

Photometric Test Report

Relevant Standards

- ☒ IES LM-79-2008
- ☒ ANSI C82.77:2014

Prepared For

RAB Lighting Inc.

Room 6A33, No.1388, Wuzhong road, Shanghai, China

Xiao Xiang, 15921313292, Gary.Xiao@rabweb.com

Prepared By

Deliver Co., Ltd.

Block 11, 78 Keling Road, SSTP, Suzhou, China

0512-66801950, kevin.jia@szdeliver.com

Project Number

DLF2404111

Report Number

DLF2404111-17a

Test Date

2024/4/21

Issue Date

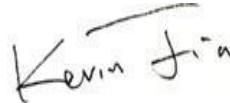
2024/4/23

Prepared By



Wangzun Zhu

Approved By



Kevin Jia

The results contained in this report pertain only to the tested sample.

This report shall not be reproduced, except in full, without written approval of Deliver Co., Ltd.

This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP.

1.0 Test Summary

DLC Technical Requirements v5.1

Indoor - High Bay Luminaires (Commercial and Industrial)				
Requirement Category	Test Method	Requirements		Test value
Luminaire Output (lm) (Goniophotometer - Section 4.2)	IES LM-79-2008	10000		35618
Minimum Luminaire Efficacy (lm/W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Standard 120	Premium 135	157.7
Power (Input Wattage) (W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		225.8
Total Harmonic Distortion (A%) (THD & PF - section 4.3)	ANSI C82.77:2014	20.00%	120V	2.03%
		20.00%	277V	7.46%
Power Factor (THD & PF - section 4.3)	ANSI C82.77:2014	0.9	120V	0.999
		0.9	277V	0.962
Allowable CCTs* (K) (Integrating Sphere - Section 4.1)	IES LM-79-2008	7 step	3985±275	3930
		4 step	3985±154	
Minimum CRI (Integrating Sphere - Section 4.1)	IES LM-79-2008 CIE 13.3-1995	≥70		84
Minimum R9 (Integrating Sphere - Section 4.1)	IES LM-79-2008 CIE 13.3-1995	≥-40		10
Minimum Rf (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	≥70		83
Minimum Rg (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	≥89		94
Minimum IES Rcs,h1 (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	-18%≤IES Rcs,h1≤+23%		-12%
Zonal Lumen Requirement (20°-50°) (Goniophotometer - Section 4.2)	IES LM-79-2008	≥30%		64.13%
Corrected UGR (X=4H, Y=8H, 70/50/20%) (Goniophotometer - Section 4.2)	CIE 190-2010	<28		27.1
Input Voltage (V)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		120
(Goniophotometer - Section 4.2)		Non-Worst Case		277
Input Current (A)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		1.884
(Goniophotometer - Section 4.2)		Non-Worst Case		0.823
Power (Input Wattage - W)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		225.8
(Goniophotometer - Section 4.2)		Non-Worst Case		219.3

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2024/4/21	H15XLB @ 240W/4000K	Q1
2	Goniophotometer Test	2024/4/21	H15XLB @ 240W/4000K	Q1
3	THD and PF Test	2024/4/21	H15XLB @ 240W/4000K	Q1

Remark(If any)

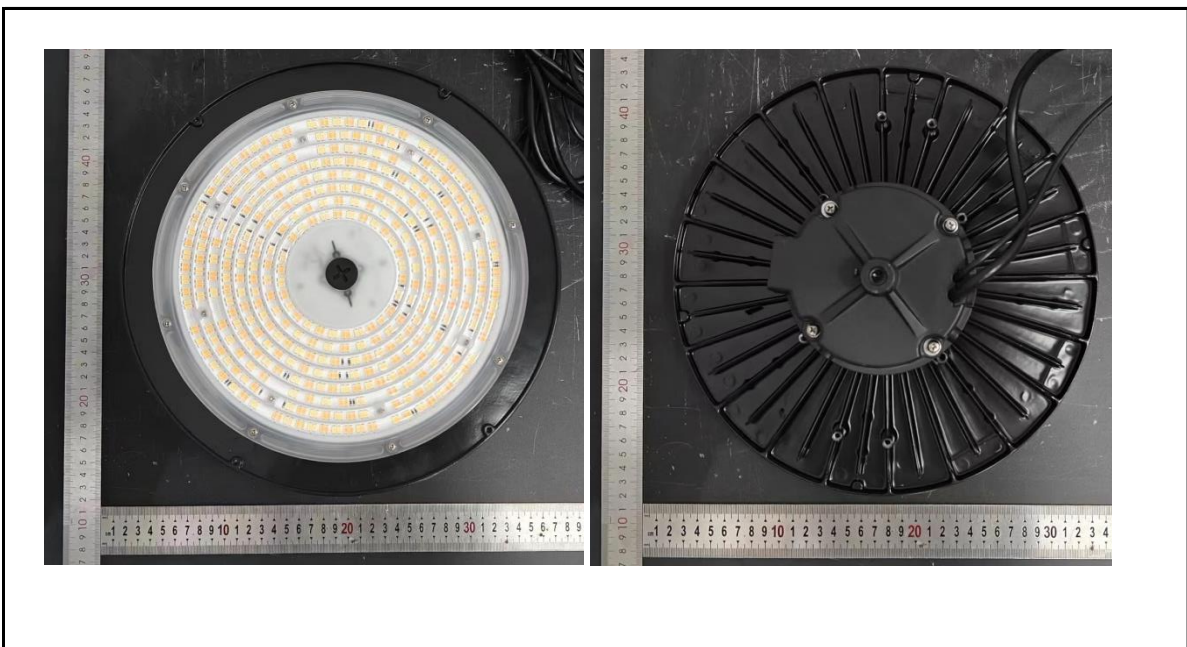
- 1、 This report shall not be used by the client to claim product endorsement by NVLAP, NIST or any agency of the US government.
- 2、 The results reported herein have been performed in accordance with the laboratory's terms of accreditation. This report shall not be reproduced except in full without the written approval of the Laboratory. The results in this report apply to the test sample(s) mentioned above at the time of the testing period only and are not to be used to indicate applicability to other similar products. This report does not imply that the product(s) has met the criteria for certification.

3.0 Production Description

Luminaire Description: H15XLB @ 240W/4000K

Electrical Specification: 120V-277V,50/60HZ

Photos of Luminaire Characteristics



4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test

Model No.	H15XLB @ 240W/4000K	Sample ID.	Q1
Operate time (Min.)	90	Stabilization time (Min.)	45
Temperature (°C)	25.3	Humidity (%RH)	56.0

Test Method

The samples were tested according to the IES LM-79-2008.

Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$.

The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere.

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.

The sample was measured using 4π geometry and operated at rated voltage and was stabilized before measurement. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780 nm.

Test Result

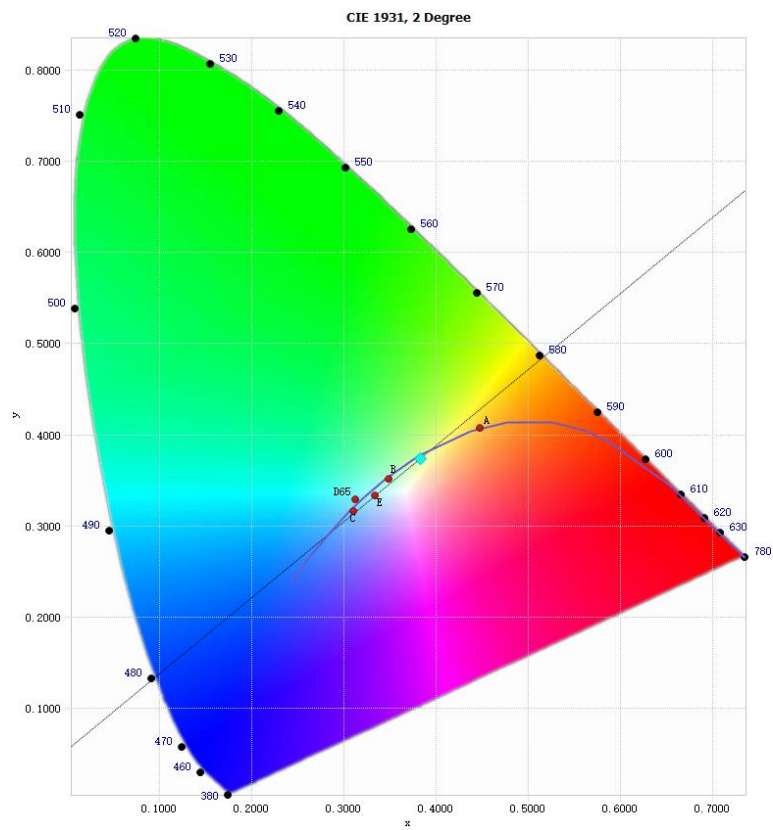
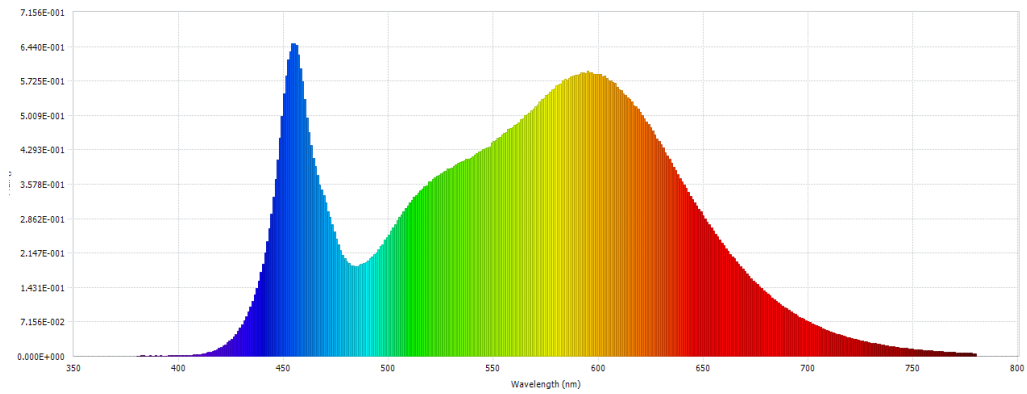
Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
119.96	60	1.884	225.8	0.999
277.01	60	0.823	219.3	0.962

Test Result

CCT (K)	CRI	R9	Duv
3930	84	10	-0.0018

Rf	Rg	IES Rcs,h1
83	94	-12%

4.1 Integrating Sphere Test



4.1 Integrating Sphere Test

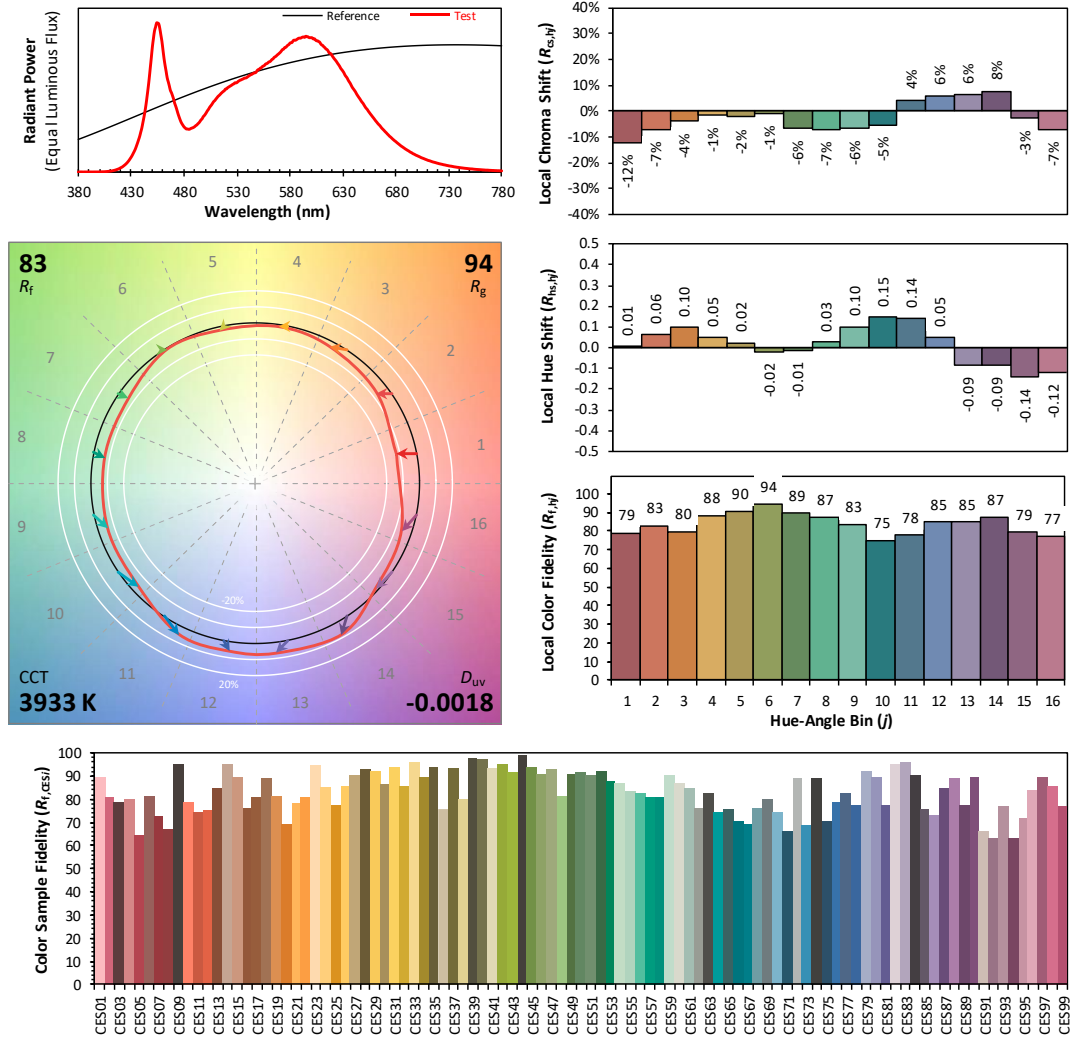
IES TM-30-18 Color Rendition Report

Source: DLF2404111-17a

Manufacturer: RAB Lighting Inc.

Date: 2024/4/21

Model: H15XLB @ 240W/4000K



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

x 0.3821
 y 0.3739
 u' 0.2274
 v' 0.5006

CIE 13.3-1995
(CRI)
 R_a 84
 R_g 14

4.1 Integrating Sphere Test

Spectral Distribution over Visible Wavelength							
WL (nm)	Radiant (Watts/nm)	WL (nm)	Radiant (Watts/nm)	WL (nm)	Radiant (Watts/nm)	WL (nm)	Radiant (Watts/nm)
380	7.24E-04	485	1.87E-01	590	5.84E-01	695	8.46E-02
385	5.97E-04	490	1.99E-01	595	5.93E-01	700	7.22E-02
390	7.47E-04	495	2.21E-01	600	5.86E-01	705	6.16E-02
395	8.83E-04	500	2.53E-01	605	5.73E-01	710	5.22E-02
400	1.19E-03	505	2.88E-01	610	5.55E-01	715	4.46E-02
405	1.98E-03	510	3.18E-01	615	5.35E-01	720	3.83E-02
410	4.11E-03	515	3.44E-01	620	5.07E-01	725	3.25E-02
415	9.14E-03	520	3.63E-01	625	4.75E-01	730	2.76E-02
420	1.91E-02	525	3.80E-01	630	4.40E-01	735	2.34E-02
425	3.57E-02	530	3.91E-01	635	4.01E-01	740	2.00E-02
430	6.57E-02	535	4.05E-01	640	3.63E-01	745	1.70E-02
435	1.15E-01	540	4.16E-01	645	3.26E-01	750	1.46E-02
440	1.92E-01	545	4.30E-01	650	2.93E-01	755	1.24E-02
445	3.31E-01	550	4.47E-01	655	2.60E-01	760	1.07E-02
450	5.46E-01	555	4.63E-01	660	2.30E-01	765	8.80E-03
455	6.50E-01	560	4.80E-01	665	2.03E-01	770	7.76E-03
460	5.33E-01	565	5.00E-01	670	1.76E-01	775	6.62E-03
465	3.94E-01	570	5.19E-01	675	1.53E-01	780	5.52E-03
470	3.19E-01	575	5.43E-01	680	1.33E-01		
475	2.44E-01	580	5.63E-01	685	1.14E-01		
480	1.97E-01	585	5.75E-01	690	9.84E-02		

4.0 LM-79 Measurement and Test Results

4.2 Goniophotometer Test

Model No.	H15XLB @ 240W/4000K	Sample ID.	Q1
Opreate time (Min.)	90	Stabilization time (Min.)	45
Temperature (°C)	25.3	Humidity (%RH)	54.0

Test Method

The samples were tested according to the IES LM-79-2008.

Photometric paramters were measured using a type C goniophotometer and software.

The ambient temperature shall be maintained at 25° C ± 1° C, measured at a point not more than 1 m from the sample and at the same height as the sample.

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.

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 0.5° vertical intervals and 10° horizontal intervals.

Test Conditions

Condition	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
WORST CASE	120.00	60	1.884	225.8	0.999
NON-WORST CASE	277.03	60	0.823	219.3	0.962

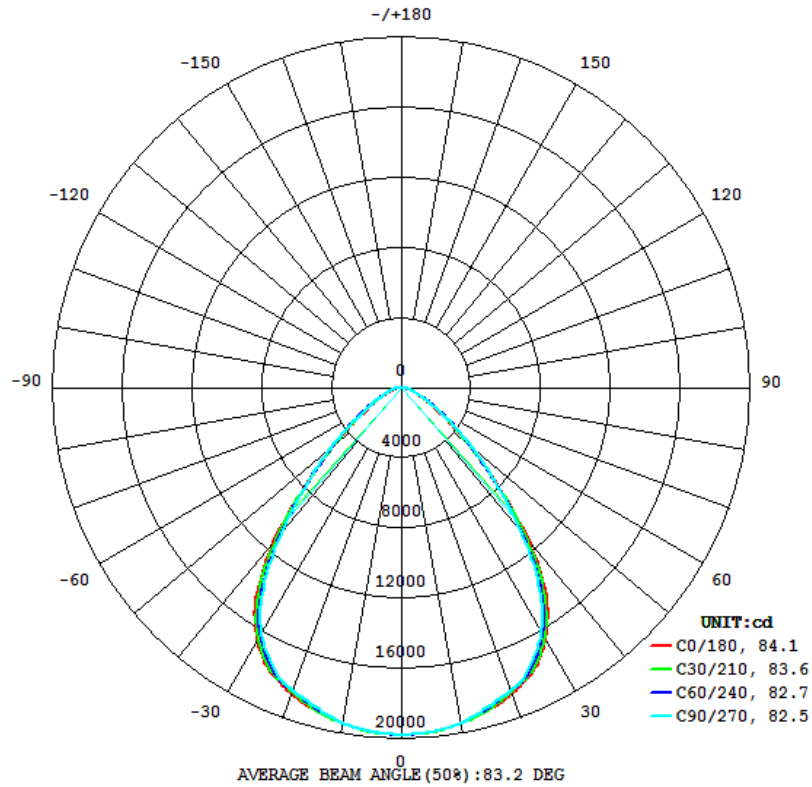
Test Result

Flux (lm)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
	C0-180	C90-270	C0-180	C90-270	
35618	121.7	123.2	84.1	82.5	157.7

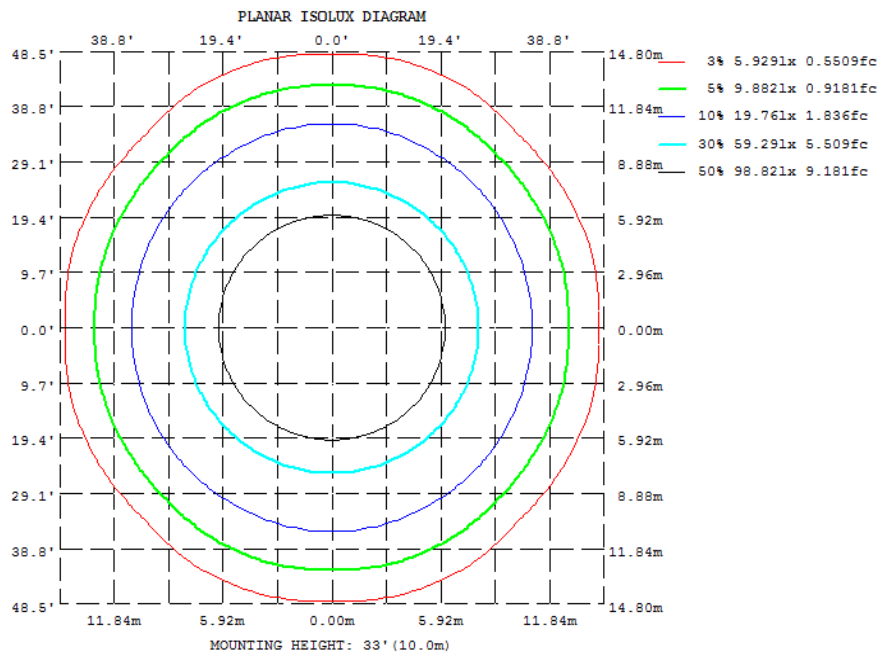
Zonal Lumen Requirement (20°-50°)	UGR (X=4H, Y=8H, 70/50/20%)
64.13%	27.1

4.2 Goniophotometer Test

Light Distrubtion Curve



Isolux Plot



4.2 Goniophotometer Test

Zonal Lumen Summary

γ	C0	C45	C90	C135	C180	C225	C270	C315
10	1941	1942	1939	1942	1941	1942	1939	1942
20	1852	1838	1834	1838	1852	1838	1834	1838
30	1656	1633	1610	1633	1656	1633	1610	1633
40	1141	1099	1069	1099	1141	1099	1069	1099
50	516.7	514.9	527.9	514.9	516.7	514.9	527.9	514.9
60	213.4	213.8	226.2	213.8	213.4	213.8	226.2	213.8
70	91.00	92.36	97.58	92.36	91.00	92.36	97.58	92.36
80	35.55	36.56	38.13	36.56	35.55	36.56	38.13	36.56
90	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0
110	0	0	0	0	0	0	0	0
120	0	0	0	0	0	0	0	0
130	0	0	0	0	0	0	0	0
140	0	0	0	0	0	0	0	0
150	0	0	0	0	0	0	0	0
160	0	0	0	0	0	0	0	0
170	0	0	0	0	0	0	0	0
180	0	0	0	0	0	0	0	0
DEG	LUMINOUS INTENSITY: ×10cd							

UGR Table - Corrected

UGR Table - Corrected										
Reflectances										
Ceiling Cavity	70	70	50	50	30	70	70	50	50	30
Walls	50	30	50	30	30	50	30	50	30	30
Floor Cavity	20	20	20	20	20	20	20	20	20	20
Room Size										
X=2H Y=2H	UGR Viewed Crosswise					UGR Viewed Endwise				
3H	25.3	26.6	25.7	27.0	27.3	25.1	26.4	25.4	26.7	27.0
4H	26.0	27.2	26.4	27.6	27.9	25.8	27.0	26.2	27.3	27.7
6H	26.3	27.4	26.7	27.8	28.1	26.0	27.1	26.4	27.5	27.9
8H	26.5	27.5	26.9	27.9	28.3	26.2	27.2	26.6	27.6	28.0
12H	26.5	27.5	27.0	27.9	28.3	26.2	27.2	26.7	27.6	28.0
	26.6	27.5	27.0	27.9	28.3	26.3	27.2	26.7	27.6	28.0
4H 2H	25.5	26.6	25.9	26.9	27.3	25.2	26.3	25.6	26.7	27.1
3H	26.4	27.3	26.8	27.7	28.1	26.1	27.0	26.5	27.4	27.8
4H	26.7	27.6	27.2	28.0	28.4	26.5	27.3	26.9	27.7	28.1
6H	27.0	27.7	27.5	28.2	28.6	26.7	27.4	27.2	27.9	28.3
8H	27.1	27.8	27.6	28.2	28.7	26.8	27.5	27.3	27.9	28.4
12H	27.2	27.8	27.7	28.2	28.7	26.9	27.4	27.4	27.9	28.4
8H 4H	26.8	27.5	27.3	27.9	28.4	26.6	27.2	27.0	27.7	28.1
6H	27.2	27.7	27.7	28.2	28.7	26.9	27.4	27.4	27.9	28.4
8H	27.3	27.8	27.8	28.3	28.8	27.0	27.5	27.5	28.0	28.5
12H	27.4	27.9	27.9	28.3	28.9	27.1	27.6	27.7	28.1	28.6
12H 4H	26.8	27.4	27.3	27.9	28.3	26.5	27.1	27.0	27.6	28.1
6H	27.2	27.7	27.7	28.1	28.7	26.9	27.4	27.4	27.9	28.4
8H	27.4	27.8	27.9	28.3	28.8	27.1	27.5	27.6	28.0	28.6
Maximum UGR = 28.9										

4.2 Goniophotometer Test

ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	1870.47	0 - 10	1870.47	5.25%
10-20	5353.64	0 - 20	7224.11	20.28%
20-30	8105.13	0 - 30	15329.24	43.04%
30-40	8721.01	0 - 40	24050.25	67.52%
40-50	6014.34	0 - 50	30064.59	84.41%
50-60	3179.12	0 - 60	33243.71	93.33%
60-70	1516.77	0 - 70	34760.48	97.59%
70-80	674.12	0 - 80	35434.60	99.49%
80-90	183.28	0 - 90	35617.88	100.00%
90-100	0.00	0 - 100	35617.88	100.00%
100-110	0.00	0 - 110	35617.88	100.00%
110-120	0.00	0 - 120	35617.88	100.00%
120-130	0.00	0 - 130	35617.88	100.00%
130-140	0.00	0 - 140	35617.88	100.00%
140-150	0.00	0 - 150	35617.88	100.00%
150-160	0.00	0 - 160	35617.88	100.00%
160-170	0.00	0 - 170	35617.88	100.00%
170-180	0.00	0 - 180	35617.88	100.00%

4.2 Goniophotometer Test

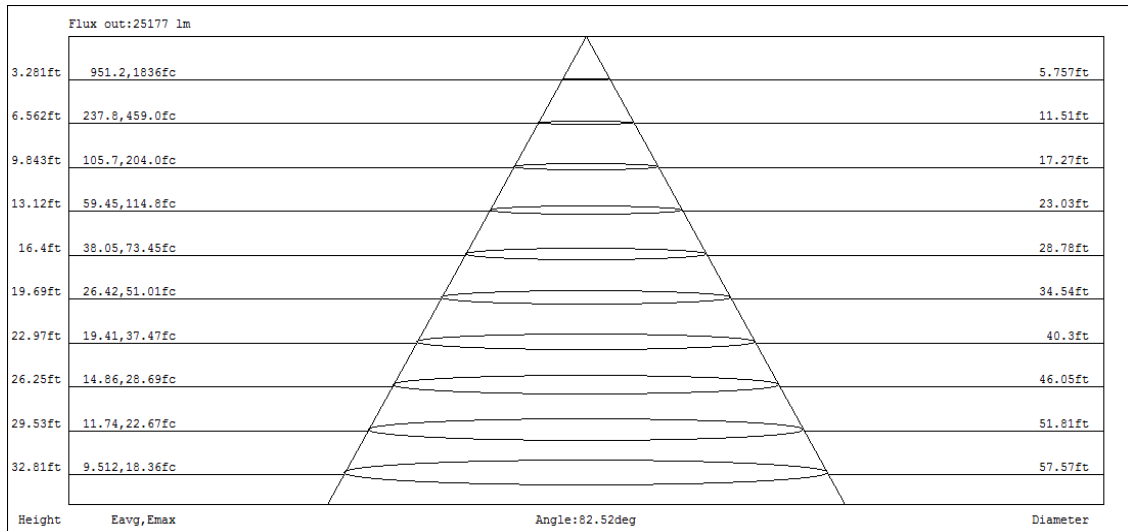
COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

Coefficients Of Utilization - Zonal Cavity Method

Effective Floor Cavity Reflectance 0.20

RC	80				70				50			30			10			0
RW	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	0
0	119	119	119	119	116	116	116	116	111	111	111	106	106	106	102	102	102	100
1	111	108	105	102	109	106	103	100	102	99	97	98	96	94	94	93	91	89
2	104	97	92	88	101	96	91	87	92	88	85	89	86	83	86	83	81	79
3	97	88	82	76	94	87	81	76	84	79	74	81	77	73	79	75	72	70
4	90	80	73	67	88	79	72	67	76	71	66	74	69	65	72	68	64	63
5	84	73	65	60	82	72	65	60	70	64	59	68	63	58	66	62	58	56
6	78	67	59	54	76	66	59	54	64	58	53	63	57	53	61	56	52	51
7	73	61	54	49	72	61	54	48	59	53	48	58	52	48	57	51	48	46
8	69	57	49	44	67	56	49	44	55	48	44	54	48	44	53	47	43	42
9	64	53	45	40	63	52	45	40	51	45	40	50	44	40	49	44	40	38
10	61	49	42	37	59	48	42	37	47	41	37	47	41	37	46	40	37	35

CONE OF LIGHT DIAGRAM



4.0 LM-79 Measurement and Test Results

4.3 THD and PF Test

Model No.	H15XLB @ 240W/4000K	Sample ID.	Q1
Temperature (°C)	25.3	Humidity (%RH)	56.0

Test Method

The samples were tested according to the ANSI C82.77:2014.

The total harmonic distortion shall be measured to the 40th order.

The ambient temperature condition was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. 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 were calculated.

Test Results

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD
119.96	60	1.884	225.8	0.999	2.03%
277.01	60	0.823	219.3	0.962	7.46%

5.0 Equipment Information

Test Equipment			
Equipment ID	Equipment Name	Last Calibration Date	Calibration Due Date
DLF107	Integrating Sphere System	2023/12/24	2024/12/23
DLF108	Auxiliary Lamp	2023/12/24	2024/12/23
DLF122	Measurement Standard Lamp Standard Lamp Type: 220 V, 0.4720 A, Tungsten, Omni-directional	2023/12/24	2024/12/23
DLF116	AC Power Source	2023/12/16	2024/12/15
DLF516	Power Meter	2023/12/16	2024/12/15
DLF112	Temperature Recorder	2023/12/28	2024/12/27
DLF114	Temperature & Humidity Datalogger	2023/12/28	2024/12/27
DLF101	Goniophotometer	2023/12/24	2024/12/23
DLF511	AC Power Source	2023/12/16	2024/12/15
DLF512	AC Power Source	2023/12/16	2024/12/15
DLF513	AC Power Source	2023/12/16	2024/12/15
DLF507	DC Power Source	2023/12/16	2024/12/15
DLF111	Temperature & Humidity Datalogger	2023/12/28	2024/12/27
DLF119	Power Meter	2023/12/16	2024/12/15
DLF031	Temperature data logger	2023/6/22	2024/6/21
DLF073	Power Analyzer	2023/6/22	2024/6/21
DLF003	Temperature & Humidity Datalogger	2023/6/22	2024/6/21

***** End of Test Report*****