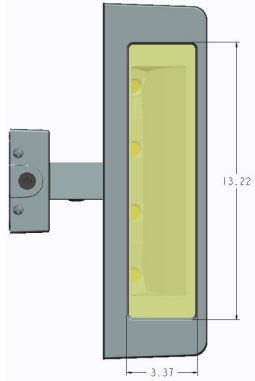


## ISOFOOTCANDLE LINES OF HORIZONTAL ILLUMINATION

Values based on 20 foot mounting height.

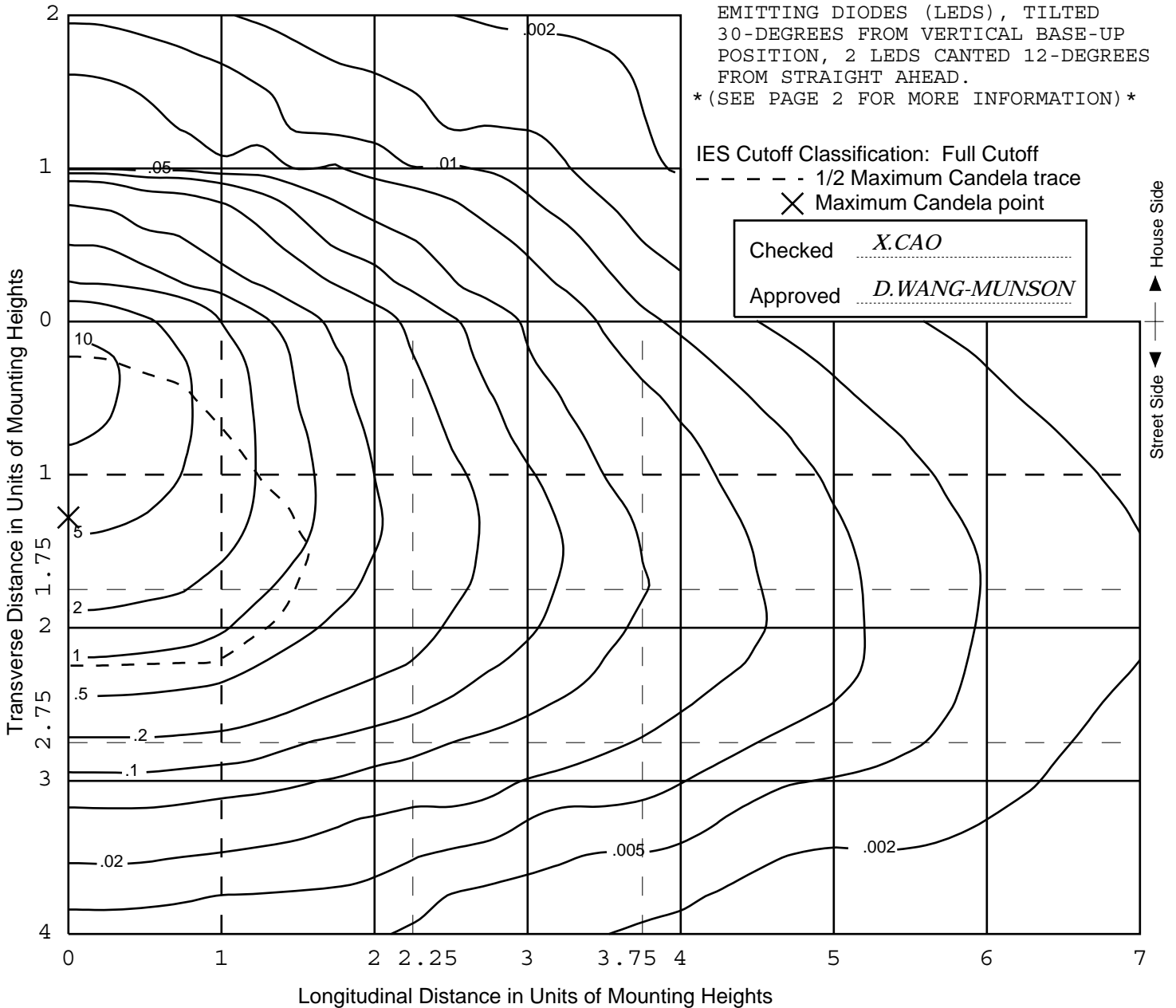


REPORT NUMBER: RAB01934  
 ISSUE DATE: 05/12/16 PAGE: 1 OF 9  
 DATE SAMPLE TESTED: 05/12/16  
 PREPARED FOR: RAB LIGHTING INC.  
 CATALOG NUMBER: WPLEDFC104 / ALEDFC104  
 (0-DEGREE UPTILT)  
 LUMINAIRE: CAST FINNED METAL HOUSING,  
 2-PIECE EXTRUDED METAL HEAT SINK, 4  
 CIRCUIT BOARDS EACH WITH 1 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  
 30-DEGREES FROM VERTICAL BASE-UP  
 POSITION, 2 LEDES CANTED 12-DEGREES  
 FROM STRAIGHT AHEAD.  
 \*(SEE PAGE 2 FOR MORE INFORMATION)\*

IES Cutoff Classification: Full Cutoff

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

Checked	<i>X.CAO</i>
Approved	<i>D.WANG-MUNSON</i>



House Side  
 Street Side

REPORT NUMBER: RAB01934  
ISSUE DATE: 05/12/16  
PREPARED FOR: RAB LIGHTING INC.

PAGE: 2 OF 9  
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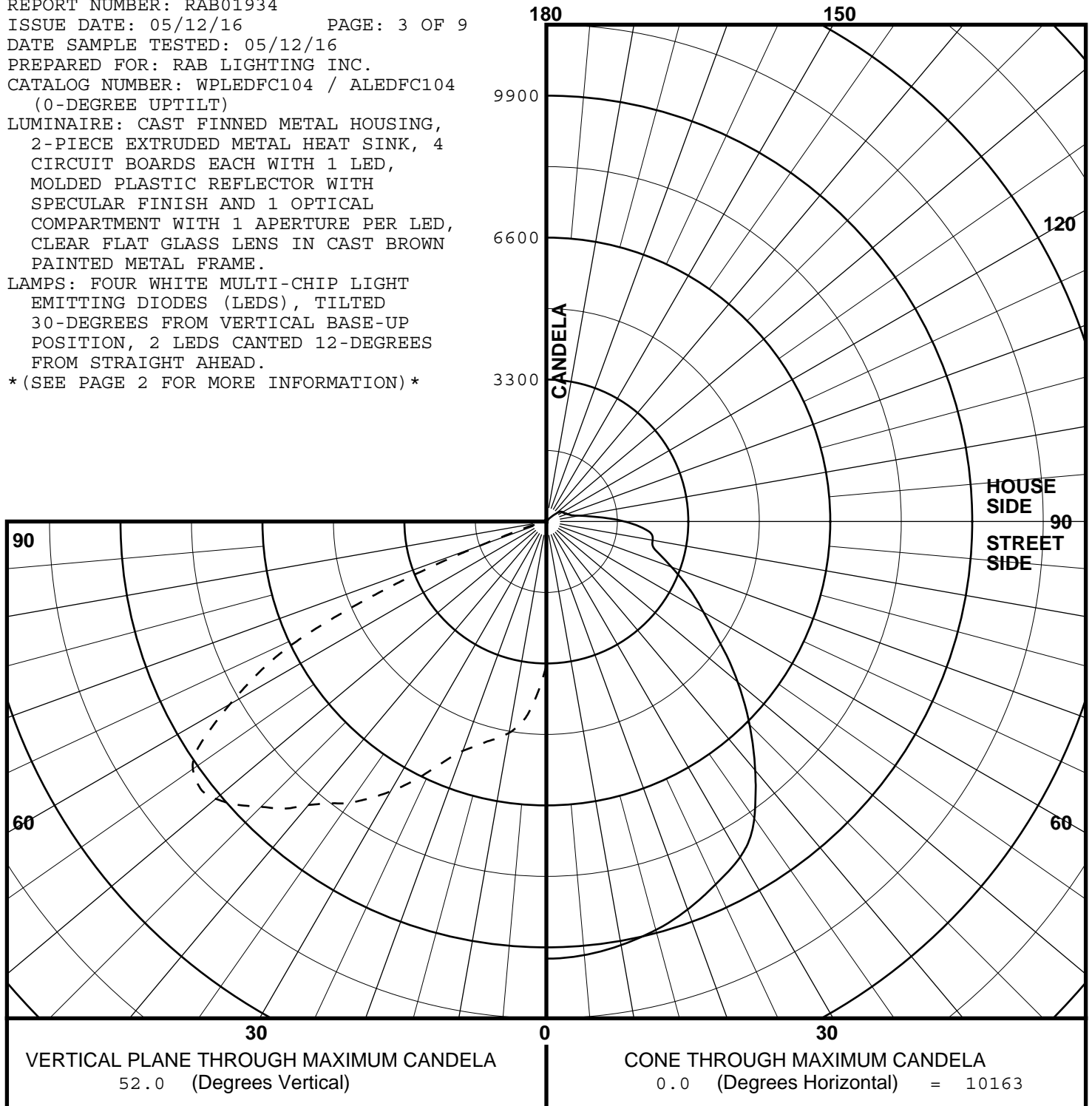
ADDITIONAL INFORMATION

NOTE: DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED.  
TOTAL INPUT WATTS = 106.03 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

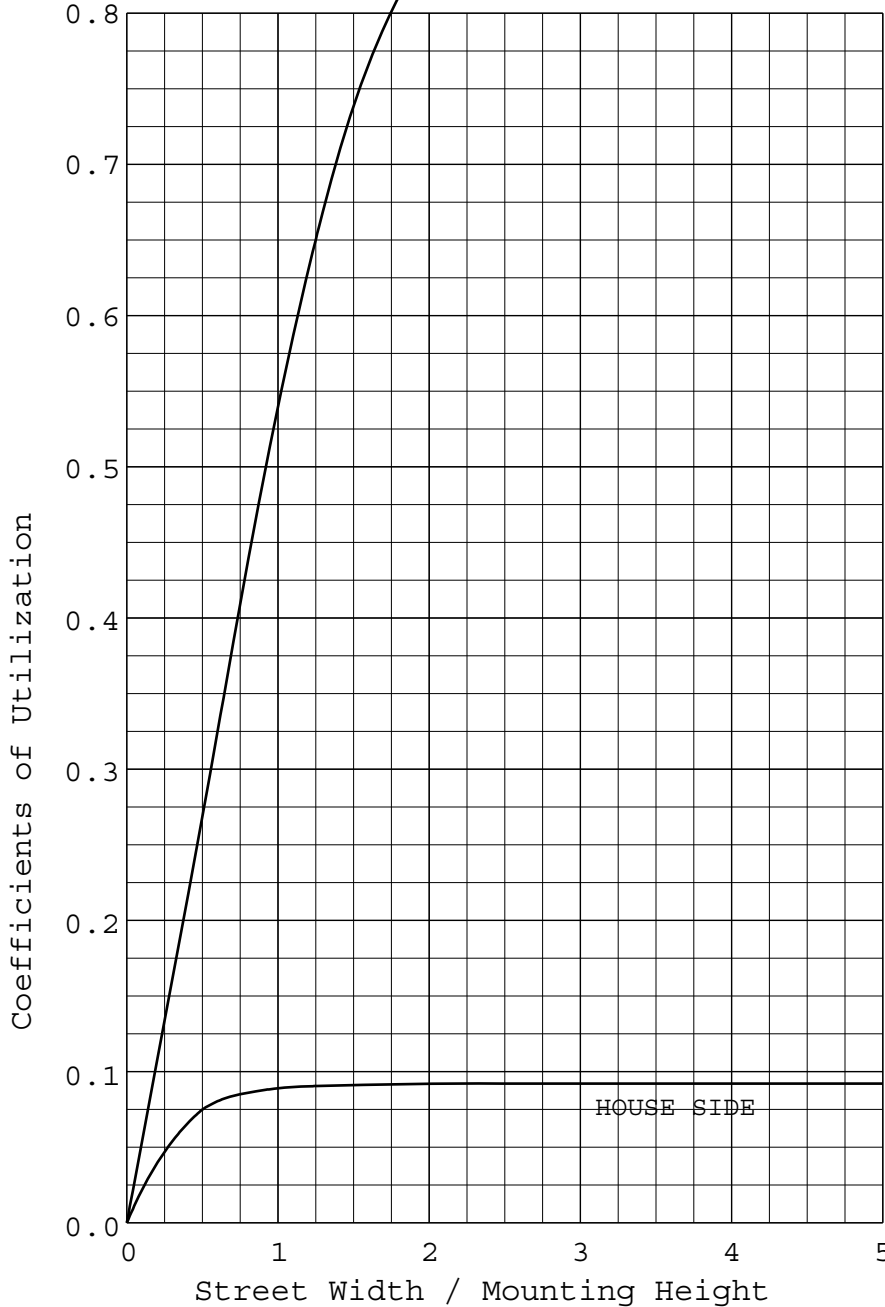
REPORT NUMBER: RAB01934  
 ISSUE DATE: 05/12/16 PAGE: 3 OF 9  
 DATE SAMPLE TESTED: 05/12/16  
 PREPARED FOR: RAB LIGHTING INC.  
 CATALOG NUMBER: WPLEDFC104 / ALEDFC104  
 (0-DEGREE UPTILT)  
 LUMINAIRE: CAST FINNED METAL HOUSING,  
 2-PIECE EXTRUDED METAL HEAT SINK, 4  
 CIRCUIT BOARDS EACH WITH 1 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  
 30-DEGREES FROM VERTICAL BASE-UP  
 POSITION, 2 LEDS CANTED 12-DEGREES  
 FROM STRAIGHT AHEAD.  
 \*(SEE PAGE 2 FOR MORE INFORMATION)\*



REPORT NUMBER: RAB01934  
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PAGE: 4 OF 9  
 DATE SAMPLE TESTED: 05/12/16

COEFFICIENTS OF UTILIZATION AND FLUX DISTRIBUTION



	LUMENS	PERCENT OF FIXTURE
DOWNWARD STREET SIDE	11896.	90.7
DOWNWARD HOUSE SIDE	1224.	9.3
DOWNWARD TOTAL	13120.	100.0
UPWARD STREET SIDE	0.	0.0
UPWARD HOUSE SIDE	0.	0.0
UPWARD TOTAL	0.	0.0
TOTAL FLUX	13120.	100.0

TOTAL INPUT WATTS = 106.0  
 EFFICACY = 123.8 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.

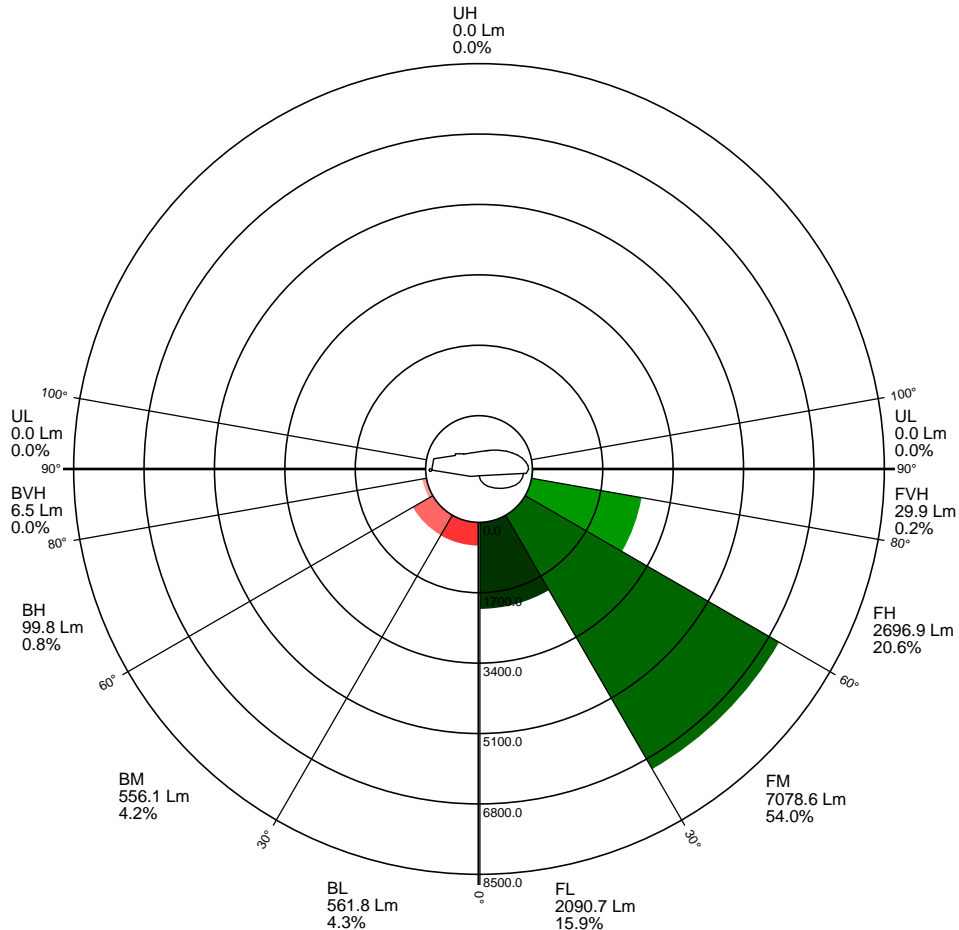
REPORT NUMBER: RAB01934  
 ISSUE DATE: 05/12/16  
 PREPARED FOR: RAB LIGHTING INC.

PAGE: 5 OF 9  
 DATE SAMPLE TESTED: 05/12/16

BUG Rating:			B2	U0	G2	
Zonal Summary		Lumens	% of Fixture	Zone Ratings		
				B	U	G
Forward		11896	90.7			
FL	(0° - 30°)	2090.7	15.9			
FM	(30° - 60°)	7078.6	54.0			
FH	(60° - 80°)	2696.9	20.6			G2
FVH	(80° - 90°)	29.9	0.2			G1
Backward		1224	9.3			
BL	(0° - 30°)	561.8	4.3	B2		
BM	(30° - 60°)	556.1	4.2	B1		
BH	(60° - 80°)	99.8	0.8	B0		G0
BVH	(80° - 90°)	6.5	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		13120	100.0			

### Zonal Lumen Summary

(Linear scale)

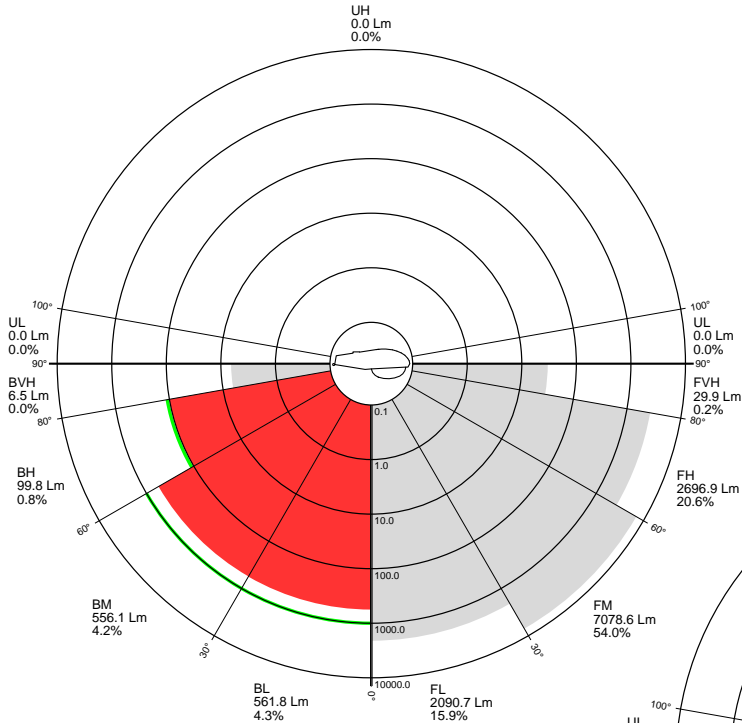


REPORT NUMBER: RAB01934  
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PAGE: 6 OF 9  
 DATE SAMPLE TESTED: 05/12/16

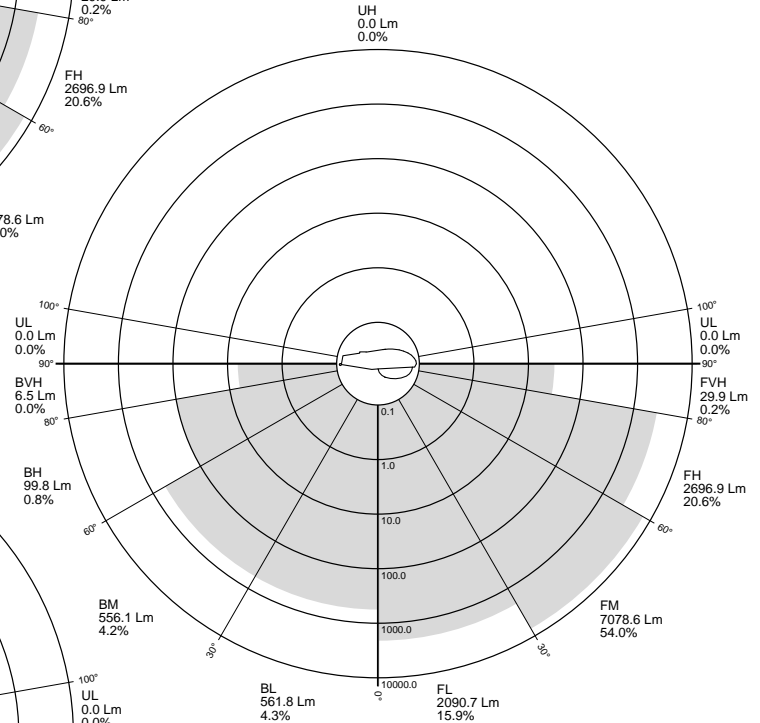
### Backlight Rating Details

(Logarithmic scale)



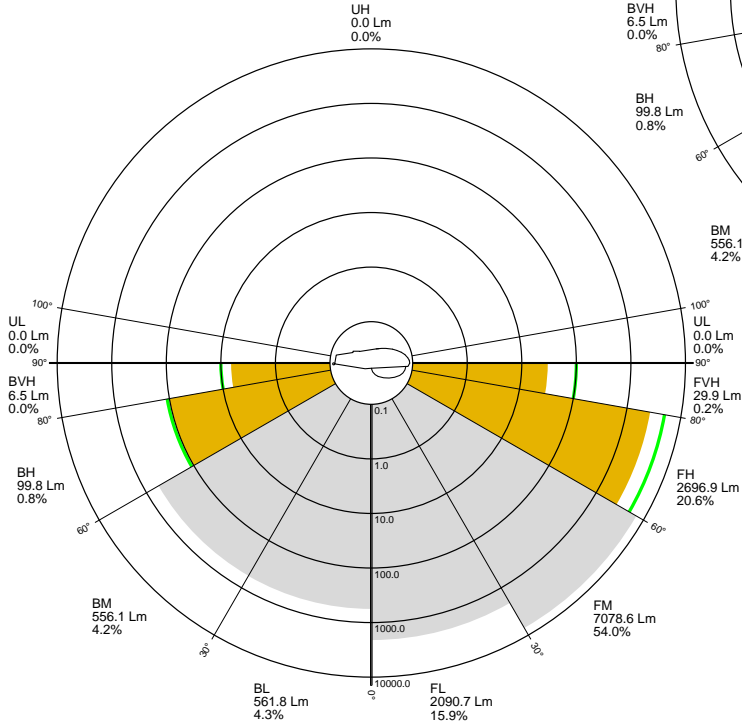
### Uplight Rating Details

(Logarithmic scale)



### Glare Rating Details

(Logarithmic scale)



REPORT NUMBER: RAB01934  
 ISSUE DATE: 05/12/16  
 PREPARED FOR: RAB LIGHTING INC.

PAGE: 7 OF 9  
 DATE SAMPLE TESTED: 05/12/16

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.	0.
87.5	1.	1.	3.	5.	8.	10.	12.	14.	15.	19.
85.0	5.	5.	5.	8.	10.	13.	14.	22.	79.	40.
82.5	13.	13.	13.	14.	14.	18.	45.	135.	346.	142.
80.0	22.	23.	24.	27.	36.	103.	199.	779.	556.	243.
77.5	54.	70.	82.	205.	185.	330.	1001.	1354.	741.	325.
75.0	281.	286.	303.	376.	552.	1317.	2157.	1942.	939.	432.
72.5	631.	667.	776.	1119.	1726.	2859.	2832.	2309.	1159.	606.
70.0	1674.	1728.	2111.	2847.	3479.	3867.	3489.	2526.	1370.	831.
V 67.5	3776.	3823.	4320.	5286.	4878.	4606.	3951.	2637.	1589.	1055.
E 65.0	5973.	6018.	6371.	6997.	5796.	5276.	4164.	2757.	1777.	1286.
R 62.5	7456.	7477.	7507.	8197.	6948.	5706.	4261.	2902.	1972.	1516.
T 60.0	8490.	8513.	8554.	9077.	7819.	5973.	4290.	3052.	2132.	1726.
I 57.5	9478.	9482.	9410.	9483.	8321.	6172.	4374.	3197.	2276.	1923.
C 55.0	10032.	10008.	9792.	9477.	8508.	6419.	4554.	3373.	2432.	2106.
A 52.5	10159.	10125.	9853.	9347.	8454.	6653.	4858.	3598.	2599.	2315.
L 52.0 <	10163.	10118.	9831.	9309.	8426.	6679.	4937.	3646.	2645.	2352.
50.0	10031.	9988.	9696.	9093.	8260.	6737.	5193.	3836.	2849.	2515.
A 47.5	9750.	9680.	9419.	8829.	7962.	6768.	5442.	4095.	3112.	2751.
N 45.0	9381.	9332.	9102.	8553.	7594.	6702.	5569.	4312.	3401.	2951.
G 42.5	9057.	9028.	8762.	8135.	7313.	6492.	5597.	4482.	3720.	3173.
L 40.0	8603.	8581.	8335.	7834.	7104.	6259.	5496.	4600.	3976.	3367.
E 37.5	8259.	8220.	8002.	7563.	6864.	6056.	5283.	4627.	4143.	3484.
35.0	7986.	7912.	7695.	7252.	6640.	5876.	5081.	4575.	4211.	3532.
30.0	7247.	7203.	7040.	6639.	6118.	5493.	4985.	4566.	4274.	3592.
25.0	6394.	6380.	6280.	5967.	5591.	5270.	4932.	4660.	4340.	3642.
20.0	5673.	5681.	5646.	5522.	5355.	5118.	4894.	4649.	4222.	3531.
15.0	5293.	5306.	5291.	5230.	5133.	4990.	4838.	4565.	4148.	3570.
10.0	4991.	4992.	4990.	4932.	4880.	4716.	4533.	4303.	3949.	3540.
5.0	4414.	4389.	4381.	4314.	4277.	4127.	3995.	3845.	3654.	3441.
0.0	3357.	3357.	3357.	3357.	3357.	3357.	3357.	3357.	3357.	3357.

||  
 PLANE OF MAXIMUM CANDELA

CONE OF MAXIMUM CANDELA

REPORT NUMBER: RAB01934  
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 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.	11.	9.	6.	4.	3.
	85.0	20.	19.	17.	14.	13.	12.	10.	8.	6.	6.
	82.5	81.	29.	20.	17.	13.	11.	9.	8.	7.	7.
	80.0	143.	61.	31.	30.	14.	11.	9.	8.	7.	7.
	77.5	196.	84.	39.	44.	18.	12.	10.	8.	7.	7.
	75.0	272.	150.	64.	66.	27.	14.	11.	9.	8.	8.
	72.5	476.	289.	129.	66.	37.	21.	15.	13.	12.	12.
	70.0	704.	351.	192.	52.	47.	27.	23.	20.	17.	18.
V	67.5	902.	469.	272.	56.	51.	36.	28.	27.	26.	27.
E	65.0	1068.	573.	306.	104.	45.	42.	38.	33.	32.	34.
R	62.5	1227.	708.	325.	186.	34.	46.	45.	42.	40.	41.
T	60.0	1365.	779.	353.	261.	46.	42.	49.	48.	48.	52.
I	57.5	1473.	836.	416.	352.	127.	33.	48.	50.	51.	57.
C	55.0	1626.	992.	513.	421.	272.	39.	38.	48.	52.	57.
A	52.5	1797.	1172.	573.	455.	385.	101.	33.	40.	49.	54.
L	52.0 <<	1825.	1193.	581.	463.	398.	124.	33.	37.	47.	52.
	50.0	1936.	1309.	607.	491.	433.	224.	48.	34.	40.	46.
A	47.5	2093.	1430.	643.	518.	462.	332.	123.	39.	37.	38.
N	45.0	2245.	1549.	690.	554.	491.	384.	231.	100.	58.	44.
G	42.5	2439.	1690.	756.	602.	516.	401.	315.	217.	161.	111.
L	40.0	2633.	1855.	840.	644.	537.	418.	351.	330.	308.	251.
E	37.5	2758.	2045.	946.	685.	557.	442.	374.	405.	422.	386.
	35.0	2846.	2163.	1078.	725.	578.	464.	413.	455.	467.	455.
	30.0	3006.	2405.	1373.	817.	611.	523.	526.	547.	531.	514.
	25.0	3129.	2593.	1647.	933.	691.	653.	664.	630.	608.	585.
	20.0	3104.	2677.	1930.	1304.	964.	852.	774.	731.	707.	691.
	15.0	3241.	2926.	2358.	1863.	1429.	1138.	993.	924.	870.	834.
	10.0	3322.	3103.	2702.	2348.	2047.	1792.	1590.	1412.	1337.	1271.
	5.0	3338.	3227.	3030.	2849.	2692.	2561.	2483.	2366.	2327.	2287.
	0.0	3357.	3357.	3357.	3357.	3357.	3357.	3357.	3357.	3357.	3357.

CONE OF MAXIMUM CANDELA



REPORT NUMBER: RAB01934  
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PAGE: 9 OF 9  
DATE SAMPLE TESTED: 05/12/16

5-DEGREE  
ZONAL LUMEN SUMMARY

0- 5	80
5- 10	236
10- 15	378
15- 20	510
20- 25	647
25- 30	801
30- 35	959
35- 40	1120
40- 45	1264
45- 50	1383
50- 55	1462
55- 60	1446
60- 65	1286
65- 70	921
70- 75	442
75- 80	147
80- 85	31
85- 90	5

10-DEGREE  
ZONAL LUMEN SUMMARY

0- 10	316
0- 20	1204
0- 30	2653
0- 40	4732
0- 50	7379
0- 60	10287
0- 70	12495
0- 80	13084
0- 90	13120

REPORT NUMBER: RAB01936  
DATE: 5/10/2016  
PREPARED FOR: RAB LIGHTING INC.  
CATALOG NUMBER: WPLEDC104 / ALEDC104 (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: RAB01936  
 DATE: 5/10/2016  
 PREPARED FOR: RAB LIGHTING INC.  
 CATALOG NUMBER: WPLEDC104 / ALEDC104 (7.5-DEGREE UPTILT)

RESULTS:

<b>PHOTOMETRIC</b>	
Total Integrated Flux (lumens)	13120 *
<b>SPECTRORADIOMETRIC</b>	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.3452
Chromaticity Ordinate y	0.3620
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2075
Chromaticity Ordinate v'	0.4896
Correlated Color Temp CCT (K)	5031
ANSI C78.377-2008 Duv	0.005
Total Radiant Flux (milliWatts)	38571 *
<b>ELECTRICAL</b>	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.887
Input Power (Watts)	106.0
Input Power Factor (%)	99.6
Input Current THD (%)	5.1
Input Voltage THD (%)	0.2
<b>EFFICACY (Lumens/Watt)</b>	
123.8	
<b>ELECTRICAL AT MAX NONIMAL INPUT</b>	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.410
Input Power (Watts)	104.4
Input Power Factor (%)	91.9
Input Current THD (%)	10.1
Input Voltage THD (%)	0.2
Off-State Power (Watts)	0.0

COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	71
R1 Light greyish red	68
R2 Dark greyish yellow	76
R3 Strong yellowish green	81
R4 Moderate yellowish green	72
R5 Light bluish green	69
R6 Light blue	67
R7 Light violet	81
R8 Light reddish purple	55
R9 Strong red	-35
R10 Strong yellow	42
R11 Strong green	68
R12 Strong blue	42
R13 Light yellowish pink (skin)	69
R14 Moderate olive green (leaf)	89

\*NOTE:

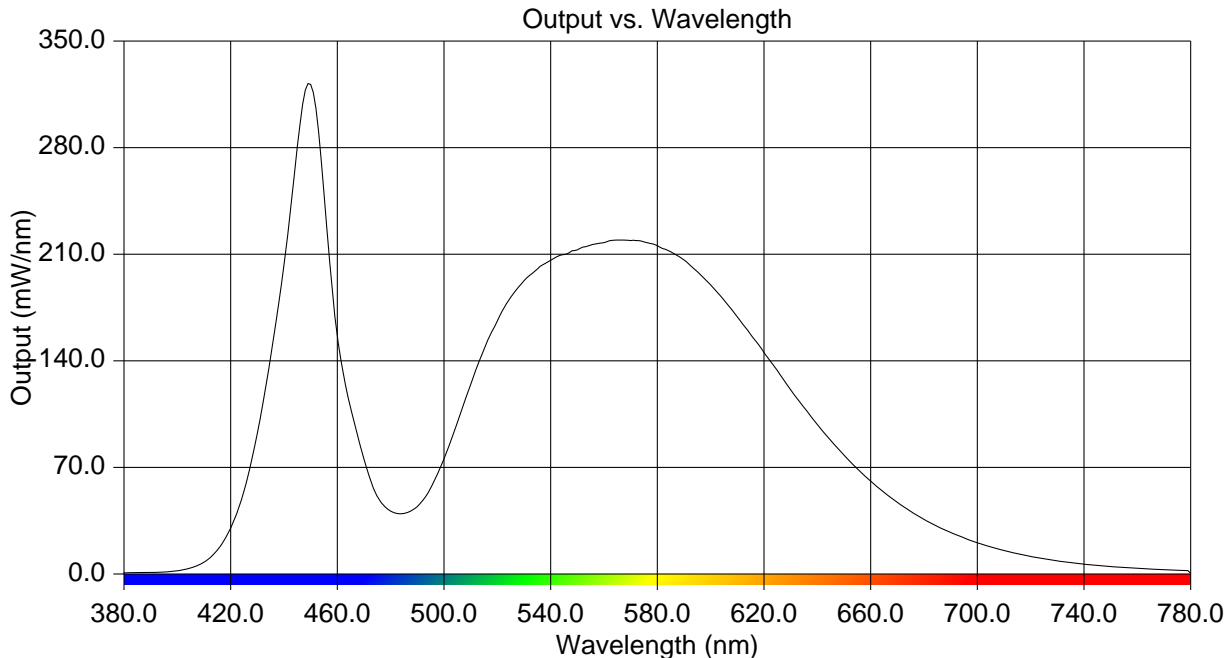
Proper calibration of integrating spheres for measuring total flux output of non-directional samples will produce reliable, repeatable results within the calibration tolerances of the equipment used. However, measurement of test samples with significant self absorption and/or directional output, even 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: RAB01936  
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 CATALOG NUMBER: WPLEDC104 / ALEDC104 (7.5-DEGREE UPTILT)

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RESULTS:

Wavelength	mW per nm	Wavelength	mW per nm	Wavelength	mW per nm
380	0.717	515	147.447	650	78.093
385	0.849	520	166.034	655	69.050
390	0.984	525	181.698	660	60.913
395	1.318	530	192.482	665	53.612
400	2.144	535	200.096	670	46.963
405	3.902	540	205.985	675	41.074
410	7.795	545	209.627	680	35.812
415	15.646	550	212.718	685	31.225
420	30.123	555	215.759	690	27.235
425	54.749	560	217.444	695	23.738
430	92.300	565	219.220	700	20.468
435	142.386	570	218.812	705	17.739
440	202.957	575	217.924	710	15.403
445	280.627	580	215.354	715	13.351
450	321.299	585	211.341	720	11.502
455	249.735	590	206.108	725	9.939
460	155.906	595	198.624	730	8.652
465	108.739	600	189.556	735	7.472
470	75.302	605	179.736	740	6.471
475	51.134	610	168.716	745	5.601
480	41.187	615	157.141	750	4.898
485	39.774	620	145.580	755	4.242
490	44.260	625	133.545	760	3.698
495	56.248	630	120.822	765	3.216
500	75.866	635	109.299	770	2.815
505	99.638	640	97.955	775	2.450
510	124.326	645	87.758	780	0.370



REPORT NUMBER: RAB01936  
DATE: 5/10/2016  
PREPARED FOR: RAB LIGHTING INC.  
CATALOG NUMBER: WPLEDC104 / ALEDC104 (7.5-DEGREE UPTILT)

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### CIE Chromaticity Diagram

