0.996
			277V	0.948
Allowable CCTs* (K) (Integrating Sphere – Section 4.1)	IES LM-79-2008	7 steps	3985±275	4035
		4 steps	3985±154	
Minimum CRI (Integrating Sphere – Section 4.1)	IES LM-79-2008 CIE13.3-1995	≥70		76.8
Minimum R9 (Integrating Sphere – Section 4.1)	IES LM-79-2008 CIE13.3-1995	N/A		-15
Minimum Rf (Integrating Sphere – Section 4.1)	ANSI/IES TM-30-18	≥70		78
Minimum Rg (Integrating Sphere – Section 4.1)	ANSI/IES TM-30-18	≥89		94
IES Rcs,h1 (Integrating Sphere – Section 4.1)	ANSI/IES TM-30-18	-18%≤IES Rcs,h1≤+23%		-15%
Zonal Lumen Requirement (80°-90°) (Goniophotometer – Section 4.2)	IES LM-79-2008	≤10%		6.8%
Input Voltage (V)				
(Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Cast		120.0
(Goniophotometer – Section 4.2)		Non-Worst Case		277.0
Input Current (A)				
(Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Case		0.715
(Goniophotometer – Section 4.2)		Non-Worst Case		0.323
Power (Input Wattage – W)				
(Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Case		85.5
(Goniophotometer – Section 4.2)		Non-Worst Case		84.8

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2023-06-13	W34M @ 80W / 4000K	230612002-S1
2	Goniophotometer Test	2023-06-13	W34M @ 80W / 4000K	230612002-S1
3	THD and PF Test	2023-06-13	W34M @ 80W / 4000K	230612002-S1

Remark (If any)

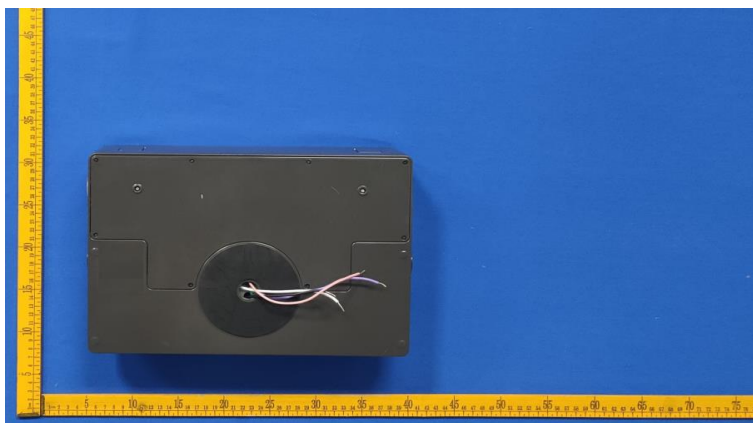
1. The results contained in this report pertain only to the tested samples.
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3. This report does not imply product certification, approval, or endorsement by NVLAP, or any agency of the Federal Government.

3.0 Product Description

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

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

Photos of Luminaire Characteristics



4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test

Model No.	W34M @ 80W / 4000K	Sample ID	230612002-S1
Operate time (Min.)	10	Stabilization time (Min.)	60
Temperature (°C)	25.4	Humidity (%RH)	41.0

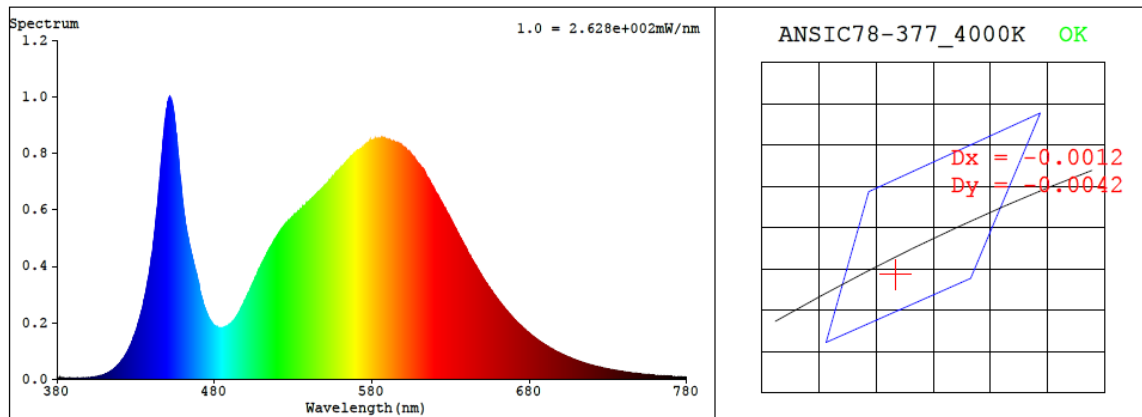
Test Method
<p>The Samples were tested according to the IES LM-79-2008.</p> <p>Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25±1°C.</p> <p>The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere.</p> <p>The voltage of an AC power supply (RMS voltage) or DC power supply (instantaneous voltage) applied to the device under test shall be regulated to within ±0.2 percent under load.</p> <p>The sample was measured using 4π geometry and operated at rated voltage and was stabilized before measurement.</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	0.715	85.5	0.996
277.0	60	0.323	84.8	0.948

CCT (K)	CRI	R9	Duv	Rf	Rg	IES Rcs,h1
4035	76.8	-15	-0.0016	78	94	-15%

4.1 Integrating Sphere Test



Colorimetric Parameters

Chromaticity Coordinate: $x = 0.3778$ $y = 0.3716$ / $u' = 0.2254$ $v' = 0.4989$ ($duv = -1.63e-03$)

CCT= 4035K Prcp WL: Ld=579.9nm Purity=24.9%

Peak WL: Lp=452nm FWHM: =21.8nm Ratio:R=17.4% G=79.5% B=3.1%

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

EEL: 0.09453 A++ Highest

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

R8 =56 R9 =-15 R10=62 R11=70 R12=51 R13=77 R14=95 R15=69

4.1 Integrating Sphere Test

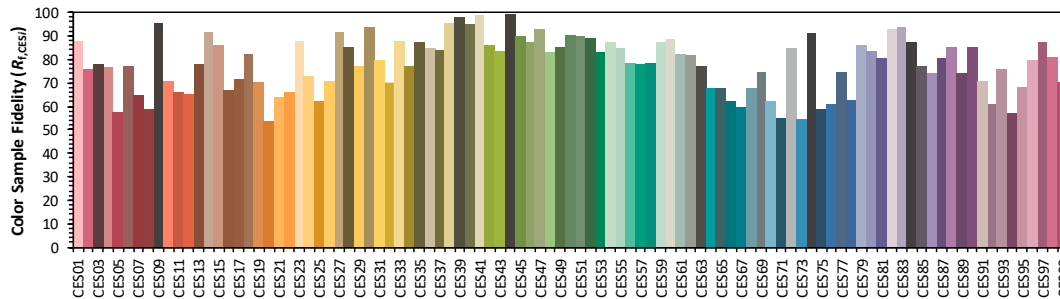
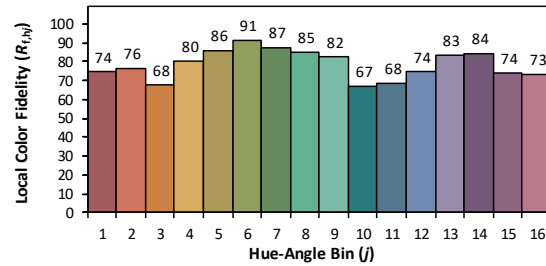
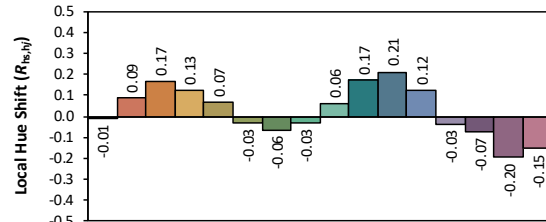
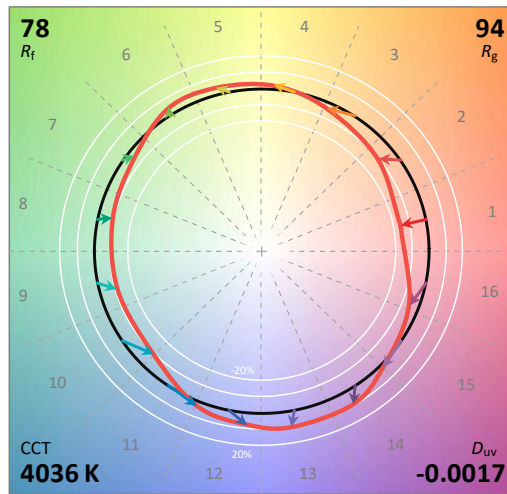
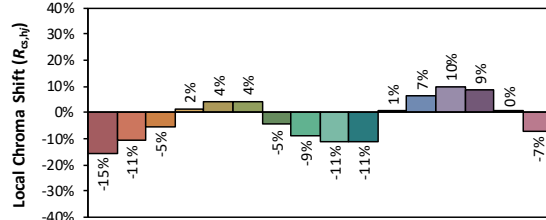
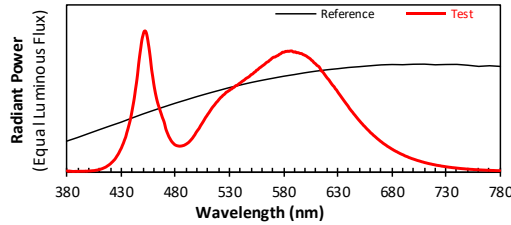
ANSI/IES TM-30-18 Color Rendition Report

Source: 1 CIE F1

Manufacturer: RAB Lighting Inc.

Date: 2023/6/14

Model: W34M @ 80W / 4000K



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

x 0.3777
 y 0.3715
 u' 0.2254
 v' 0.4988

CIE 13.3-1995
(CRI)

R_a 77
 R_g -15

4.1 Integrating Sphere Test

Spectral Distribution over Visible Wavelength											
WL (nm)	Radiant (W/nm)	WL (nm)	Radiant (W/nm)	WL (nm)	Radiant (W/nm)	WL (nm)	Radiant (W/nm)	WL (nm)	Radiant (W/nm)	WL (nm)	Radiant (W/nm)
380	7.20E-06	447	8.23E-04	514	4.53E-04	581	8.47E-04	648	3.82E-04	715	5.74E-05
381	3.10E-06	448	8.77E-04	515	4.62E-04	582	8.52E-04	649	3.73E-04	716	5.60E-05
382	6.30E-06	449	9.32E-04	516	4.71E-04	583	8.51E-04	650	3.64E-04	717	5.43E-05
383	3.20E-06	450	9.65E-04	517	4.81E-04	584	8.53E-04	651	3.55E-04	718	5.24E-05
384	4.00E-06	451	9.91E-04	518	4.91E-04	585	8.51E-04	652	3.46E-04	719	5.11E-05
385	2.40E-06	452	9.96E-04	519	4.98E-04	586	8.54E-04	653	3.38E-04	720	4.94E-05
386	2.90E-06	453	9.84E-04	520	5.09E-04	587	8.54E-04	654	3.29E-04	721	4.79E-05
387	2.90E-06	454	9.52E-04	521	5.18E-04	588	8.54E-04	655	3.22E-04	722	4.61E-05
388	3.60E-06	455	9.05E-04	522	5.26E-04	589	8.48E-04	656	3.13E-04	723	4.52E-05
389	2.90E-06	456	8.54E-04	523	5.32E-04	590	8.47E-04	657	3.05E-04	724	4.37E-05
390	2.90E-06	457	7.92E-04	524	5.41E-04	591	8.49E-04	658	2.97E-04	725	4.30E-05
391	3.30E-06	458	7.24E-04	525	5.46E-04	592	8.42E-04	659	2.90E-04	726	4.07E-05
392	4.00E-06	459	6.74E-04	526	5.53E-04	593	8.43E-04	660	2.82E-04	727	3.98E-05
393	4.20E-06	460	6.21E-04	527	5.62E-04	594	8.42E-04	661	2.74E-04	728	3.86E-05
394	3.90E-06	461	5.77E-04	528	5.66E-04	595	8.38E-04	662	2.68E-04	729	3.77E-05
395	4.20E-06	462	5.38E-04	529	5.72E-04	596	8.37E-04	663	2.60E-04	730	3.62E-05
396	4.00E-06	463	5.05E-04	530	5.75E-04	597	8.35E-04	664	2.54E-04	731	3.52E-05
397	5.10E-06	464	4.77E-04	531	5.84E-04	598	8.29E-04	665	2.47E-04	732	3.40E-05
398	4.20E-06	465	4.54E-04	532	5.86E-04	599	8.27E-04	666	2.41E-04	733	3.29E-05
399	5.40E-06	466	4.30E-04	533	5.93E-04	600	8.23E-04	667	2.34E-04	734	3.19E-05
400	6.10E-06	467	4.07E-04	534	5.97E-04	601	8.19E-04	668	2.28E-04	735	3.13E-05
401	6.10E-06	468	3.84E-04	535	6.02E-04	602	8.13E-04	669	2.21E-04	736	2.99E-05
402	7.00E-06	469	3.65E-04	536	6.10E-04	603	8.08E-04	670	2.15E-04	737	2.93E-05
403	7.70E-06	470	3.41E-04	537	6.11E-04	604	8.03E-04	671	2.10E-04	738	2.84E-05
404	8.30E-06	471	3.08E-04	538	6.17E-04	605	7.97E-04	672	2.03E-04	739	2.78E-05
405	8.60E-06	472	2.86E-04	539	6.24E-04	606	7.89E-04	673	1.98E-04	740	2.68E-05
406	1.05E-05	473	2.67E-04	540	6.29E-04	607	7.84E-04	674	1.93E-04	741	2.59E-05
407	1.17E-05	474	2.49E-04	541	6.34E-04	608	7.73E-04	675	1.88E-04	742	2.51E-05
408	1.31E-05	475	2.35E-04	542	6.41E-04	609	7.68E-04	676	1.82E-04	743	2.43E-05
409	1.49E-05	476	2.21E-04	543	6.45E-04	610	7.61E-04	677	1.77E-04	744	2.34E-05
410	1.65E-05	477	2.11E-04	544	6.51E-04	611	7.52E-04	678	1.72E-04	745	2.28E-05
411	1.94E-05	478	2.02E-04	545	6.58E-04	612	7.48E-04	679	1.68E-04	746	2.21E-05
412	2.17E-05	479	1.95E-04	546	6.63E-04	613	7.42E-04	680	1.62E-04	747	2.16E-05
413	2.49E-05	480	1.89E-04	547	6.67E-04	614	7.29E-04	681	1.58E-04	748	2.08E-05
414	2.83E-05	481	1.86E-04	548	6.72E-04	615	7.14E-04	682	1.53E-04	749	2.01E-05
415	3.15E-05	482	1.84E-04	549	6.78E-04	616	7.09E-04	683	1.49E-04	750	1.93E-05
416	3.56E-05	483	1.82E-04	550	6.87E-04	617	7.00E-04	684	1.45E-04	751	1.89E-05
417	4.11E-05	484	1.82E-04	551	6.90E-04	618	6.89E-04	685	1.42E-04	752	1.86E-05
418	4.61E-05	485	1.82E-04	552	6.96E-04	619	6.78E-04	686	1.37E-04	753	1.78E-05
419	5.15E-05	486	1.83E-04	553	7.04E-04	620	6.68E-04	687	1.33E-04	754	1.74E-05
420	5.77E-05	487	1.85E-04	554	7.08E-04	621	6.58E-04	688	1.29E-04	755	1.71E-05
421	6.55E-05	488	1.87E-04	555	7.18E-04	622	6.51E-04	689	1.26E-04	756	1.62E-05
422	7.25E-05	489	1.92E-04	556	7.21E-04	623	6.39E-04	690	1.22E-04	757	1.58E-05
423	8.06E-05	490	1.96E-04	557	7.28E-04	624	6.28E-04	691	1.19E-04	758	1.54E-05
424	8.88E-05	491	2.01E-04	558	7.36E-04	625	6.17E-04	692	1.15E-04	759	1.51E-05
425	1.00E-04	492	2.06E-04	559	7.40E-04	626	6.08E-04	693	1.11E-04	760	1.43E-05
426	1.12E-04	493	2.14E-04	560	7.47E-04	627	6.00E-04	694	1.08E-04	761	1.41E-05
427	1.24E-04	494	2.22E-04	561	7.52E-04	628	5.87E-04	695	1.06E-04	762	1.35E-05
428	1.38E-04	495	2.31E-04	562	7.57E-04	629	5.79E-04	696	1.01E-04	763	1.33E-05
429	1.54E-04	496	2.40E-04	563	7.64E-04	630	5.67E-04	697	9.89E-05	764	1.28E-05
430	1.68E-04	497	2.52E-04	564	7.71E-04	631	5.56E-04	698	9.59E-05	765	1.25E-05
431	1.87E-04	498	2.62E-04	565	7.76E-04	632	5.46E-04	699	9.30E-05	766	1.21E-05
432	2.05E-04	499	2.76E-04	566	7.80E-04	633	5.35E-04	700	9.07E-05	767	1.17E-05
433	2.27E-04	500	2.87E-04	567	7.87E-04	634	5.24E-04	701	8.80E-05	768	1.13E-05
434	2.46E-04	501	2.98E-04	568	7.93E-04	635	5.13E-04	702	8.56E-05	769	1.08E-05
435	2.75E-04	502	3.08E-04	569	8.00E-04	636	5.03E-04	703	8.28E-05	770	1.10E-05
436	3.01E-04	503	3.22E-04	570	8.06E-04	637	4.92E-04	704	8.03E-05	771	1.04E-05
437	3.30E-04	504	3.35E-04	571	8.11E-04	638	4.82E-04	705	7.82E-05	772	1.02E-05
438	3.59E-04	505	3.46E-04	572	8.11E-04	639	4.72E-04	706	7.60E-05	773	9.70E-06
439	3.94E-04	506	3.59E-04	573	8.16E-04	640	4.62E-04	707	7.37E-05	774	9.80E-06
440	4.35E-04	507	3.72E-04	574	8.20E-04	641	4.49E-04	708	7.11E-05	775	9.30E-06
441	4.78E-04	508	3.85E-04	575	8.23E-04	642	4.39E-04	709	6.93E-05	776	8.90E-06
442	5.22E-04	509	3.95E-04	576	8.30E-04	643	4.29E-04	710	6.69E-05	777	8.70E-06
443	5.78E-04	510	4.07E-04	577	8.33E-04	644	4.21E-04	711	6.48E-05	778	8.40E-06
444	6.29E-04	511	4.18E-04	578	8.38E-04	645	4.10E-04	712	6.31E-05	779	8.50E-06
445	6.89E-04	512	4.30E-04	579	8.45E-04	646	4.01E-04	713	6.10E-05	780	8.50E-06
446	7.62E-04	513	4.41E-04	580	8.45E-04	647	3.92E-04	714	5.92E-05	N/A	N/A

4.0 LM-79 Measurement and Test Results

4.2 Goniophotometer Test

Model No.	W34M @ 80W / 4000K	Sample ID	230612002-S1
Operate time (Min.)	30	Stabilization time (Min.)	60
Temperature (°C)	25.0	Humidity (%RH)	42.1

Test Method
<p>The Samples were tested according to the IES LM-79-2008.</p> <p>Photometric parameters were measured using a type C goniophotometer and software.</p> <p>The ambient temperature shall be maintained at $25 \pm 1^{\circ}\text{C}$, measured at a point not more than 1 m from the sample and at the same height as the sample.</p> <p>The voltage of an AC power supply (RMS voltage) or DC power supply (instantaneous voltage) applied to the device under test shall be regulated to within ± 0.2 percent under load.</p> <p>The samples were operated at rated voltage and was stabilized before measurement. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at 1.0° vertical intervals and 15° horizontal intervals.</p>

Test Conditions

Condition	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
WORST CASE	120.0	60	0.715	85.5	0.996
NON-WORST CASE	277.0	60	0.323	84.8	0.948

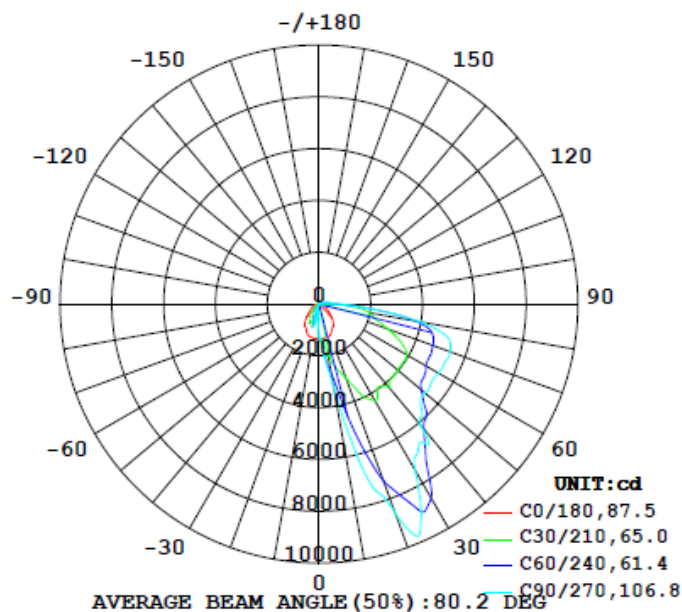
Test Result

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	12495	90.7	124.1	63.6	61.3	146.1	6.6%	B1-U3-G5
0°-90° zones	12070	90.7	124.1	63.6	61.3	141.2	6.8%	B1-U3-G5

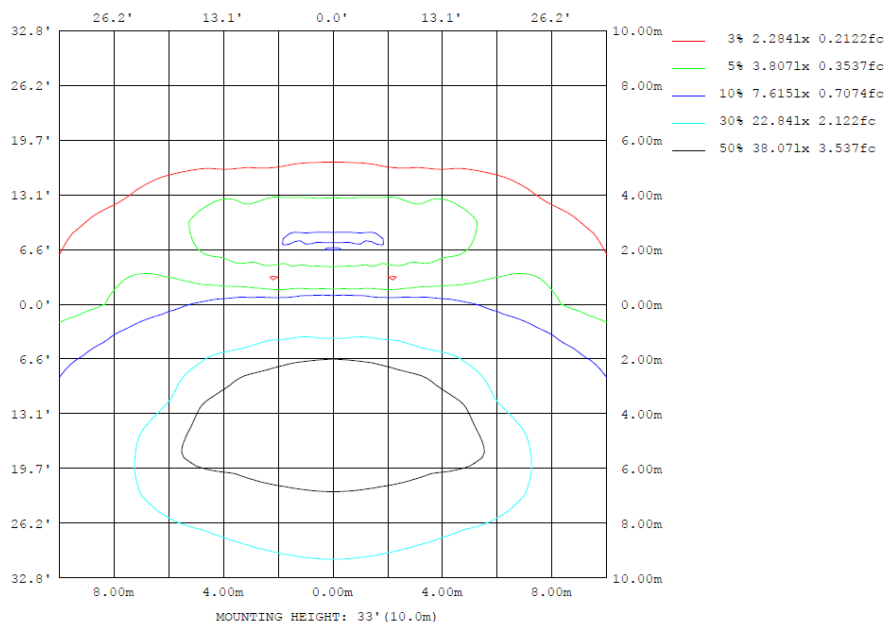
4.2 Goniophotometer Test

Lighting Distribution Curve

LUMINOUS INTENSITY DISTRIBUTION DIAGRAM



Isolux Plot



4.2 Goniophotometer Test

Zonal Lumen Summary

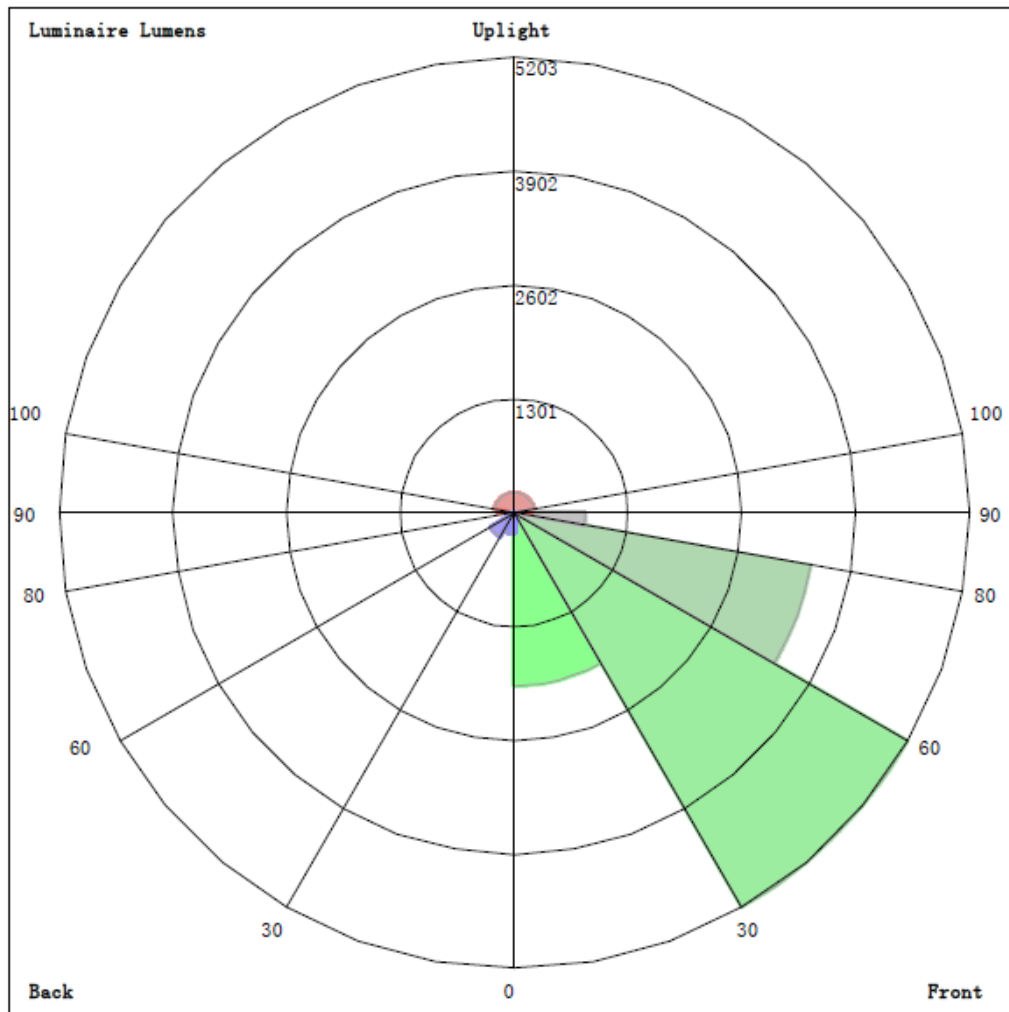
ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	± zone	± total	lum, lamp
10	1351	2447	3251	2447	1351	298.1	595.8	298.1	0- 10	112.6	112.6	0.90,0.90
20	1278	4910	8566	4910	1278	890.8	467.1	890.8	10- 20	636.7	749.3	6,6
30	1035	7389	7439	7389	1035	520.5	245.7	520.5	20- 30	1466	2215	17.7,17.7
40	834.2	7485	6077	7485	834.2	304.3	90.39	304.3	30- 40	1818	4033	32.3,32.3
50	524.2	5401	5317	5401	524.2	126.8	16.58	126.8	40- 50	1874	5907	47.3,47.3
60	342.5	4280	5330	4280	342.5	51.10	3.882	51.10	50- 60	1829	7735	61.9,61.9
70	213.5	4003	5383	4003	213.5	28.32	1.072	28.32	60- 70	1827	9563	76.5,76.5
80	82.42	3570	3977	3570	82.42	21.37	2.624	21.37	70- 80	1682	11244	90,90
90	23.95	762.6	814.7	762.6	23.95	14.34	4.155	14.34	80- 90	825.7	12070	96.6,96.6
100	16.96	267.3	409.9	267.3	16.96	7.860	5.003	7.860	90-100	195.7	12266	98.2,98.2
110	12.76	129.7	183.1	129.7	12.76	7.160	5.186	7.160	100-110	93.76	12359	98.9,98.9
120	9.685	106.4	132.6	106.4	9.685	6.725	5.102	6.725	110-120	53.16	12413	99.3,99.3
130	7.549	75.50	108.3	75.50	7.549	6.427	5.717	6.427	120-130	37.27	12450	99.6,99.6
140	5.848	42.33	94.32	42.33	5.848	5.723	5.872	5.723	130-140	26.00	12476	99.8,99.8
150	4.507	23.44	42.86	23.44	4.507	4.960	5.316	4.960	140-150	12.01	12488	99.9,99.9
160	3.420	11.27	19.12	11.27	3.420	4.564	3.917	4.564	150-160	5.185	12493	100,100
170	2.729	2.033	2.129	2.033	2.729	3.349	2.332	3.349	160-170	1.469	12495	100,100
180	3.114	2.812	2.568	2.812	3.114	2.959	2.518	2.959	170-180	0.2495	12495	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

Zonal (lm)		Total (lm)		Percent
0-10	112.65	0-10	112.65	0.90%
10-20	636.68	0-20	749.33	6.00%
20-30	1465.91	0-30	2215.24	17.73%
30-40	1817.66	0-40	4032.90	32.28%
40-50	1873.64	0-50	5906.54	47.27%
50-60	1828.63	0-60	7735.17	61.91%
60-70	1827.39	0-70	9562.56	76.53%
70-80	1681.63	0-80	11244.19	89.99%
80-90	825.75	0-90	12069.94	96.60%
90-100	195.73	0-100	12265.67	98.17%
100-110	93.76	0-110	12359.43	98.92%
110-120	53.16	0-120	12412.59	99.34%
120-130	37.27	0-130	12449.86	99.64%
130-140	26.00	0-140	12475.86	99.85%
140-150	12.01	0-150	12487.87	99.95%
150-160	5.18	0-160	12493.05	99.99%
160-170	1.47	0-170	12494.52	100.00%
170-180	0.25	0-180	12494.77	100.00%

4.2 Goniophotometer Test

LCS/BUG

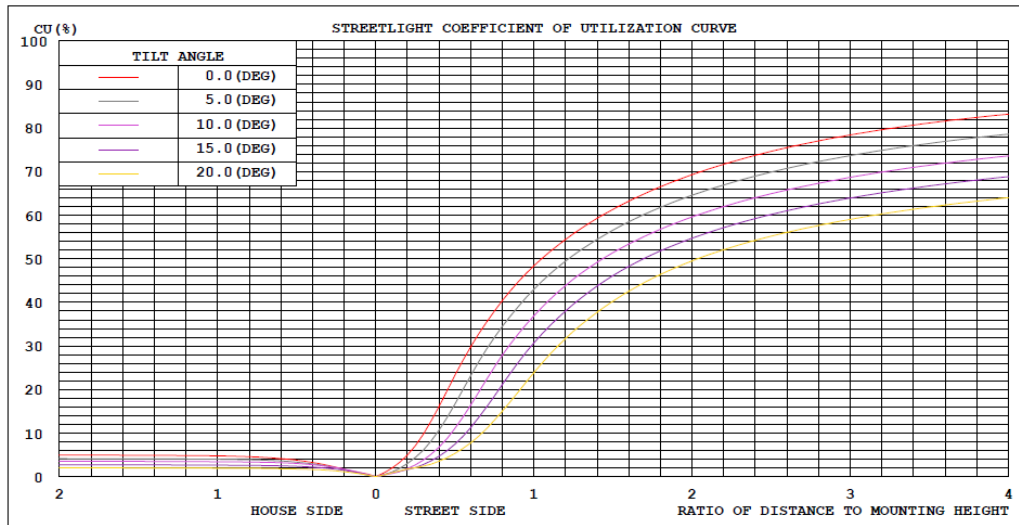


LUMINAIRE CLASSIFICATION SYSTEM (LCS)

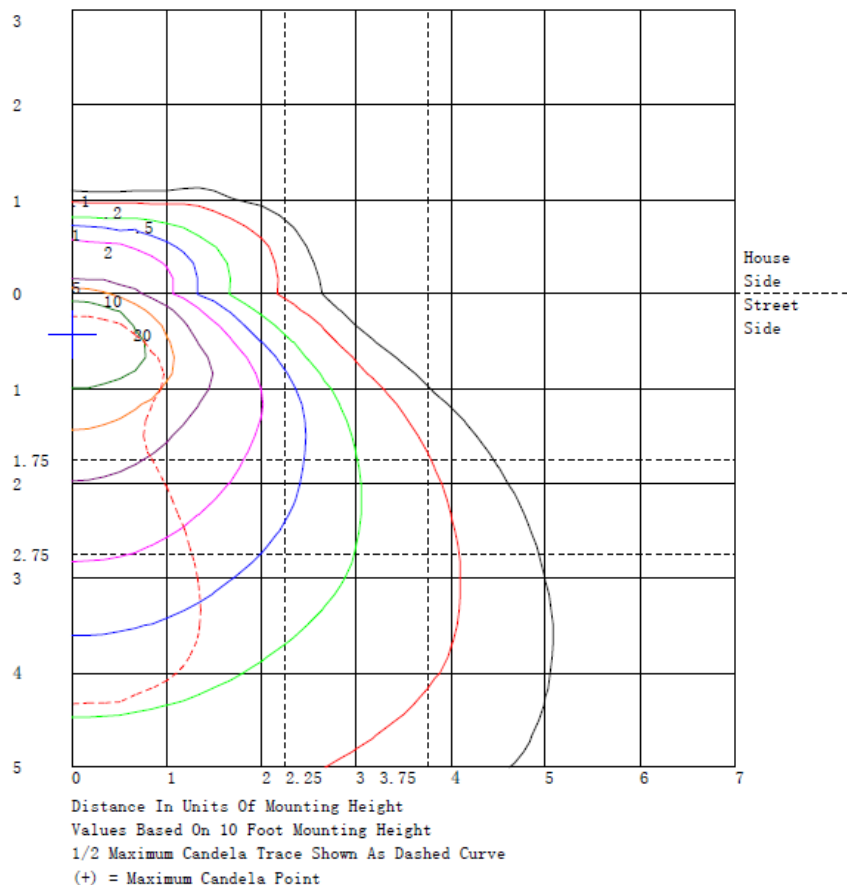
	Lumens	% Lamp	% Luminaire
FL - Front-Low (0-30)	1978.6	N.A.	15.8
FM - Front-Medium (30-60)	5203.1	N.A.	41.6
FH - Front-High (60-80)	3440.6	N.A.	27.5
FVH - Front-Very High (80-90)	813.3	N.A.	6.5
BL - Back-Low (0-30)	236.7	N.A.	1.9
BM - Back-Medium (30-60)	316.9	N.A.	2.5
BH - Back-High (60-80)	68.4	N.A.	0.5
BVH - Back-Very High (80-90)	12.4	N.A.	0.1
UL - Uplight-Low (90-100)	195.7	N.A.	1.6
UH - Uplight-High (100-180)	229.1	N.A.	1.8
Total	12494.8	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	1325	1326	1326	1327	1328	1328	1329	1329	1330	1330	1331	1332	1332	1332	1332	1333	1333	1333	1333
5	1347	1327	1318	1319	1331	1354	1387	1435	1489	1545	1595	1643	1688	1732	1770	1802	1824	1838	1846
10	1351	1331	1360	1437	1586	1765	1958	2133	2298	2447	2553	2646	2733	2840	2945	3044	3137	3209	3251
15	1329	1411	1542	1724	1982	2270	2567	2782	3019	3310	3781	4302	4835	5317	5754	6127	6402	6585	6670
20	1278	1558	1843	2133	2383	2672	3036	3577	4208	4910	5730	6534	7250	7675	7975	8183	8382	8513	8566
25	1146	1489	1875	2305	2756	3268	3858	4612	5426	6264	7107	7890	8564	8994	9281	9442	9448	9389	9313
30	1035	1374	1796	2301	2871	3537	4309	5359	6421	7389	8029	8455	8659	8483	8169	7812	7627	7500	7439
35	971	1384	1831	2312	2735	3260	3956	5302	6647	7749	7823	7581	7187	7019	6876	6764	6717	6699	6701
40	834	1284	1777	2314	2845	3457	4189	5421	6592	7485	7300	6835	6307	6321	6413	6510	6363	6201	6077
45	661	1213	1767	2326	2860	3418	4019	4873	5670	6289	6307	6134	5878	5793	5727	5676	5621	5583	5567
50	524	1019	1545	2102	2727	3357	3966	4553	5047	5401	5408	5303	5161	5170	5204	5248	5277	5300	5317
55	421	748	1180	1716	2476	3251	3953	4331	4579	4731	4836	4898	4942	5023	5102	5174	5231	5273	5297
60	342	580	961	1485	2319	3171	3919	4161	4254	4280	4442	4609	4771	4908	5029	5133	5225	5294	5330
65	275	449	768	1231	1983	2772	3488	3802	3994	4125	4335	4538	4732	4920	5086	5221	5302	5347	5360
70	213	315	550	919	1519	2180	2832	3292	3680	4003	4266	4488	4683	4898	5088	5243	5329	5374	5383
75	143	207	388	684	1147	1689	2272	2864	3421	3906	4184	4384	4538	4740	4919	5064	5142	5182	5188
80	82.4	130	284	545	952	1436	1969	2560	3113	3570	3734	3793	3795	3854	3903	3940	3960	3972	3977
85	46.6	96.2	216	405	714	1056	1394	1663	1877	2020	2010	1949	1872	1868	1876	1890	1893	1895	1900
90	23.9	58.5	112	186	291	406	521	620	703	763	765	751	734	750	772	794	804	811	815
95	17.7	36.4	64.4	102	154	212	271	327	377	416	426	429	429	447	466	484	491	494	495
100	17.0	32.0	51.0	74.1	103	134	168	202	236	267	290	310	328	352	375	394	404	409	410
105	15.4	29.1	43.9	60.0	78.0	96.6	115	133	150	166	180	194	210	232	255	275	286	292	293
110	12.8	21.6	31.9	43.9	58.5	73.9	89.5	104	118	130	138	146	153	163	172	179	182	183	183
115	11.2	19.3	28.3	38.1	48.8	60.4	72.7	87.3	102	114	121	127	132	139	146	152	153	153	151
120	9.68	17.2	24.9	32.8	40.0	48.1	58.0	74.8	91.7	106	110	112	112	118	125	131	132	133	133
125	8.41	14.1	20.1	26.6	32.7	39.8	48.4	61.8	75.8	88.8	96.4	102	106	110	113	115	115	115	115
130	7.55	10.3	14.3	19.6	26.2	34.0	43.0	53.3	64.3	75.5	87.1	97.6	106	109	111	110	110	109	108
135	6.73	7.36	9.87	14.3	21.6	30.0	38.8	45.8	52.8	60.0	68.4	77.2	86.3	96.9	107	114	115	114	112
140	5.85	5.23	6.68	10.2	17.4	25.5	33.3	36.7	39.5	42.3	47.5	53.4	59.7	66.3	72.9	79.3	85.9	91.2	94.3
145	5.15	3.25	3.46	5.79	11.9	18.8	25.4	27.6	29.0	30.6	35.1	39.9	44.6	47.3	49.3	51.0	53.0	54.6	55.6
150	4.51	3.23	3.22	4.46	7.70	11.6	15.7	18.3	20.8	23.4	27.8	32.1	36.0	37.5	38.3	38.9	40.5	41.9	42.9
155	3.93	3.26	3.19	3.72	4.93	6.67	8.89	11.5	14.5	17.8	21.8	25.6	28.5	28.9	28.4	27.7	28.1	28.5	29.0
160	3.42	3.32	3.24	3.19	2.78	2.69	3.20	5.46	8.26	11.3	13.9	16.2	18.0	18.8	19.2	19.2	19.2	19.2	19.1
165	2.92	2.90	2.85	2.77	2.57	2.42	2.38	2.54	2.94	3.64	5.03	6.58	8.09	9.07	9.83	10.4	10.8	11.0	11.2
170	2.73	2.68	2.63	2.56	2.48	2.39	2.30	2.21	2.12	2.03	1.95	1.88	1.82	1.76	1.73	1.73	1.85	1.99	2.13
175	2.88	2.86	2.82	2.79	2.74	2.69	2.64	2.58	2.52	2.45	2.39	2.32	2.26	2.20	2.16	2.13	2.09	2.08	2.10
180	3.11	3.11	3.09	3.07	3.04	3.01	2.97	2.92	2.87	2.81	2.75	2.69	2.64	2.59	2.55	2.53	2.53	2.54	2.57

C (DEG)																			UNIT: cd	
γ (DEG)	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185	
0	1333	1332	1332	1332	1332	1332	1332	1331	1330	1330	1329	1329	1328	1328	1327	1326	1326	1325	1331	
5	1838	1824	1802	1770	1732	1688	1643	1595	1545	1489	1435	1387	1354	1331	1319	1318	1327	1347	1248	
10	3209	3137	3044	2945	2840	2733	2646	2553	2447	2298	2133	1958	1765	1586	1437	1360	1331	1351	974	
15	6585	6402	6127	5754	5317	4835	4302	3781	3310	3019	2782	2567	2270	1982	1724	1542	1411	1329	868	
20	8513	8382	8183	7975	7675	7250	6534	5730	4910	4208	3577	3036	2672	2383	2133	1843	1558	1278	790	
25	9389	9448	9442	9281	8994	8564	7890	7107	6264	5426	4612	3858	3268	2756	2305	1875	1489	1146	718	
30	7500	7627	7812	8169	8483	8659	8455	8029	7389	6421	5359	4309	3537	2871	2301	1796	1374	1035	748	
35	6699	6717	6764	6876	7019	7187	7581	7823	7749	6647	5302	3956	3260	2735	2312	1831	1384	971	800	
40	6201	6363	6510	6413	6321	6307	6835	7300	7485	6592	5421	4189	3457	2845	2314	1777	1284	834	763	
45	5583	5621	5676	5727	5793	5878	6134	6307	6289	5670	4873	4019	3418	2860	2326	1767	1213	661	675	
50	5300	5277	5248	5204	5170	5161	5303	5408	5401	5047	4553	3966	3357	2727	2102	1545	1019	524	533	
55	5273	5231	5174	5102	5023	4942	4898	4836	4731	4579	4331	3953	3251	2476	1716	1180	748	421	433	
60	5294	5225	5133	5029	4908	4771	4609	4442	4280	4254	4161	3919	3171	2319	1485	961	580	342	357	
65	5347	5302	5221	5086	4920	4732	4538	4335	4125	3994	3802	3488	2772	1983	1231	768	449	275	283	
70	5374	5329	5243	5088	4898	4683	4488	4266	4003	3680	3292	2832	2180	1519	919	550	315	213	201	
75	5182	5142	5064	4919	4740	4538	4384	4184	3906	3421	2864	2272	1689	1147	684	388	207	143	128	
80	3972	3960	3940	3903	3854	3795	3793	3734	3570	3113	2560	1969	1436	952	545	284	130	82.4	76.5	
85	1895	1893	1890	1876	1868	1872	1949	2010	2020	1877	1663	1394	1056	714	405	216	96.2	46.6	50.1	
90	811	804	794	772	750	734	751	765	763	703	620	521	406	291	186	112	58.5	23.9	25.8	
95	494	491	484	466	447	429	429	426	416	377	327	271	212	154	102	64.4	36.4	17.7	18.8	
100	409	404	394	375	352	328	310	290	267	236	202	168	134	103	74.1	51.0	32.0	17.0	16.2	
105	292	286	275	255	232	210	194	180	166	150	133	115	96.6	78.0	60.0	43.9	29.1	15.4	14.6	
110	183	182	179	172	163	153	146	138	130	118	104	89.5	73.9	58.5	43.9	31.9	21.6	12.8	12.6	
115	153	153	152	146	139	132	127	121	114	102	87.3	72.7	60.4	48.8	38.1	28.3	19.3	11.2	11.5	
120	133	132	131	125	118	112	112	110	106	91.7	74.8	58.0	48.1	40.0	32.8	24.9	17.2	9.68	11.1	
125	115	115	115	113	110	106	102	96.4	88.8	75.8	61.8	48.4	39.8	32.7	26.6	20.1	14.1	8.41	10.1	
130	109	110	110	111	109	106	97.6	87.1	75.5	64.3	53.3	43.0	34.0	26.2	19.6	14.3	10.3	7.55	7.92	
135	114	115	114	107	96.9	86.3	77.2	68.4	60.0	52.8	45.8	38.8	30.0	21.6	14.3	9.87	7.36	6.73	7.18	
140	91.2	85.9	79.3	72.9	66.3	59.7	53.4	47.5	42.0	35.9	36.7	33.3	25.5	17.4	10.2	6.68	5.23	2.85	6.30	
145	54.6	53.0	51.0	49.3	47.3	44.6	39.9	35.1	30.6	29.0	27.6	25.4	18.8	11.9	5.79	3.46	3.25	5.5	5.69	
150	41.9	40.5	38.9	38.3	37.5	36.0	32.1	27.8	23.8	20.8	18.3	15.7	11.6	7.70	4.46	3.22	3.23	4.51	5.16	
155	28.5	28.1	27.7	28.4	28.9	28.5	25.6	21.8	17.4	14.5	11.5	8.89	6.67	4.93	3.72	3.19	3.26	3.93	4.58	
160	19.2	19.2	19.2	19.2	18.8	18.0	16.2	13.9	11.3	8.26	5.46	3.20	2.69	2.28	2.19	3.24	3.24	3.42	4.07	
165	11.0	10.8	10.4	9.83	9.07	8.09	6.58	5.03	3.64	2.94	2.54	2.38	2.42	2.57	2.77	2.85	2.90	3.2	3.55	
170	1.99	1.85	1.73	1.73	1.76	1.82	1.88	1.95	2.03	2.12	2.21	2.30	2.39	2.48	2.56	2.63	2.68	2.73	3.1	
175	2.08	2.09	2.13	2.16	2.20	2.26	2.32	2.39	2.45	2.52	2.58	2.64	2.69	2.74	2.79	2.82	2.86	2.88	3.19	
180	2.54	2.53	2.53	2.55	2.59	2.64	2.69	2.75	2.81	2.87	2.92	2.97	3.01	3.04	3.07	3.09	3.11	3.11	3.3	

Table--3

UNIT: °C

γ	C (DEG)	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280
0		1336	1339	1340	1339	1338	1339	1339	1339	1338	1336	1335	1336	1336	1337	1336	1335	1333	1335	1336
5		1132	999	825	651	496	413	360	328	305	293	288	282	278	276	273	272	272	272	273
10		676	458	344	291	278	265	273	298	350	409	465	489	506	520	551	579	596	579	551
15		528	309	250	283	379	500	633	756	806	834	847	872	888	892	863	831	807	831	863
20		457	278	330	480	669	780	858	891	809	696	579	534	507	493	478	470	467	470	478
25		439	310	434	630	819	775	681	570	531	502	477	434	393	360	351	350	354	350	351
30		551	444	483	569	658	636	586	520	461	403	349	310	281	260	249	245	246	245	249
35		671	587	573	582	592	543	480	412	350	293	247	229	221	219	209	202	198	202	209
40		697	638	590	544	497	433	367	304	253	209	171	139	114	96.3	89.6	88.4	90.4	88.4	89.6
45		667	635	565	483	398	336	280	228	175	128	90.3	70.7	59.6	54.1	48.1	44.7	43.9	44.7	48.1
50		525	499	447	383	314	247	183	127	89.9	62.9	44.2	32.0	24.9	21.4	18.2	16.6	16.6	16.6	18.2
55		428	405	356	295	230	170	116	71.1	47.4	33.3	25.4	17.5	12.3	9.32	7.83	7.55	8.04	7.55	7.83
60		353	332	281	220	159	115	79.1	51.1	34.4	24.0	17.8	11.6	7.38	4.80	3.65	3.47	3.88	3.47	3.65
65		275	253	204	149	96.2	68.9	50.1	37.6	27.1	19.5	14.0	8.68	4.60	1.81	0.88	0.86	1.35	0.86	0.88
70		185	163	132	99.5	69.5	51.3	38.0	28.3	20.8	15.3	11.2	6.90	3.49	1.08	0.46	0.58	1.07	0.58	0.46
75		113	97.3	80.9	65.0	50.6	39.8	30.8	23.7	18.1	13.8	10.3	6.77	3.87	1.78	1.25	1.36	1.78	1.36	1.25
80		70.2	63.4	55.7	47.9	40.3	33.4	27.0	21.4	16.7	12.7	9.37	6.46	4.18	2.60	2.19	2.29	2.62	2.29	2.19
85		51.2	50.0	45.2	39.0	32.3	27.3	22.8	18.7	14.8	11.5	8.59	6.29	4.54	3.37	3.07	3.15	3.42	3.15	3.07
90		26.7	26.6	25.1	22.9	20.4	18.4	16.4	14.3	11.7	9.15	6.89	5.52	4.61	4.09	3.94	4.00	4.16	4.00	3.94
95		19.2	18.8	17.1	15.1	12.9	11.4	10.2	9.01	7.63	6.38	5.35	4.86	4.63	4.56	4.55	4.59	4.65	4.59	4.55
100		15.4	14.4	13.3	12.0	10.8	9.79	8.80	7.86	6.97	6.00	5.30	5.01	4.90	4.91	4.92	4.96	5.00	4.96	4.92
105		13.7	12.7	11.6	10.5	9.51	8.75	8.07	7.43	6.68	6.00	5.45	5.23	5.15	5.16	5.17	5.20	5.24	5.20	5.17
110		12.2	11.7	10.7	9.75	8.79	8.17	7.65	7.16	6.52	5.92	5.43	5.23	5.15	5.14	5.14	5.16	5.19	5.16	5.14
115		11.5	11.2	10.4	9.34	8.34	7.80	7.37	6.98	6.40	5.86	5.40	5.21	5.13	5.12	5.11	5.12	5.13	5.12	5.11
120		11.9	11.9	10.8	9.37	7.90	7.34	6.98	6.72	6.23	5.77	5.38	5.21	5.14	5.12	5.10	5.10	5.10	5.10	5.10
125		11.0	11.2	10.3	9.02	7.66	7.15	6.82	6.58	6.18	5.82	5.53	5.42	5.38	5.39	5.37	5.35	5.34	5.35	5.37
130		8.14	8.21	8.06	7.81	7.47	7.13	6.77	6.43	6.11	5.85	5.66	5.63	5.66	5.72	5.73	5.73	5.72	5.73	5.73
135		7.46	7.57	7.43	7.17	6.86	6.61	6.36	6.13	5.91	5.74	5.62	5.65	5.74	5.84	5.88	5.91	5.91	5.91	5.88
140		6.61	6.77	6.75	6.61	6.41	6.18	5.94	5.72	5.58	5.48	5.45	5.52	5.63	5.75	5.82	5.87	5.87	5.87	5.82
145		6.06	6.25	6.19	6.02	5.78	5.60	5.43	5.29	5.23	5.21	5.23	5.32	5.44	5.55	5.64	5.69	5.69	5.69	5.64
150		5.54	5.77	5.71	5.53	5.30	5.16	5.04	4.96	4.95	4.97	5.03	5.10	5.18	5.25	5.31	5.33	5.32	5.33	5.33
155		5.03	5.28	5.25	5.09	4.88	4.79	4.73	4.69	4.66	4.64	4.65	4.70	4.74	4.78	4.74	4.67	4.58	4.67	4.74
160		4.53	4.81	4.82	4.71	4.56	4.56	4.56	4.56	4.49	4.41	4.33	4.31	4.28	4.25	4.15	4.03	3.92	4.03	4.15
165		3.98	4.28	4.35	4.32	4.23	4.22	4.19	4.14	4.04	3.93	3.80	3.67	3.54	3.42	3.32	3.24	3.17	3.24	3.32
170		3.53	3.75	3.80	3.76	3.67	3.59	3.48	3.35	3.17	2.97	2.78	2.61	2.46	2.35	2.31	2.31	2.33	2.31	2.32
175		3.35	3.48	3.53	3.52	3.44	3.30	3.13	2.95	2.82	2.70	2.60	2.50	2.41	2.36	2.35	2.36	2.39	2.36	2.35
180		3.04	3.02	3.03	3.04	3.05	3.03	3.00	2.96	2.88	2.79	2.70	2.63	2.57	2.52	2.50	2.50	2.52	2.50	2.50

γ (DEG)	C (DEG)	285	290	295	300	305	310	315	320	325	330	335	340	345	350	355				
0		1337	1336	1336	1335	1336	1338	1339	1339	1339	1338	1339	1340	1339	1336	1331				
5		276	278	282	288	293	305	328	360	413	496	651	825	999	1132	1248				
10		520	506	489	465	409	350	298	273	265	278	291	344	458	676	974				
15		892	888	872	847	834	806	756	633	500	379	283	250	309	528	868				
20		493	507	534	579	696	809	891	858	780	669	480	330	278	457	790				
25		360	393	434	477	502	531	570	681	775	819	630	434	310	439	718				
30		260	281	310	349	403	461	520	586	636	658	569	483	444	551	748				
35		219	221	229	247	293	350	412	480	543	592	582	573	587	671	800				
40		96.3	114	139	171	209	253	304	367	433	497	544	590	638	697	763				
45		54.1	59.6	70.7	90.3	128	175	228	280	336	398	483	565	635	667	675				
50		21.4	24.9	32.0	44.2	62.9	89.9	127	183	247	314	383	447	499	525	533				
55		9.32	12.3	17.5	25.4	33.3	47.4	71.1	116	170	230	295	356	405	428	433				
60		4.80	7.38	11.6	17.8	24.0	34.4	51.1	79.1	115	159	220	281	332	353	357				
65		1.81	4.60	8.68	14.0	19.5	27.1	37.6	50.1	68.9	96.2	149	204	253	275	283				
70		1.08	3.49	6.90	11.2	15.3	20.8	28.3	38.0	51.3	69.5	99.5	132	163	185	201				
75		1.78	3.87	6.77	10.3	13.8	18.1	23.7	30.8	39.8	50.6	65.0	80.9	97.3	113	128				
80		2.60	4.18	6.46	9.37	12.7	16.7	21.4	27.0	33.4	40.3	47.9	55.7	63.4	70.2	76.5				
85		3.37	4.54	6.29	8.59	11.5	14.8	18.7	22.8	27.3	32.3	39.0	45.2	50.0	51.2	50.1				
90		4.09	4.61	5.52	6.89	9.15	11.7	14.3	16.4	18.4	20.4	22.9	25.1	26.6	26.7	25.8				
95		4.56	4.63	4.86	5.35	6.38	7.63	9.01	10.2	11.4	12.9	15.1	17.1	18.8	19.2	18.8				
100		4.91	4.90	5.01	5.30	6.00	6.87	7.86	8.80	9.79	10.8	12.0	13.3	14.4	15.4	16.2				
105		5.16	5.15	5.23	5.45	6.00	6.68	7.43	8.07	8.75	9.51	10.5	11.6	12.7	13.7	14.6				
110		5.14	5.15	5.23	5.43	5.92	6.52	7.16	7.65	8.17	8.79	9.75	10.7	11.7	12.2	12.6				
115		5.12	5.13	5.21	5.40	5.86	6.40	6.98	7.37	7.80	8.34	9.34	10.4	11.2	11.5	11.5				
120		5.12	5.14	5.21	5.38	5.77	6.23	6.72	6.98	7.34	7.90	9.37	10.8	11.9	11.9	11.1				
125		5.39	5.38	5.42	5.53	5.82	6.18	6.58	6.82	7.15	7.66	9.02	10.3	11.2	11.0	10.1				
130		5.72	5.66	5.63	5.66	5.85	6.11	6.43	6.77	7.13	7.47	7.81	8.06	8.21	8.14	7.92				
135		5.84	5.74	5.65	5.62	5.74	5.91	6.13	6.36	6.61	6.86	7.17	7.43	7.57	7.46	7.18				
140		5.75	5.63	5.52	5.45	5.48	5.58	5.72	5.94	6.18	6.41	6.61	6.75	6.77	6.61	6.30				
145		5.55	5.44	5.32	5.23	5.21	5.23	5.29	5.43	5.60	5.78	6.02	6.19	6.25	6.06	5.69				
150		5.25	5.18	5.10	5.03	4.97	4.95	4.96	5.04	5.16	5.30	5.53	5.71	5.77	5.54	5.12				
155		4.78	4.74	4.70	4.65	4.64	4.66	4.69	4.73	4.79	4.88	5.09	5.25	5.28	5.03	4.58				
160		4.25	4.28	4.31	4.33	4.41	4.49	4.56	4.56	4.56	4.56	4.71	4.82	4.81	4.53	4.07				
165		3.42	3.54	3.67	3.80	3.93	4.04	4.14	4.19	4.22	4.23	4.32	4.35	4.28	3.98	3.53				
170		2.35	2.46	2.61	2.78	2.97	3.17	3.35	3.48	3.59	3.67	3.76	3.80	3.75	3.53	3.19				
175		2.36	2.41	2.50	2.60	2.70	2.82	2.95	3.13	3.30	3.44	3.52	3.53	3.48	3.35	3.15				
180		2.52	2.57	2.63	2.70	2.79	2.88	2.96	3.00	3.03	3.05	3.04	3.03	3.02	3.04	3.07				

4.0 LM-79 Measurement and Test Results

4.3 THD and PF Test

Model No.	W34M @ 80W / 4000K	Sample ID	230612002-S1
Temperature (°C)	25.4	Humidity (%RH)	41.0

Test Method
<p>The samples were tested according to the ANSI C82.77:2014</p> <p>The total harmonic distortion shall be measured to the 40th order.</p> <p>The ambient temperature shall be maintained at $25 \pm 1^{\circ}\text{C}$. The sample measurements were made using a digital power meter and power supply. The sample was operated at rated voltage and was stabilized before measurement. The total harmonic distortion was calculated.</p>

Test Results

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	iTHD(%)
120.0	60	0.715	85.5	0.996	2.97
277.0	60	0.323	84.8	0.948	5.18

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*****