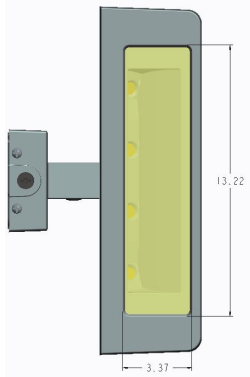


## ISOFOOTCANDLE LINES OF HORIZONTAL ILLUMINATION

Values based on 20 foot mounting height.



REPORT NUMBER: RAB01949  
ISSUE DATE: 05/09/16 PAGE: 1 OF 9  
DATE SAMPLE TESTED: 05/09/16  
PREPARED FOR: RAB LIGHTING INC.  
CATALOG NUMBER: WPLEDC104Y / ALEDC104Y  
(7.5-DEGREE UPTILT)

LUMINAIRE: CAST FINNED METAL HOUSING,  
2-PIECE EXTRUDED METAL HEAT SINK, 4  
CIRCUIT BOARDS EACH WITH 1 LED,  
MOLDED PLASTIC REFLECTOR WITH  
SPECULAR FINISH AND 1 OPTICAL  
COMPARTMENT WITH 1 APERTURE PER LED,  
CLEAR FLAT GLASS LENS IN CAST BROWN  
PAINTED METAL FRAME.

LAMPS: FOUR WHITE MULTI-CHIP LIGHT  
EMITTING DIODES (LEDs), TILTED  
37.5-DEGREES FROM VERTICAL BASE-UP  
POSITION, 2 LEDS CANTED 12-DEGREES  
FROM STRAIGHT AHEAD.

\*(SEE PAGE 2 FOR MORE INFORMATION)\*

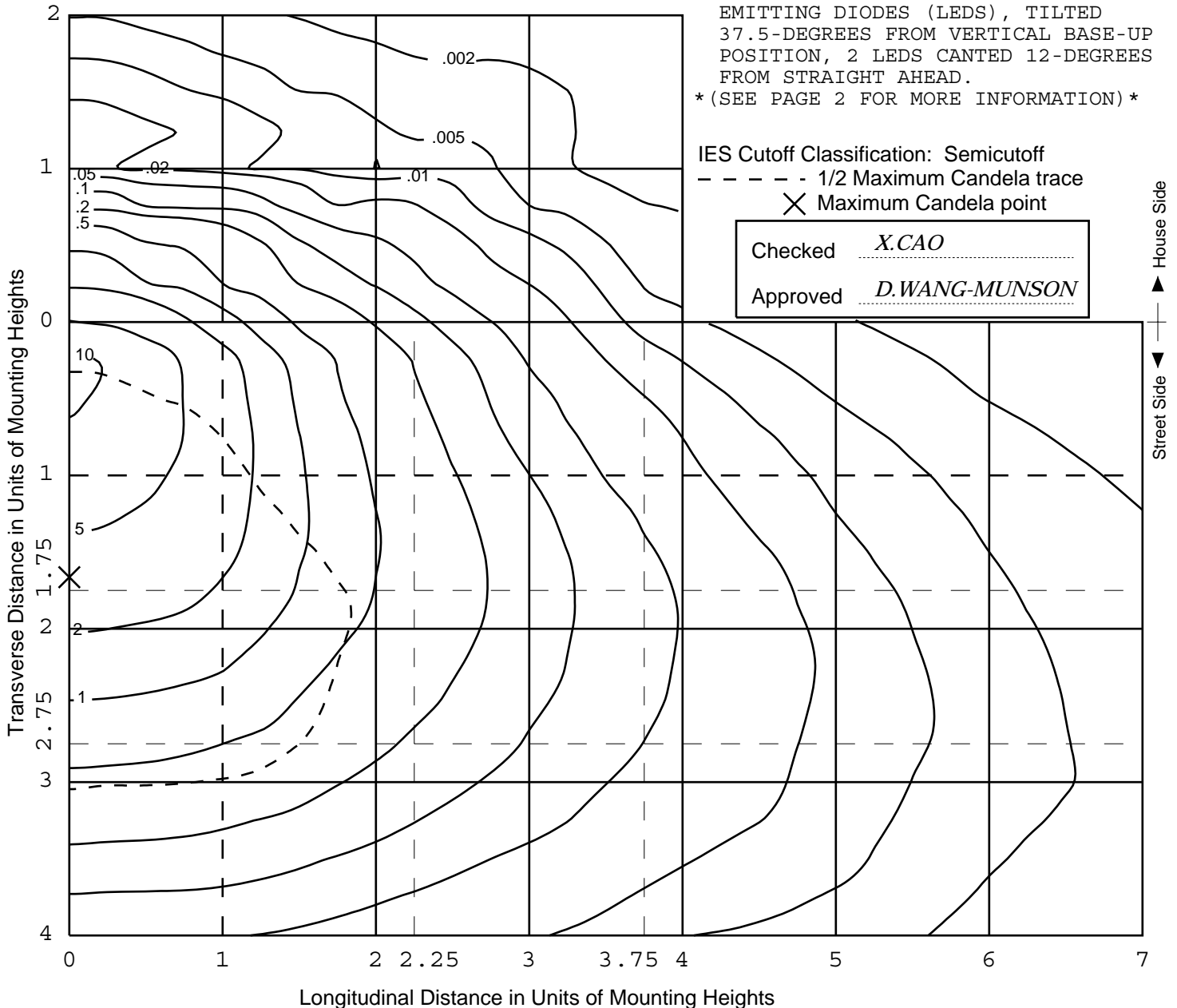
IES Cutoff Classification: Semicutoff

--- 1/2 Maximum Candela trace

X Maximum Candela point

Checked X.CAO

Approved D.WANG-MUNSON



REPORT NUMBER: RAB01949  
ISSUE DATE: 05/09/16  
PREPARED FOR: RAB LIGHTING INC.

PAGE: 2 OF 9  
DATE SAMPLE TESTED: 05/09/16

ADDITIONAL INFORMATION

NOTE: DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED.  
TOTAL INPUT WATTS = 108.4 W AT 120.0 VAC.

LED DRIVER: RD-120-A0700

TEST PROCEDURE: IESNA LM-79-08

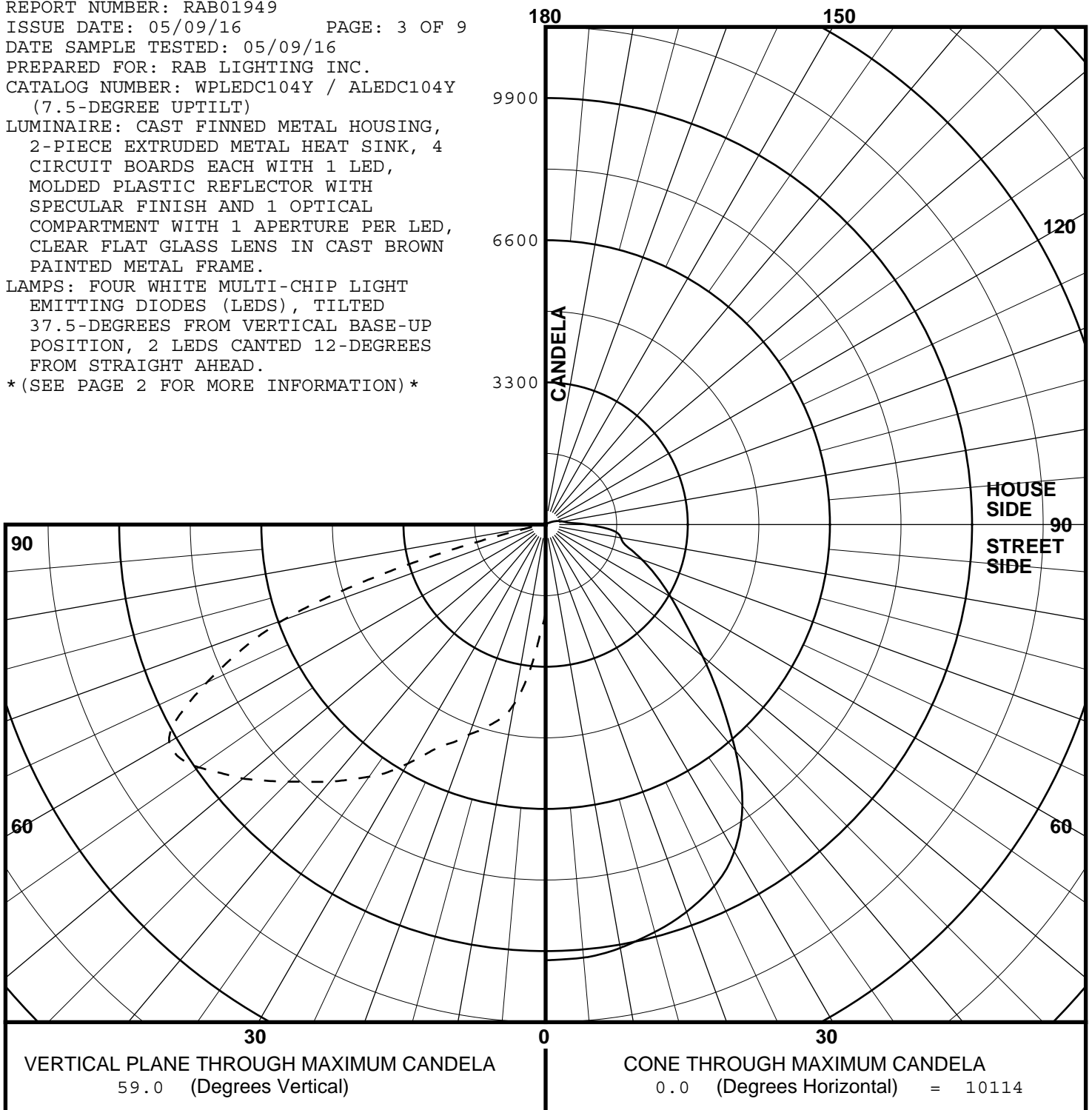
ACCREDITED LABORATORY CODE 201058-0

TEST DISTANCE : 28.25 FEET

NOTE: THIS REPORT WITH THE USE OF THE NVLAP LOGO SHALL NOT BE USED BY  
THE CLIENT TO CLAIM PRODUCT CERTIFICATION, APPROVAL, OR  
ENDORSEMENT BY NVLAP, NIST, OR ANY AGENCY OF THE FEDERAL  
GOVERNMENT.

## MAXIMUM PLANE AND MAXIMUM CONE PLOTS OF CANDELA

REPORT NUMBER: RAB01949  
 ISSUE DATE: 05/09/16 PAGE: 3 OF 9  
 DATE SAMPLE TESTED: 05/09/16  
 PREPARED FOR: RAB LIGHTING INC.  
 CATALOG NUMBER: WPLEDC104Y / ALEDC104Y  
 (7.5-DEGREE UPTILT)  
 LUMINAIRE: CAST FINNED METAL HOUSING,  
 2-PIECE EXTRUDED METAL HEAT SINK, 4  
 CIRCUIT BOARDS EACH WITH 1 LED,  
 MOLDED PLASTIC REFLECTOR WITH  
 SPECULAR FINISH AND 1 OPTICAL  
 COMPARTMENT WITH 1 APERTURE PER LED,  
 CLEAR FLAT GLASS LENS IN CAST BROWN  
 PAINTED METAL FRAME.  
 LAMPS: FOUR WHITE MULTI-CHIP LIGHT  
 EMITTING DIODES (LEDs), TILTED  
 37.5-DEGREES FROM VERTICAL BASE-UP  
 POSITION, 2 LEDS CANTED 12-DEGREES  
 FROM STRAIGHT AHEAD.  
 \*(SEE PAGE 2 FOR MORE INFORMATION) \*

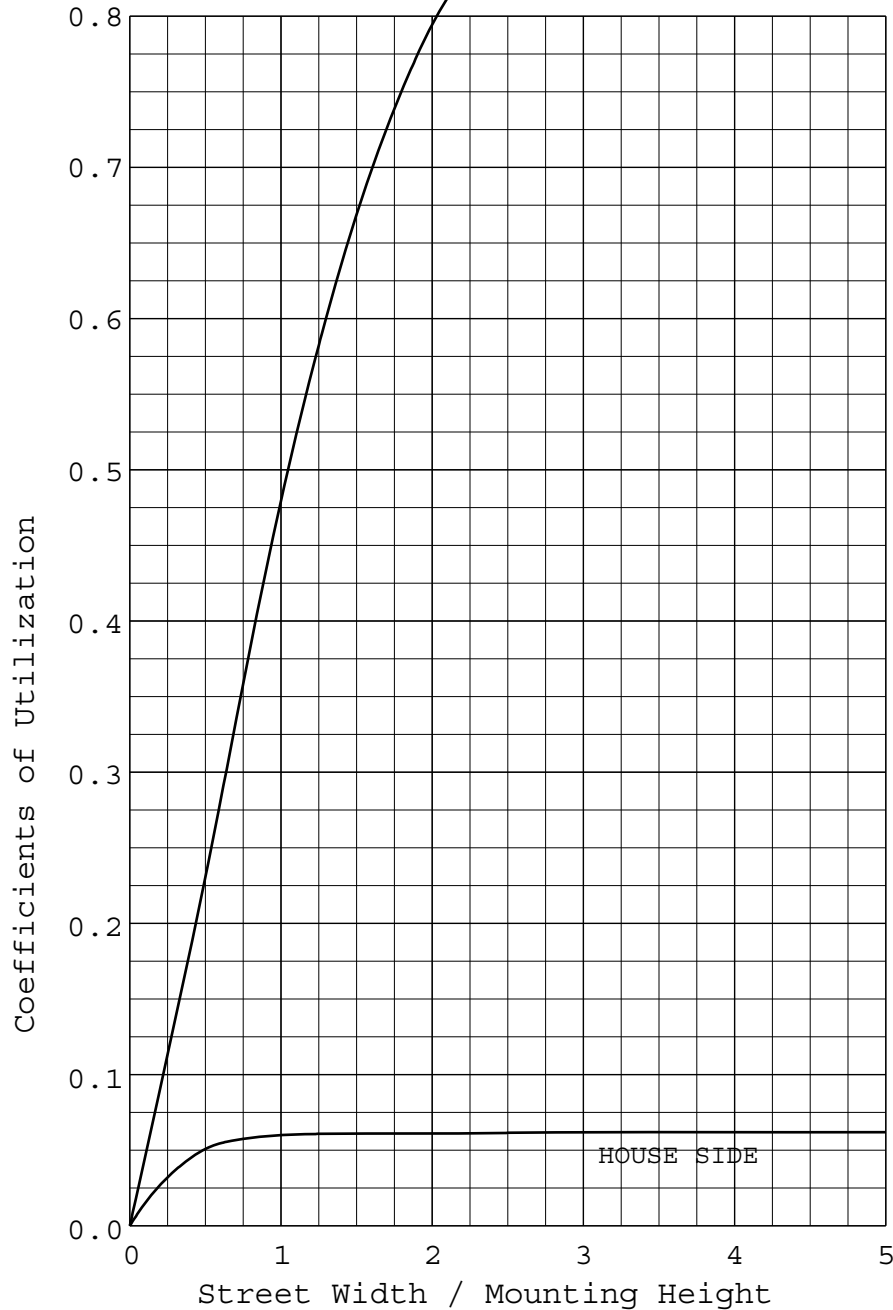


REPORT NUMBER: RAB01949  
ISSUE DATE: 05/09/16  
PREPARED FOR: RAB LIGHTING INC.

STREET SIDE

PAGE: 4 OF 9  
DATE SAMPLE TESTED: 05/09/16

COEFFICIENTS OF UTILIZATION AND FLUX DISTRIBUTION



	LUMENS	PERCENT OF FIXTURE
DOWNWARD STREET SIDE	12101.	93.7
DOWNWARD HOUSE SIDE	809.	6.3
DOWNWARD TOTAL	12909.	100.0
UPWARD STREET SIDE	0.	0.0
UPWARD HOUSE SIDE	0.	0.0
UPWARD TOTAL	0.	0.0
TOTAL FLUX	12909.	100.0
TOTAL INPUT WATTS = 108.4		
EFFICACY = 119.1 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: RAB01949  
 ISSUE DATE: 05/09/16  
 PREPARED FOR: RAB LIGHTING INC.

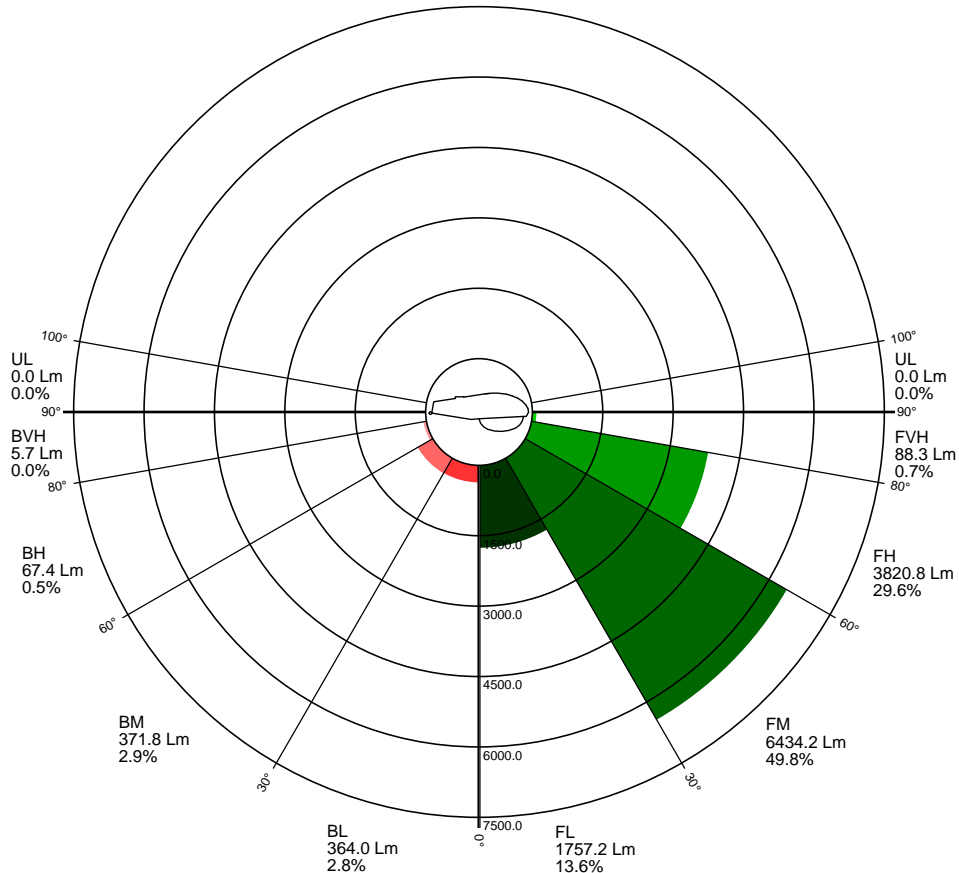
PAGE: 5 OF 9  
 DATE SAMPLE TESTED: 05/09/16

BUG Rating:				B1 U0 G2		
Zonal Summary		Lumens	% of Fixture	Zone Ratings		
				B	U	G
Forward		12101	93.7			
FL	(0° - 30°)	1757.2	13.6			
FM	(30° - 60°)	6434.2	49.8			
FH	(60° - 80°)	3820.8	29.6			G2
FVH	(80° - 90°)	88.3	0.7			G1
Backward		809	6.3			
BL	(0° - 30°)	364.0	2.8	B1		
BM	(30° - 60°)	371.8	2.9	B1		
BH	(60° - 80°)	67.4	0.5	B0		G0
BVH	(80° - 90°)	5.7	0.0			G0
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		12909	100.0			

### Zonal Lumen Summary

(Linear scale)

UH  
0.0 Lm  
0.0%

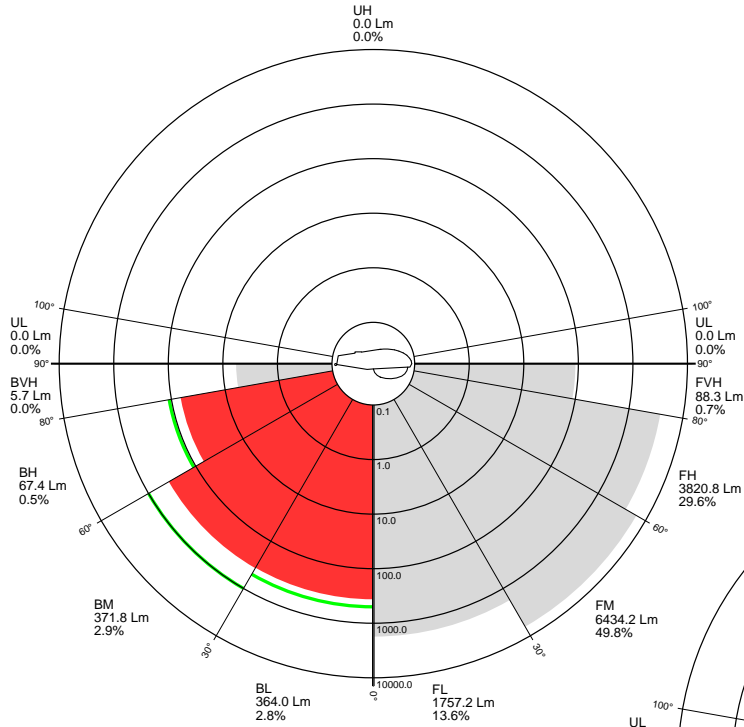


REPORT NUMBER: RAB01949  
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 PREPARED FOR: RAB LIGHTING INC.

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 DATE SAMPLE TESTED: 05/09/16

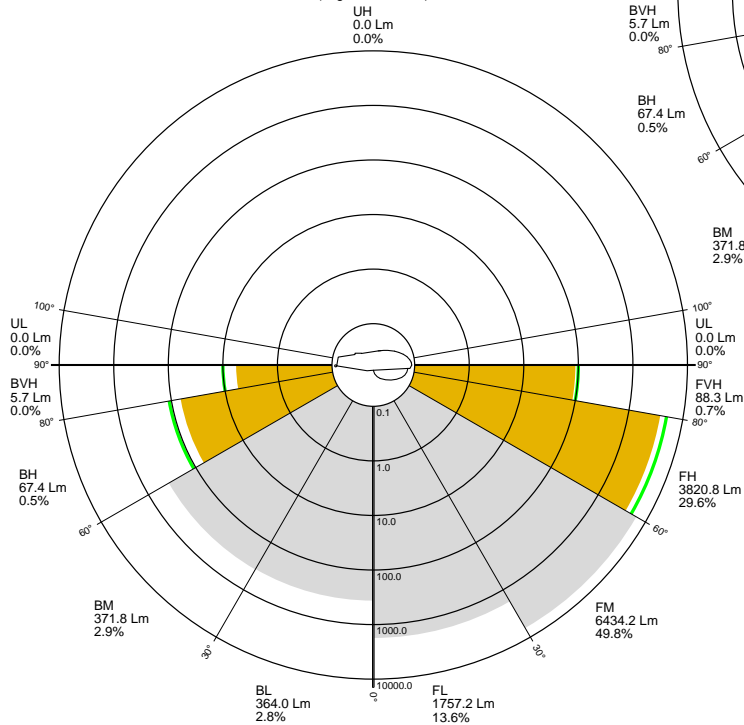
## Backlight Rating Details

(Logarithmic scale)



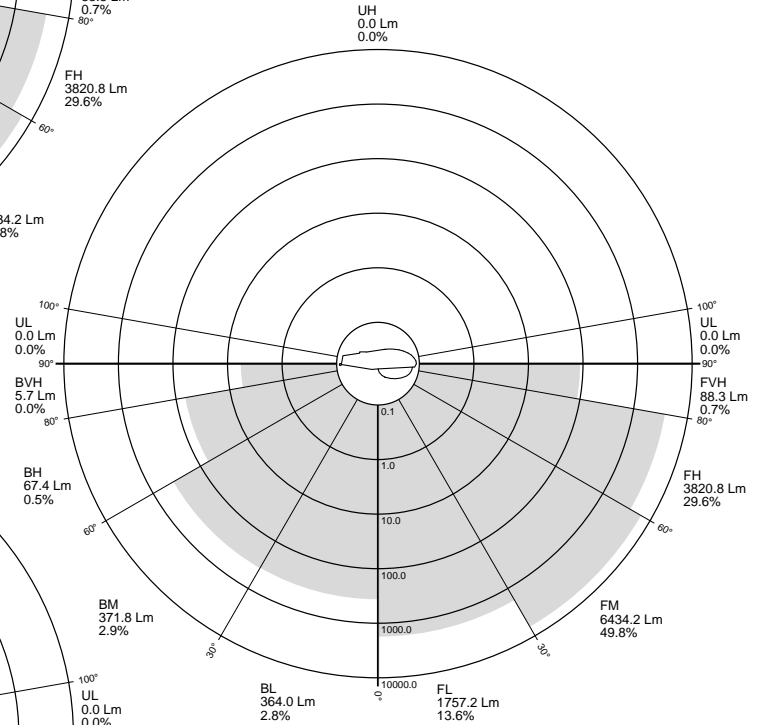
## Glare Rating Details

(Logarithmic scale)



## Uplight Rating Details

(Logarithmic scale)



REPORT NUMBER: RAB01949  
 ISSUE DATE: 05/09/16  
 PREPARED FOR: RAB LIGHTING INC.

PAGE: 7 OF 9  
 DATE SAMPLE TESTED: 05/09/16

### CANDELA TABULATION

	STREET SIDE	LATERAL ANGLE								
		0.0	5.0	15.0	25.0	35.0	45.0	55.0	65.0	75.0 85.0
	90.0	0.	0.	0.	0.	0.	0.	0.	0.	0.
	87.5	14.	14.	15.	13.	14.	16.	15.	23.	19.
	85.0	20.	22.	27.	26.	36.	49.	70.	115.	231. 38.
	82.5	126.	119.	144.	152.	152.	153.	365.	709.	428. 123.
	80.0	303.	305.	314.	350.	448.	756.	1434.	1168.	574. 197.
	77.5	739.	717.	846.	1126.	1600.	2234.	2267.	1771.	686. 265.
	75.0	2254.	2188.	2599.	2964.	3330.	3377.	2883.	2049.	897. 363.
	72.5	4521.	4446.	4823.	5161.	4583.	4066.	3478.	2172.	1096. 523.
	70.0	6496.	6452.	6601.	6793.	5441.	4816.	3731.	2275.	1272. 764.
V	67.5	7684.	7646.	7660.	7978.	6497.	5286.	3803.	2402.	1443. 1019.
E	65.0	8683.	8646.	8648.	8903.	7358.	5397.	3797.	2526.	1609. 1179.
R	62.5	9583.	9544.	9465.	9380.	7805.	5476.	3834.	2667.	1764. 1405.
T	60.0	10091.	10063.	9786.	9349.	7963.	5646.	3890.	2799.	1907. 1533.
I	59.0	10114.	10091.	9791.	9258.	7964.	5732.	3940.	2845.	1959. 1566.
C	57.5	10077.	10057.	9710.	9082.	7903.	5846.	4067.	2898.	2045. 1602.
A	55.0	9826.	9815.	9434.	8723.	7789.	6039.	4368.	3047.	2202. 1726.
L	52.5	9482.	9454.	9106.	8460.	7505.	6147.	4670.	3243.	2389. 1852.
	50.0	9173.	9133.	8786.	8142.	7205.	6214.	4895.	3442.	2628. 1936.
A	47.5	8801.	8768.	8395.	7844.	6940.	6162.	5000.	3662.	2894. 2051.
N	45.0	8438.	8399.	8073.	7562.	6745.	5998.	5010.	3895.	3179. 2138.
G	42.5	8097.	8074.	7761.	7301.	6541.	5774.	4920.	4075.	3437. 2246.
L	40.0	7793.	7776.	7501.	7025.	6355.	5538.	4778.	4136.	3597. 2350.
E	37.5	7459.	7468.	7187.	6783.	6117.	5358.	4659.	4145.	3654. 2383.
	35.0	7144.	7166.	6911.	6491.	5861.	5202.	4621.	4138.	3640. 2388.
	30.0	6408.	6406.	6200.	5839.	5407.	5016.	4556.	4227.	3588. 2414.
	25.0	5664.	5655.	5566.	5377.	5113.	4777.	4507.	4133.	3398. 2368.
	20.0	5187.	5175.	5142.	5030.	4829.	4654.	4319.	3828.	3049. 2222.
	15.0	4787.	4798.	4776.	4715.	4552.	4353.	4026.	3493.	2852. 2254.
	10.0	4235.	4267.	4209.	4146.	3942.	3716.	3359.	2988.	2586. 2206.
	5.0	3099.	3144.	3084.	3051.	2923.	2809.	2627.	2478.	2291. 2114.
	0.0	2047.	2047.	2047.	2047.	2047.	2047.	2047.	2047.	2047.

||  
 PLANE OF MAXIMUM CANDELA

CONE OF MAXIMUM CANDELA

REPORT NUMBER: RAB01949  
 ISSUE DATE: 05/09/16  
 PREPARED FOR: RAB LIGHTING INC.

PAGE: 8 OF 9  
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### 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
	90.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	87.5	16.	16.	15.	14.	13.	12.	10.	8.	5.	5.
	85.0	19.	17.	16.	14.	13.	11.	9.	7.	5.	4.
	82.5	57.	23.	18.	14.	13.	11.	9.	7.	4.	3.
	80.0	99.	49.	22.	16.	13.	11.	9.	7.	4.	3.
	77.5	139.	76.	40.	30.	13.	11.	9.	7.	5.	4.
	75.0	174.	91.	29.	37.	15.	11.	9.	7.	5.	4.
	72.5	355.	234.	42.	57.	21.	12.	9.	7.	5.	4.
	70.0	508.	268.	98.	52.	25.	15.	11.	8.	5.	5.
V	67.5	630.	357.	198.	32.	38.	20.	15.	11.	10.	10.
E	65.0	751.	441.	249.	23.	43.	25.	21.	19.	15.	16.
R	62.5	880.	494.	269.	36.	36.	36.	25.	23.	24.	26.
T	60.0	945.	506.	296.	94.	22.	40.	37.	27.	27.	31.
I	59.0<<	961.	514.	315.	133.	17.	40.	41.	30.	29.	31.
C	57.5	979.	533.	340.	202.	18.	36.	43.	38.	34.	35.
A	55.0	1067.	601.	401.	337.	35.	25.	42.	43.	45.	49.
L	52.5	1214.	731.	483.	412.	107.	18.	33.	40.	47.	53.
	50.0	1290.	797.	512.	454.	252.	30.	22.	32.	42.	48.
A	47.5	1371.	846.	542.	484.	370.	79.	22.	20.	32.	37.
N	45.0	1435.	893.	576.	509.	422.	183.	35.	19.	21.	24.
G	42.5	1516.	939.	624.	538.	440.	291.	88.	32.	24.	21.
L	40.0	1605.	1012.	672.	562.	455.	353.	192.	85.	43.	34.
E	37.5	1698.	1105.	718.	589.	470.	376.	294.	212.	132.	92.
	35.0	1762.	1204.	757.	613.	484.	398.	353.	353.	284.	236.
	30.0	1861.	1364.	838.	632.	509.	445.	452.	478.	470.	460.
	25.0	1883.	1438.	874.	646.	571.	551.	559.	548.	530.	522.
	20.0	1847.	1496.	981.	784.	709.	694.	662.	626.	607.	597.
	15.0	1982.	1719.	1253.	1014.	887.	792.	749.	726.	708.	702.
	10.0	2024.	1851.	1519.	1250.	1096.	1008.	942.	888.	845.	836.
	5.0	2027.	1947.	1789.	1641.	1510.	1406.	1308.	1269.	1222.	1222.
	0.0	2047.	2047.	2047.	2047.	2047.	2047.	2047.	2047.	2047.	2047.

CONE OF MAXIMUM CANDELA

REPORT NUMBER: RAB01949  
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PREPARED FOR: RAB LIGHTING INC.

PAGE: 9 OF 9  
DATE SAMPLE TESTED: 05/09/16

5-DEGREE  
ZONAL LUMEN SUMMARY

0- 5	50
5- 10	158
10- 15	285
15- 20	412
20- 25	539
25- 30	678
30- 35	822
35- 40	959
40- 45	1092
45- 50	1215
50- 55	1321
55- 60	1397
60- 65	1400
65- 70	1240
70- 75	878
75- 80	370
80- 85	85
85- 90	9

10-DEGREE  
ZONAL LUMEN SUMMARY

0- 10	208
0- 20	904
0- 30	2121
0- 40	3902
0- 50	6209
0- 60	8927
0- 70	11567
0- 80	12815
0- 90	12909

REPORT NUMBER: RAB01938  
DATE: 5/10/2016  
PREPARED FOR: RAB LIGHTING INC.  
CATALOG NUMBER: WPLEDC104Y / ALEDC104Y (7.5-DEGREE UPTILT)

ADDRESS: 170 LUDLOW AVE, NORTHVALE, NJ 07647

LUMINAIRE: CAST FINNED METAL HOUSING, 2-PIECE EXTRUDED METAL HEAT SINK, 4 CIRCUIT BOARDS EACH WITH 1 LED, MOLDED PLASTIC REFLECTOR WITH SPECULAR FINISH AND 1 OPTICAL COMPARTMENT WITH 1 APERTURE PER LED, CLEAR FLAT GLASS LENS IN CAST BROWN PAINTED METAL FRAME.

LAMP: FOUR WHITE MULTI-CHIP LIGHT EMITTING DIODES (LEDS), TILTED 37.5-DEGREES FROM VERTICAL BASE-UP POSITION, 2 LEDS CANTED 12-DEGREES FROM STRAIGHT AHEAD.

DRIVER: RD-120-A0700

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:	GWINSTEK PROGRAMMABLE AC POWER SOURCE APS-7100	Calibration Due: N/A
	CHROMA PROGRAMMABLE DIGITAL POWER METER MODEL 66202	2/26/17
	OCEAN OPTICS QE65PRO Spectroradiometer	4/4/17
	RAB 2.0 meter Diameter Integrating Sphere, 4PI Geometry	4/4/17

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: RAB01938  
 DATE: 5/10/2016  
 PREPARED FOR: RAB LIGHTING INC.  
 CATALOG NUMBER: WPLEDC104Y / ALEDC104Y (7.5-DEGREE UPTILT)

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### RESULTS:

PHOTOMETRIC	
Total Integrated Flux (lumens)	12909 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.4304
Chromaticity Ordinate y	0.4081
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2447
Chromaticity Ordinate v'	0.5220
Correlated Color Temp CCT (K)	3144
ANSI C78.377-2008 Duv	0.003
Total Radiant Flux (milliWatts)	36055 *
ELECTRICAL	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.907
Input Power (Watts)	108.4
Input Power Factor (%)	99.6
Input Current THD (%)	4.9
Input Voltage THD (%)	0.2
EFFICACY (Lumens/Watt)	
	119.1
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.418
Input Power (Watts)	106.6
Input Power Factor (%)	92.0
Input Current THD (%)	9.7
Input Voltage THD (%)	0.2
Off-State Power (Watts)	0.0

COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	70
R1 Light greyish red	66
R2 Dark greyish yellow	79
R3 Strong yellowish green	90
R4 Moderate yellowish green	67
R5 Light bluish green	65
R6 Light blue	70
R7 Light violet	79
R8 Light reddish purple	44
R9 Strong red	-37
R10 Strong yellow	51
R11 Strong green	61
R12 Strong blue	41
R13 Light yellowish pink (skin)	68
R14 Moderate olive green (leaf)	94

### \*NOTE:

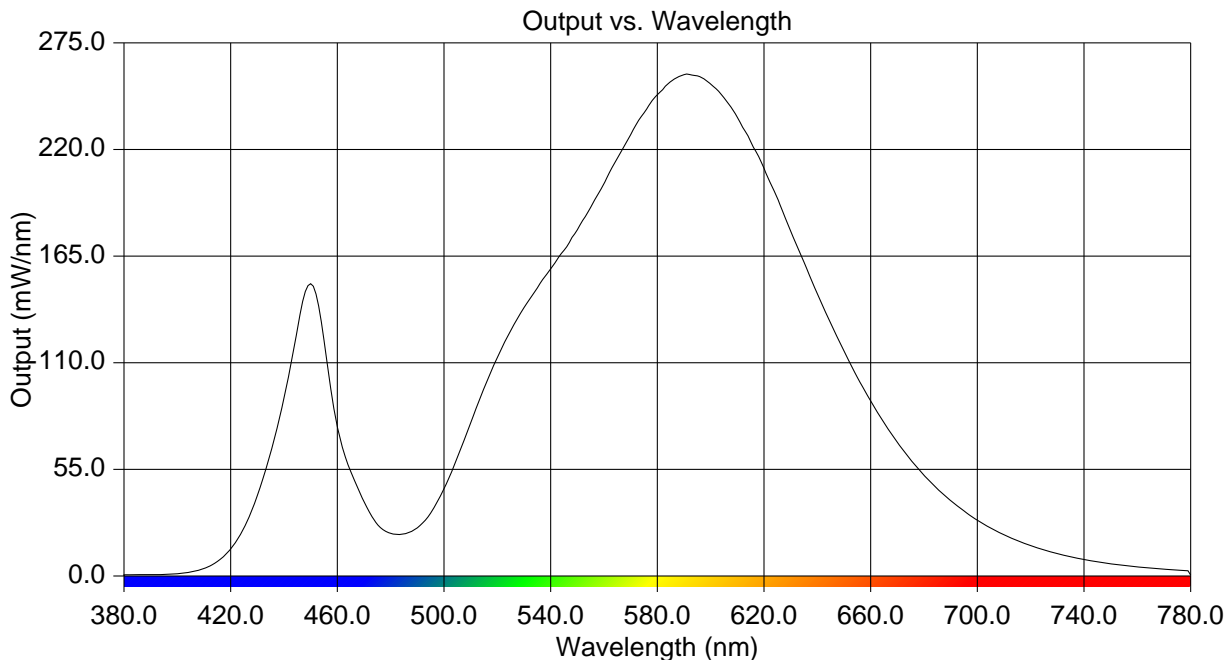
Proper calibration of integrating spheres for measuring total flux output of non-directional samples will produce reliable, repeatable results within the calibration tolerances of the equipment used. However, measurement of test samples with significant self absorption and/or directional output, even 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: RAB01938  
 DATE: 5/10/2016  
 PREPARED FOR: RAB LIGHTING INC.  
 CATALOG NUMBER: WPLED104Y / ALED104Y (7.5-DEGREE UPTILT)

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### RESULTS:

Wavelength	mW per nm	Wavelength	mW per nm	Wavelength	mW per nm
380	0.597	515	96.810	650	116.106
385	0.611	520	112.435	655	102.422
390	0.707	525	126.792	660	90.213
395	0.836	530	138.373	665	79.024
400	1.163	535	148.523	670	69.024
405	2.031	540	158.383	675	59.899
410	3.835	545	167.917	680	51.957
415	7.477	550	178.505	685	44.941
420	13.997	555	190.078	690	38.821
425	24.914	560	202.314	695	33.572
430	41.495	565	215.522	700	28.714
435	63.756	570	227.545	705	24.740
440	91.414	575	238.764	710	21.236
445	127.800	580	248.098	715	18.316
450	150.714	585	254.749	720	15.673
455	121.577	590	258.507	725	13.418
460	76.963	595	257.889	730	11.500
465	53.967	600	253.562	735	9.884
470	38.370	605	246.553	740	8.459
475	26.786	610	236.506	745	7.295
480	21.932	615	224.007	750	6.331
485	21.727	620	210.247	755	5.444
490	24.789	625	194.855	760	4.690
495	32.439	630	177.899	765	4.069
500	45.046	635	161.845	770	3.528
505	61.007	640	145.562	775	3.028
510	78.865	645	130.490	780	0.458



REPORT NUMBER: RAB01938  
DATE: 5/10/2016  
PREPARED FOR: RAB LIGHTING INC.  
CATALOG NUMBER: WPLEDC104Y / ALEDC104Y (7.5-DEGREE UPTILT)

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## CIE Chromaticity Diagram

