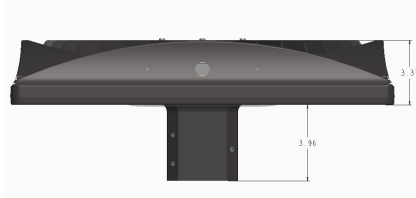


ISOFOOTCANDLE LINES OF HORIZONTAL ILLUMINATION

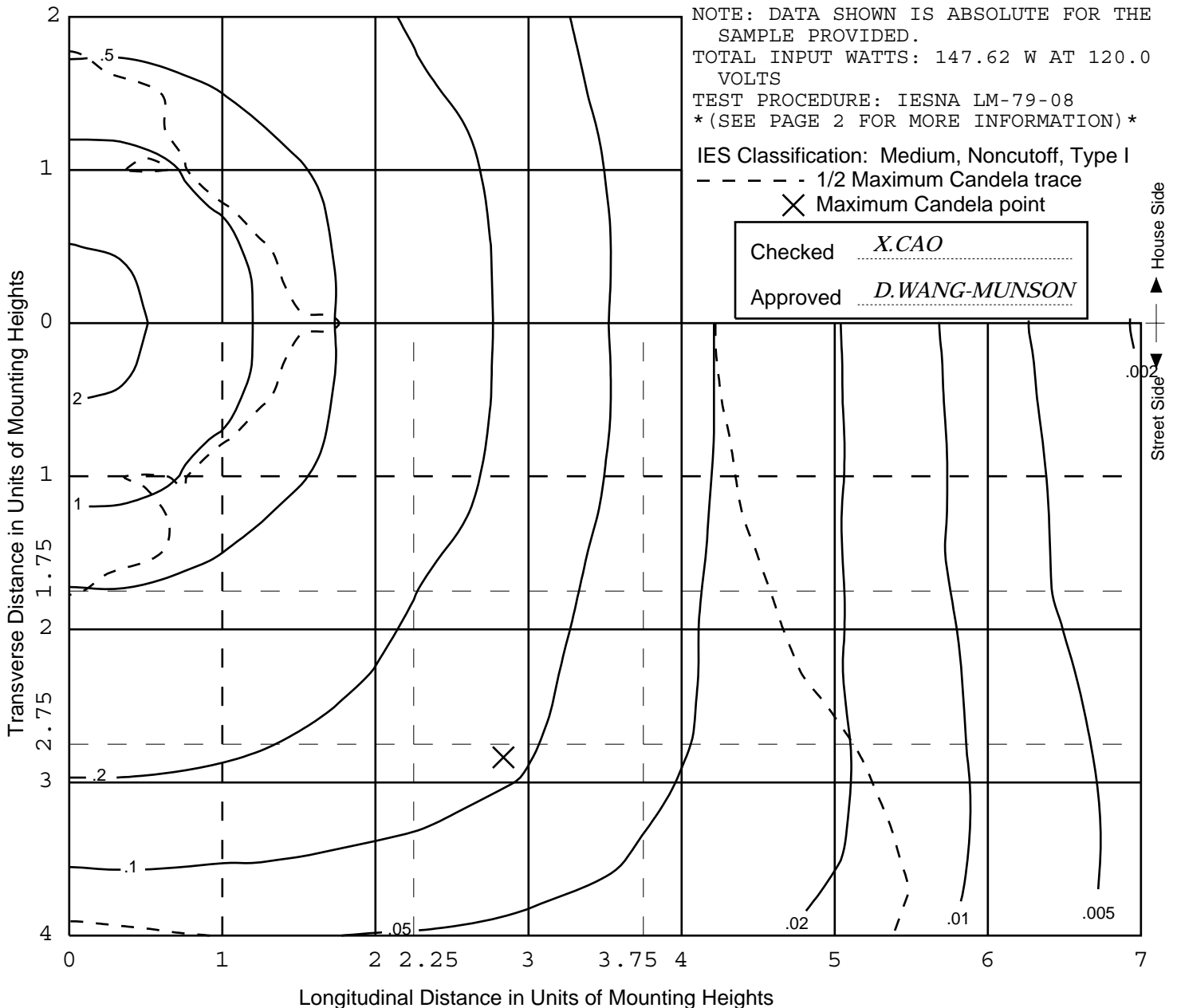
Values based on 25 foot mounting height.



REPORT NUMBER: RAB01416
 ISSUE DATE: 12/16/15 PAGE: 1 OF 9
 DATE SAMPLE TESTED: 12/16/15
 PREPARED FOR: RAB LIGHTING INC.
 CATALOG NUMBER: ALED5S150N/D10 (TYPE V Square)
 LUMINAIRE: CAST FINNED METAL HOUSING, 4 WHITE CIRCUIT BOARD WITH 11 LEDS, MOLDED 1-PIECE PLASTIC REFLECTOR WITH SPECULAR FINISH, CLEAR POLYCARBONATE LENS IN CAST BRONZE PAINTED METAL FRAME.
 LAMP: FORTY-FOUR WHITE LIGHT EMITTING DIODES (LEDs), TILTED 80-DEGREES FROM VERTICAL BASE-UP POSITION.
 NOTE: DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED.
 TOTAL INPUT WATTS: 147.62 W AT 120.0 VOLTS
 TEST PROCEDURE: IESNA LM-79-08
 (SEE PAGE 2 FOR MORE INFORMATION)

IES Classification: Medium, Noncutoff, Type I

--- 1/2 Maximum Candela trace
 X Maximum Candela point



REPORT NUMBER: RAB01416
ISSUE DATE: 12/16/15
PREPARED FOR: RAB LIGHTING INC.

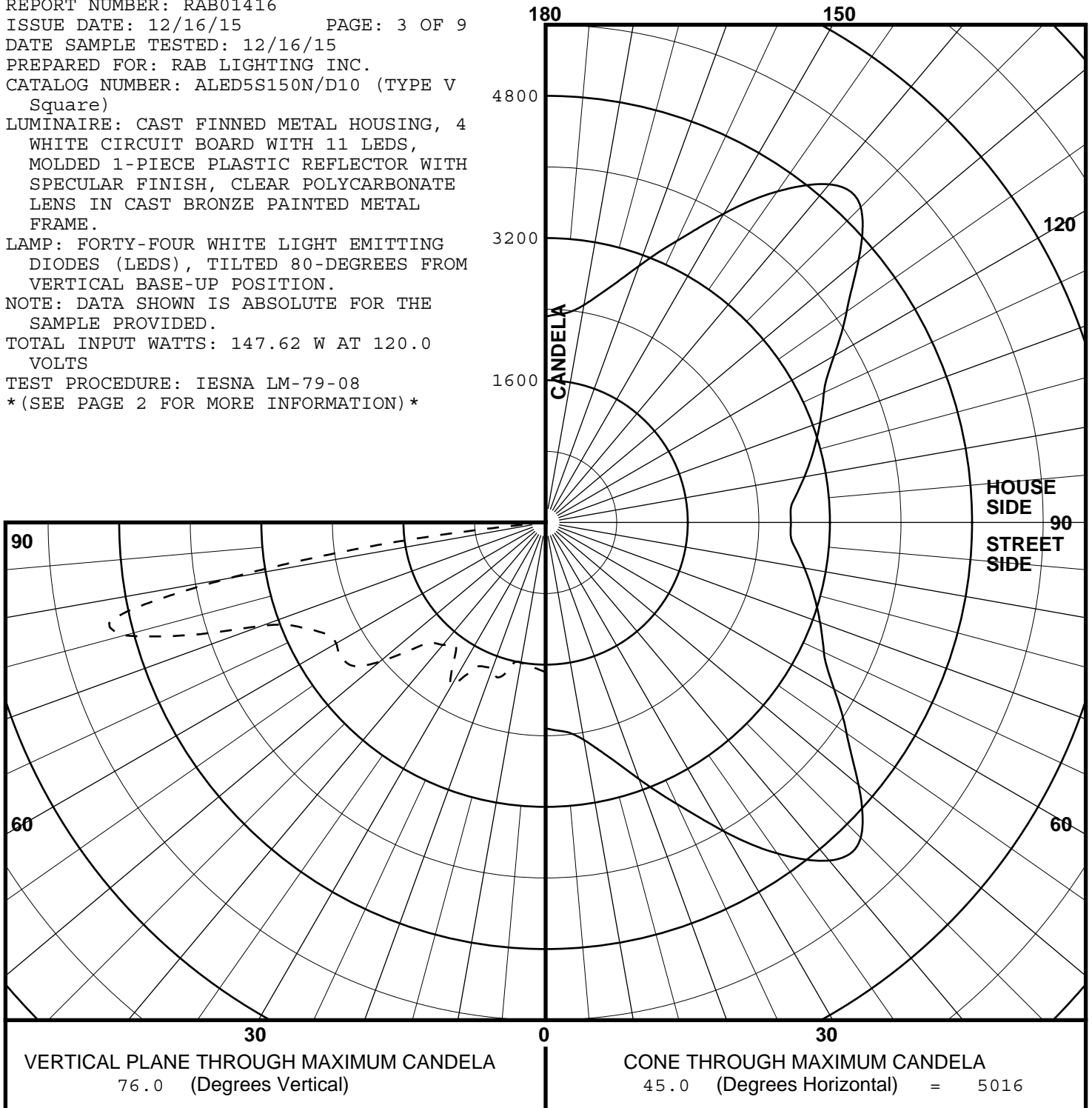
PAGE: 2 OF 9
DATE SAMPLE TESTED: 12/16/15

ADDITIONAL INFORMATION

TEST DISTANCE: 28.25 FEET
LED DRIVER: 2 x RDD-U85-A2100
ACCREDITED LABORATORY CODE 201085-0

MAXIMUM PLANE AND MAXIMUM CONE PLOTS OF CANDELA

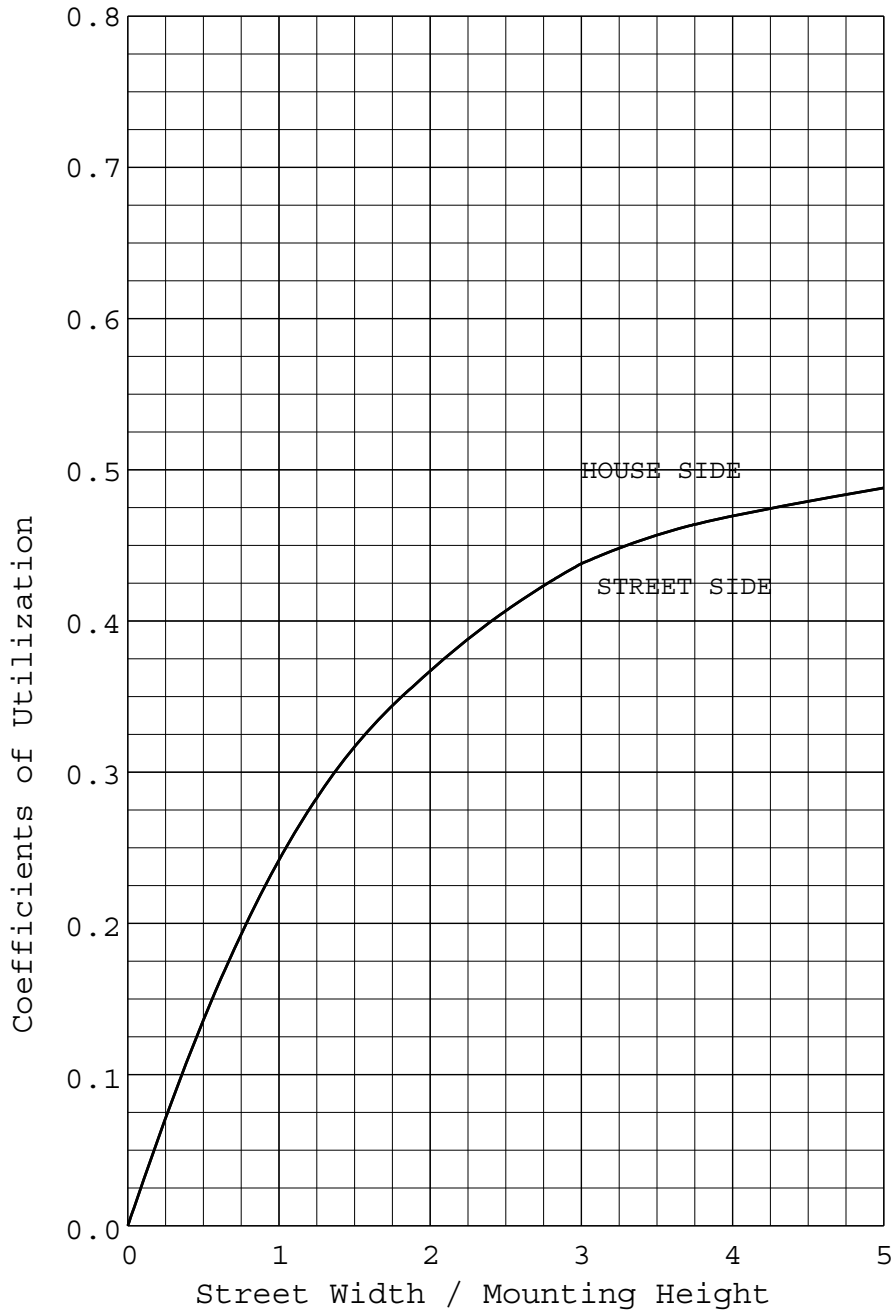
REPORT NUMBER: RAB01416
 ISSUE DATE: 12/16/15 PAGE: 3 OF 9
 DATE SAMPLE TESTED: 12/16/15
 PREPARED FOR: RAB LIGHTING INC.
 CATALOG NUMBER: ALED5S150N/D10 (TYPE V Square)
 LUMINAIRE: CAST FINNED METAL HOUSING, 4 WHITE CIRCUIT BOARD WITH 11 LEDS, MOLDED 1-PIECE PLASTIC REFLECTOR WITH SPECULAR FINISH, CLEAR POLYCARBONATE LENS IN CAST BRONZE PAINTED METAL FRAME.
 LAMP: FORTY-FOUR WHITE LIGHT EMITTING DIODES (LEDS), TILTED 80-DEGREES FROM VERTICAL BASE-UP POSITION.
 NOTE: DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED.
 TOTAL INPUT WATTS: 147.62 W AT 120.0 VOLTS
 TEST PROCEDURE: IESNA LM-79-08
 (SEE PAGE 2 FOR MORE INFORMATION)



REPORT NUMBER: RAB01416
 ISSUE DATE: 12/16/15
 PREPARED FOR: RAB LIGHTING INC.

PAGE: 4 OF 9
 DATE SAMPLE TESTED: 12/16/15

COEFFICIENTS OF UTILIZATION AND FLUX DISTRIBUTION



	LUMENS	PERCENT OF FIXTURE
DOWNWARD STREET SIDE	6930.	50.0
DOWNWARD HOUSE SIDE	6930.	50.0
DOWNWARD TOTAL	13860.	100.0
UPWARD STREET SIDE	0.	0.0
UPWARD HOUSE SIDE	0.	0.0
UPWARD TOTAL	0.	0.0
TOTAL FLUX	13860.	100.0
TOTAL INPUT WATTS = 147.6		
EFFICACY = 93.9 Lm/W		

ALL CANDELA AND LUMENS IN THIS REPORT ARE BASED ON ABSOLUTE PHOTOMETRY.
 THE COEFFICIENT OF UTILIZATION VALUES ARE BASED ON THE TOTAL ABSOLUTE
 LUMEN OUTPUT OF THIS LUMINAIRE SAMPLE.

REPORT NUMBER: RAB01416
 ISSUE DATE: 12/16/15
 PREPARED FOR: RAB LIGHTING INC.

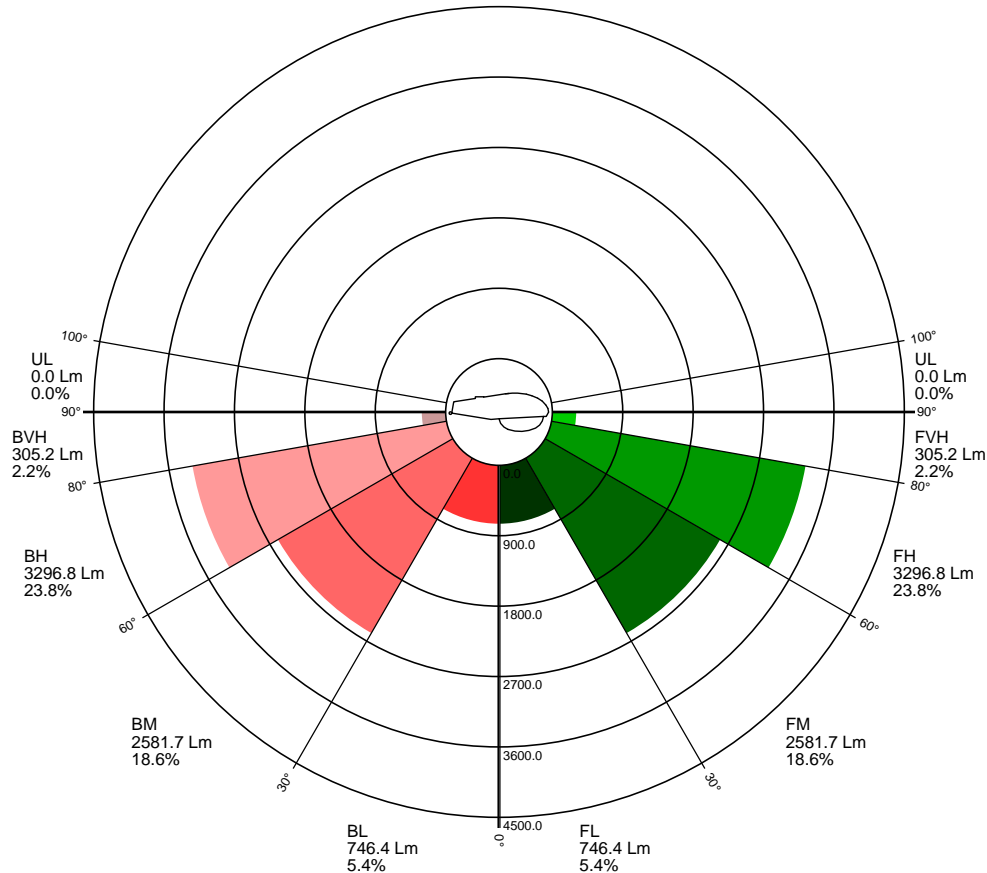
PAGE: 5 OF 9
 DATE SAMPLE TESTED: 12/16/15

BUG Rating:				B4 U0 G3		
Zonal Summary		Lumens	% of Fixture	Zone Ratings		
				B	U	G
Forward		6930	50.0			
FL	(0° - 30°)	746.4	5.4			
FM	(30° - 60°)	2581.7	18.6			
FH	(60° - 80°)	3296.8	23.8			G2
FVH	(80° - 90°)	305.2	2.2			G3
Backward		6930	50.0			
BL	(0° - 30°)	746.4	5.4	B2		
BM	(30° - 60°)	2581.7	18.6	B3		
BH	(60° - 80°)	3296.8	23.8	B4		G2
BVH	(80° - 90°)	305.2	2.2			G3
Upward		0	0.0			
UL	(90° - 100°)	0.0	0.0		U0	
UH	(100° - 180°)	0.0	0.0		U0	
Trapped Light		0	0.0			
Total Flux		13860	100.0			

Zonal Lumen Summary

(Linear scale)

UH
0.0 Lm
0.0%

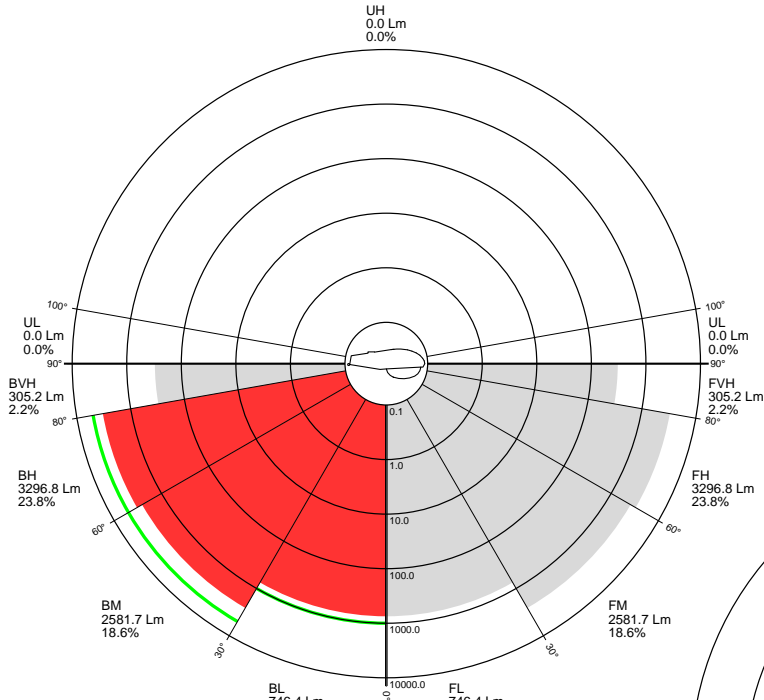


REPORT NUMBER: RAB01416
 ISSUE DATE: 12/16/15
 PREPARED FOR: RAB LIGHTING INC.

PAGE: 6 OF 9
 DATE SAMPLE TESTED: 12/16/15

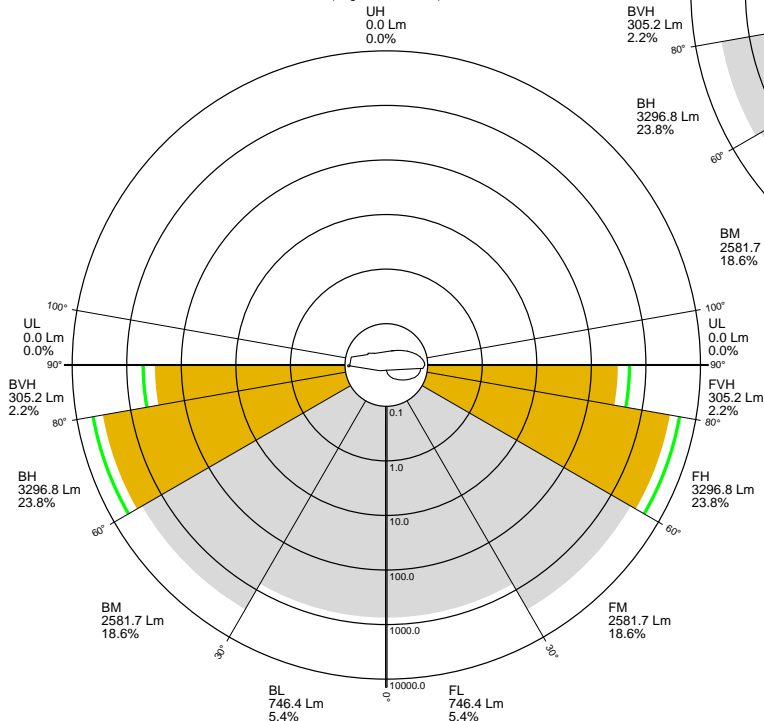
Backlight Rating Details

(Logarithmic scale)



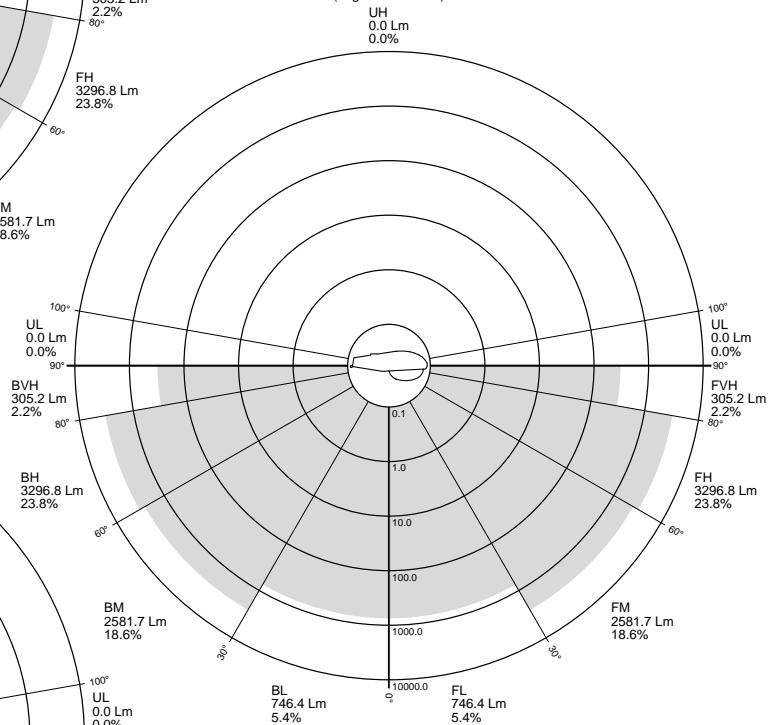
Glare Rating Details

(Logarithmic scale)



Uplight Rating Details

(Logarithmic scale)



PAGE: 7 OF 9
DATE SAMPLE TESTED: 12/16/15

[illegible]

PLANE OF MAXIMUM CANDELA

CONE OF MAXIMUM CANDELA

REPORT NUMBER: RAB01416
 ISSUE DATE: 12/16/15
 PREPARED FOR: RAB LIGHTING INC.

PAGE: 8 OF 9
 DATE SAMPLE TESTED: 12/16/15

CANDELA TABULATION

HOUSE SIDE

LATERAL ANGLE

	90.0	95.0	105.0	115.0	125.0	135.0	145.0	155.0	165.0	175.0	180.0
180.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
175.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
165.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
155.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
145.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
135.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
125.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
115.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
105.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
95.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
90.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
87.5	8.	8.	9.	13.	21.	22.	19.	11.	7.	7.	7.
85.0	25.	36.	90.	236.	397.	79.	350.	266.	76.	25.	21.
82.5	112.	203.	502.	1249.	1846.	1795.	2043.	861.	390.	140.	96.
V 80.0	1205.	1276.	1517.	2182.	3524.	3636.	2815.	1714.	1353.	1154.	1131.
E 77.5	2191.	2212.	2517.	3138.	4325.	4970.	3839.	2700.	2028.	1709.	1716.
R 76.0<<	2761.	2798.	3123.	3456.	4135.	5016.	4546.	3496.	2727.	2361.	2316.
T 75.0	3031.	3110.	3309.	3530.	4073.	4907.	4577.	4048.	3291.	2979.	2833.
I 72.5	3137.	3164.	3390.	3654.	3736.	4219.	4237.	4255.	4066.	3867.	3812.
C 70.0	3183.	3195.	3360.	3531.	3328.	3400.	3785.	3973.	3873.	3862.	3839.
A 67.5	3181.	3208.	3169.	3241.	3022.	3049.	3264.	3507.	3568.	3616.	3598.
L 65.0	2786.	2828.	2824.	3045.	2950.	2873.	2973.	3064.	3063.	3133.	3138.
62.5	2552.	2596.	2656.	2881.	2934.	2750.	2846.	2746.	2788.	2755.	2701.
A 60.0	2494.	2560.	2635.	2804.	2864.	2722.	2686.	2623.	2563.	2515.	2443.
N 57.5	2542.	2550.	2603.	2636.	2770.	2755.	2693.	2434.	2456.	2436.	2429.
G 55.0	2424.	2428.	2601.	2509.	2696.	2742.	2620.	2443.	2463.	2320.	2309.
L 52.5	2387.	2388.	2481.	2421.	2511.	2657.	2514.	2461.	2440.	2330.	2332.
E 50.0	2318.	2322.	2459.	2413.	2378.	2437.	2425.	2525.	2452.	2316.	2324.
47.5	2334.	2312.	2458.	2458.	2195.	2178.	2273.	2592.	2536.	2372.	2390.
45.0	2320.	2323.	2348.	2345.	2016.	1941.	2071.	2490.	2475.	2388.	2399.
42.5	2110.	2096.	2154.	2111.	1866.	1843.	1914.	2218.	2349.	2263.	2280.
40.0	1946.	1922.	1972.	1943.	1822.	1799.	1862.	1963.	2057.	2029.	2073.
37.5	1890.	1869.	1893.	1802.	1885.	1727.	1932.	1830.	1927.	1932.	1955.
35.0	1824.	1808.	1785.	1745.	1896.	1758.	1915.	1828.	1813.	1828.	1847.
30.0	1791.	1768.	1725.	1747.	1827.	2113.	1822.	1780.	1751.	1786.	1795.
25.0	1795.	1790.	1796.	1942.	1852.	1786.	1919.	2005.	1834.	1802.	1802.
20.0	1785.	1776.	1727.	1724.	1809.	1746.	1813.	1733.	1779.	1812.	1806.
15.0	1726.	1721.	1697.	1693.	1750.	1761.	1724.	1690.	1688.	1698.	1696.
10.0	1679.	1677.	1643.	1630.	1588.	1600.	1631.	1671.	1658.	1677.	1679.
5.0	1663.	1662.	1707.	1645.	1636.	1633.	1637.	1638.	1680.	1625.	1623.
0.0	1683.	1683.	1683.	1683.	1683.	1683.	1683.	1683.	1683.	1683.	1683.

CONE OF MAXIMUM CANDELA

REPORT NUMBER: RAB01416
 ISSUE DATE: 12/16/15
 PREPARED FOR: RAB LIGHTING INC.

PAGE: 9 OF 9
 DATE SAMPLE TESTED: 12/16/15

5-DEGREE ZONAL LUMEN SUMMARY

0- 5	40
5- 10	117
10- 15	201
15- 20	287
20- 25	385
25- 30	463
30- 35	534
35- 40	625
40- 45	777
45- 50	953
50- 55	1075
55- 60	1200
60- 65	1358
65- 70	1665
70- 75	1963
75- 80	1607
80- 85	583
85- 90	27
90- 95	0
95-100	0
100-105	0
105-110	0
110-115	0
115-120	0
120-125	0
125-130	0
130-135	0
135-140	0
140-145	0
145-150	0
150-155	0
155-160	0
160-165	0
165-170	0
170-175	0
175-180	0

10-DEGREE ZONAL LUMEN SUMMARY

0- 10	157
0- 20	645
0- 30	1493
0- 40	2652
0- 50	4382
0- 60	6656
0- 70	9679
0- 80	13250
0- 90	13860
0-100	13860
0-110	13860
0-120	13860
0-130	13860
0-140	13860
0-150	13860
0-160	13860
0-170	13860
0-180	13860

REPORT NUMBER: RAB01417
DATE: 12/15/2015
PREPARED FOR: RAB LIGHTING INC.
CATALOG NUMBER: ALED5S150N/D10 (TYPE V Square)

ADDRESS: 170 LUDLOW AVE, NORTHVALE, NJ 07647

LUMINAIRE: CAST FINNED METAL HOUSING, 4 WHITE CIRCUIT BOARD WITH 11 LEDS, MOLDED 1-PIECE PLASTIC REFLECTOR WITH SPECULAR FINISH, CLEAR POLYCARBONATE LENS IN CAST BRONZE PAINTED METAL FRAME.

LAMP: FORTY-FOUR WHITE LIGHT EMITTING DIODES (LEDs), TILTED 80-DEGREES FROM VERTICAL BASE-UP POSITION.

DRIVER: 2 X RDD-U85-A2100

OBJECT OF TEST: DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED AT THE RATED INPUT VOLTAGES (120.0 AND 277.0 VAC, 60Hz) TO THE TEST SAMPLE.

INSTRUMENTS:	CHROMA PROGRAMMABLE AC POWER SOURCE MODEL 61602	Calibration Due: N/A
	CHROMA PROGRAMMABLE DIGITAL POWER METER MODEL 66202	3/9/16
	OCEAN OPTICS QE65PRO Spectroradiometer	11/10/16
	RAB 2.0 meter Diameter Integrating Sphere, 4PI Geometry	11/10/16

OBJECT OF TEST: Measure the Absolute Flux in lumens*, Total Radiant Flux*, Spectral Power Distribution (SPD), Correlated Color Temperature (CCT), Color Rendering Indices (CRIa,1-14), Chromaticity Coordinates (x,y; u'v'), ANSI C78.377 Duv, and electrical data including ANSI C82.77-2002 Power Factor (PF), and Total Harmonic Distortion (THD) to the test sample. Measure electrical data including Total Harmonic Distortion (THD) at maximum nominal rated input voltage. Report Off-State Power.

PROCEDURE: The test sample was mounted inside the integrating sphere, energized, and allowed to stabilize. After stabilization occurred, measurements were taken. In order to measure mean performance, multiple data sets were recorded and averaged. Readings were taken with the test sample operating at 60 HZ input in a 25 +/-1 degree Celsius free air ambient and in accordance with IESNA LM-79-08. Electrical data was also recorded at maximum nominal rated input voltage (277.0 VAC). All data are traceable to the National Institute of Standards and Technology. Off-State Power was reported with no voltage applied to the sample.

*NOTE: Proper calibration of integrating spheres for measuring total flux output of non-directional samples will produce reliable, repeatable results within the calibration tolerances of the equipment used. However, measurement of test samples with significant self absorption and/or directional output, even when these effects are compensated for, are likely to have a greater variation in results compared to the flux output calculated from a goniophotometric exploration since these artifacts do not affect the goniophotometric results.

RESULTS: (continued subsequent pages)

Checked	<u>X.CAO</u>
Approved	<u>D.WANG-MUNSON</u> Lighting Engineer

REPORT NUMBER: RAB01417
 DATE: 12/15/2015
 PREPARED FOR: RAB LIGHTING INC.
 CATALOG NUMBER: ALED5S150N/D10 (TYPE V Square)

Page 2 of 4

RESULTS:

PHOTOMETRIC	
Total Integrated Flux (lumens)	13860 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.3866
Chromaticity Ordinate y	0.3904
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2237
Chromaticity Ordinate v'	0.5084
Correlated Color Temp CCT (K)	3937
ANSI C78.377-2008 Duv	0.005
Total Radiant Flux (milliWatts)	40391 *
ELECTRICAL	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	1.23
Input Power (Watts)	147.6
Input Power Factor (%)	99.6
Input Current THD (%)	7.0
Input Voltage THD (%)	0.2
EFFICACY (Lumens/Watt)	
	93.9
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.565
Input Power (Watts)	145.2
Input Power Factor (%)	92.8
Input Current THD (%)	14.3
Input Voltage THD (%)	0.2
Off-State Power (Watts)	0.0

COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	73
R1 Light greyish red	70
R2 Dark greyish yellow	78
R3 Strong yellowish green	85
R4 Moderate yellowish green	74
R5 Light bluish green	70
R6 Light blue	71
R7 Light violet	82
R8 Light reddish purple	56
R9 Strong red	-22
R10 Strong yellow	49
R11 Strong green	71
R12 Strong blue	48
R13 Light yellowish pink (skin)	71
R14 Moderate olive green (leaf)	92

*NOTE:

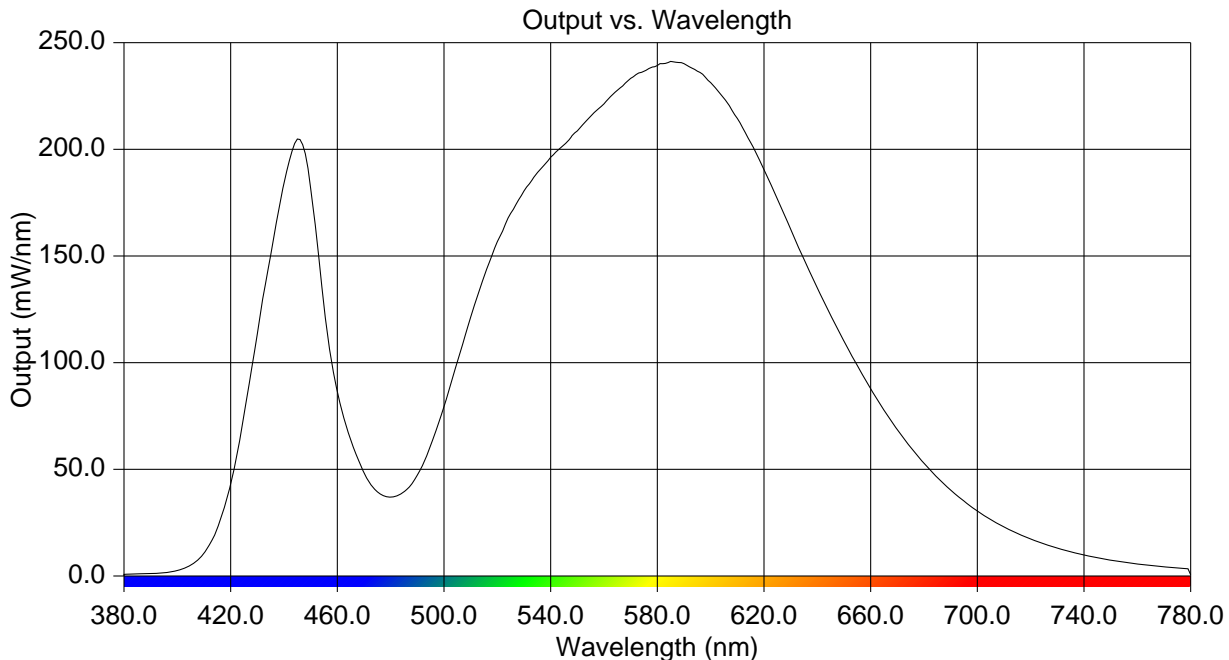
Proper calibration of integrating spheres for measuring total flux output of non-directional samples will produce reliable, repeatable results within the calibration tolerances of the equipment used. However, measurement of test samples with significant self absorption and/or directional output, even when these effects are compensated for, are likely to have a greater variation in results compared to the flux output calculated from a goniophotometric exploration since these artifacts do not affect the goniophotometric results.

REPORT NUMBER: RAB01417
 DATE: 12/15/2015
 PREPARED FOR: RAB LIGHTING INC.
 CATALOG NUMBER: ALED5S150N/D10 (TYPE V Square)

Page 3 of 4

RESULTS:

Wavelength	mW per nm	Wavelength	mW per nm	Wavelength	mW per nm
380	0.756	515	140.341	650	110.018
385	0.959	520	156.726	655	98.662
390	1.144	525	169.980	660	87.790
395	1.506	530	180.493	665	77.760
400	2.563	535	189.022	670	68.669
405	5.043	540	196.292	675	60.355
410	10.740	545	202.131	680	52.765
415	22.133	550	208.638	685	46.159
420	43.295	555	215.678	690	40.258
425	75.008	560	221.315	695	35.137
430	113.495	565	227.715	700	30.487
435	150.322	570	233.266	705	26.449
440	184.089	575	236.552	710	22.977
445	204.833	580	239.286	715	19.966
450	181.677	585	241.213	720	17.396
455	127.006	590	240.161	725	15.072
460	86.189	595	236.636	730	13.017
465	63.920	600	231.274	735	11.324
470	48.410	605	223.924	740	9.790
475	39.374	610	214.488	745	8.554
480	36.970	615	203.189	750	7.441
485	39.598	620	190.499	755	6.463
490	47.309	625	176.876	760	5.646
495	61.188	630	162.663	765	4.919
500	79.393	635	148.480	770	4.321
505	100.328	640	135.112	775	3.767
510	121.326	645	122.125	780	0.575



REPORT NUMBER: RAB01417
DATE: 12/15/2015
PREPARED FOR: RAB LIGHTING INC.
CATALOG NUMBER: ALED5S150N/D10 (TYPE V Square)

Page 4 of 4

CIE Chromaticity Diagram

