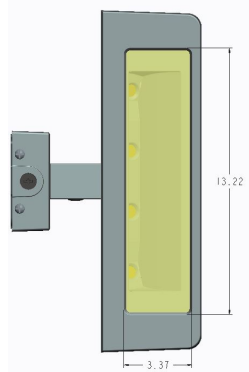


ISOFOOTCANDLE LINES OF HORIZONTAL ILLUMINATION

Values based on 20 foot mounting height.



REPORT NUMBER: RAB01939
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DATE SAMPLE TESTED: 05/09/16
PREPARED FOR: RAB LIGHTING INC.
CATALOG NUMBER: WPLEDFC104Y /
ALEDFC104Y (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)

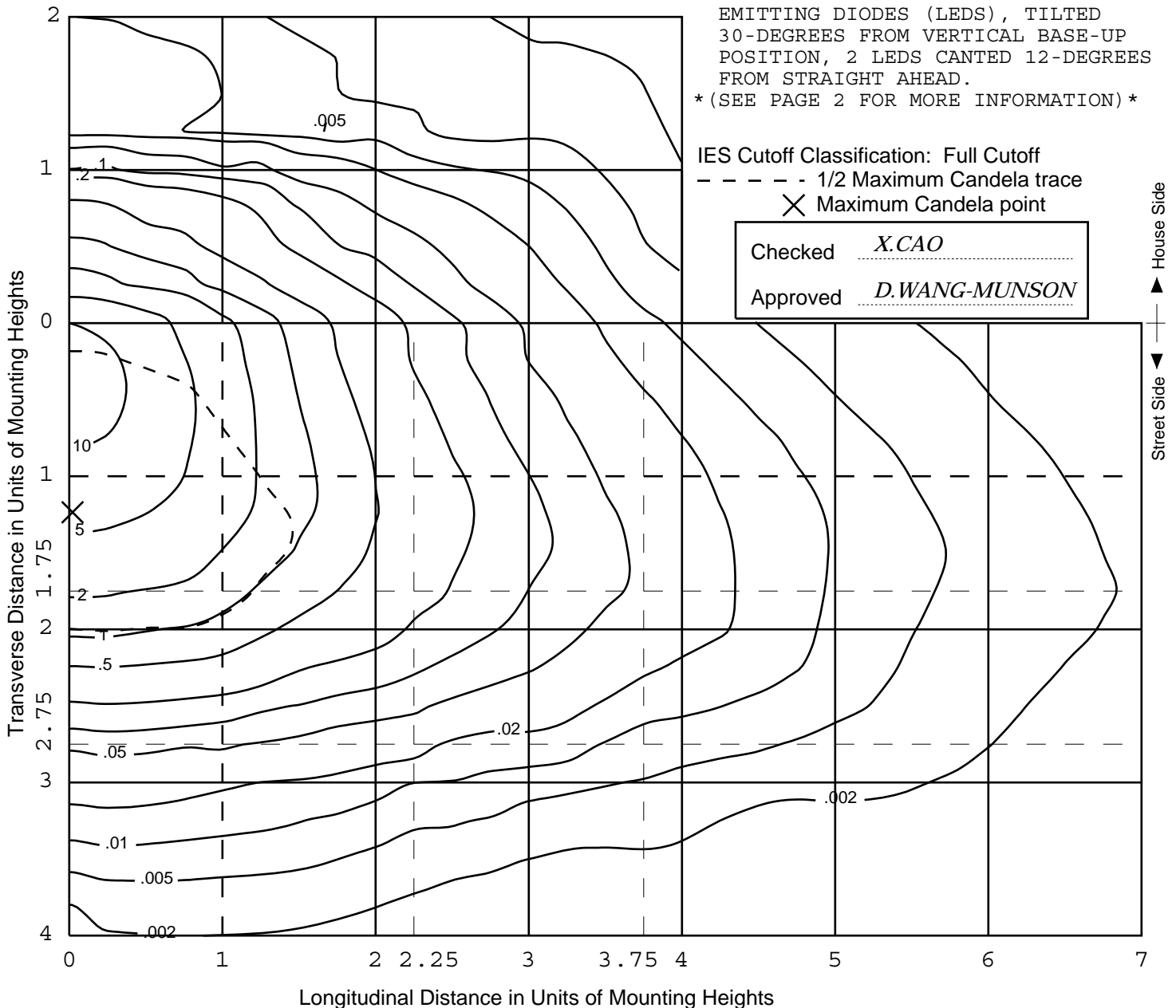
IES Cutoff Classification: Full Cutoff

--- 1/2 Maximum Candela trace

X Maximum Candela point

Checked X.CAO

Approved D.WANG-MUNSON



REPORT NUMBER: RAB01939
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 = 108.33 W AT 120.0 VAC.

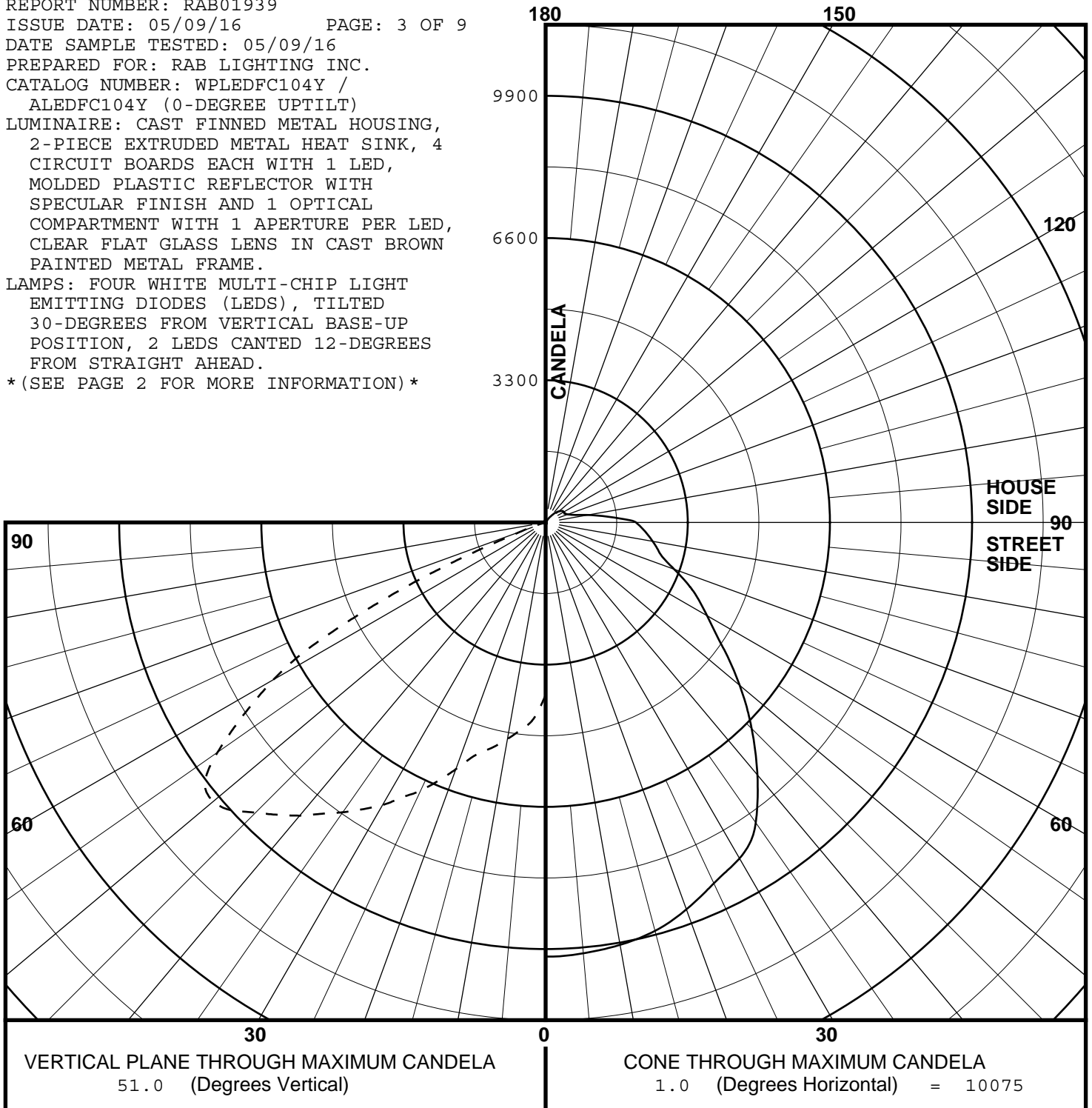
LED DRIVER: RD-120-A0700

TEST PROCEDURE: IESNA LM-79-08

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: RAB01939
 ISSUE DATE: 05/09/16 PAGE: 3 OF 9
 DATE SAMPLE TESTED: 05/09/16
 PREPARED FOR: RAB LIGHTING INC.
 CATALOG NUMBER: WPLEDFC104Y /
 ALEDFC104Y (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: RAB01939

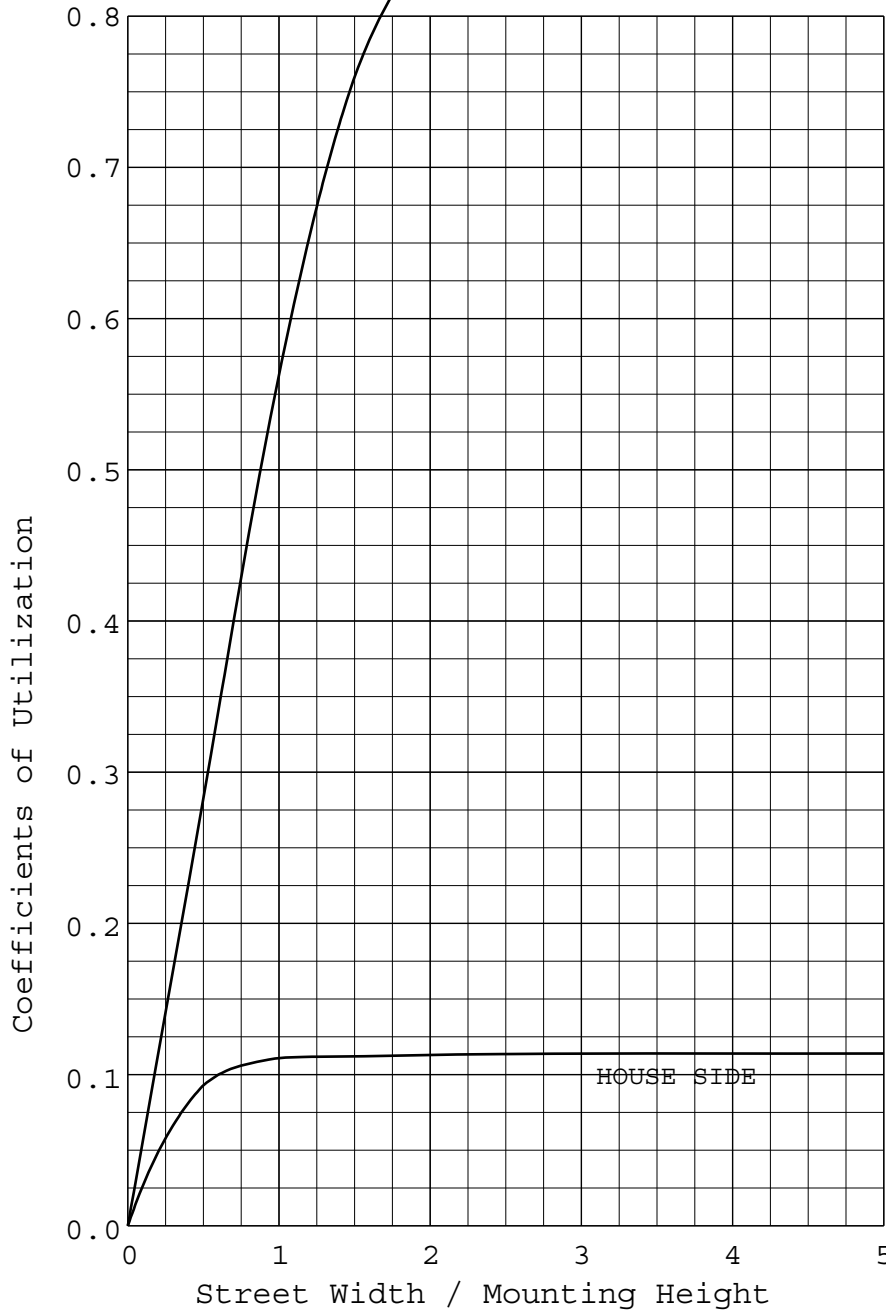
ISSUE DATE: 05/09/16

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	11468.	88.5
DOWNWARD HOUSE SIDE	1489.	11.5
DOWNWARD TOTAL	12957.	100.0
UPWARD STREET SIDE	0.	0.0
UPWARD HOUSE SIDE	0.	0.0
UPWARD TOTAL	0.	0.0
TOTAL FLUX	12957.	100.0
TOTAL INPUT WATTS = 108.3		
EFFICACY = 119.6 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: RAB01939
 ISSUE DATE: 05/09/16
 PREPARED FOR: RAB LIGHTING INC.

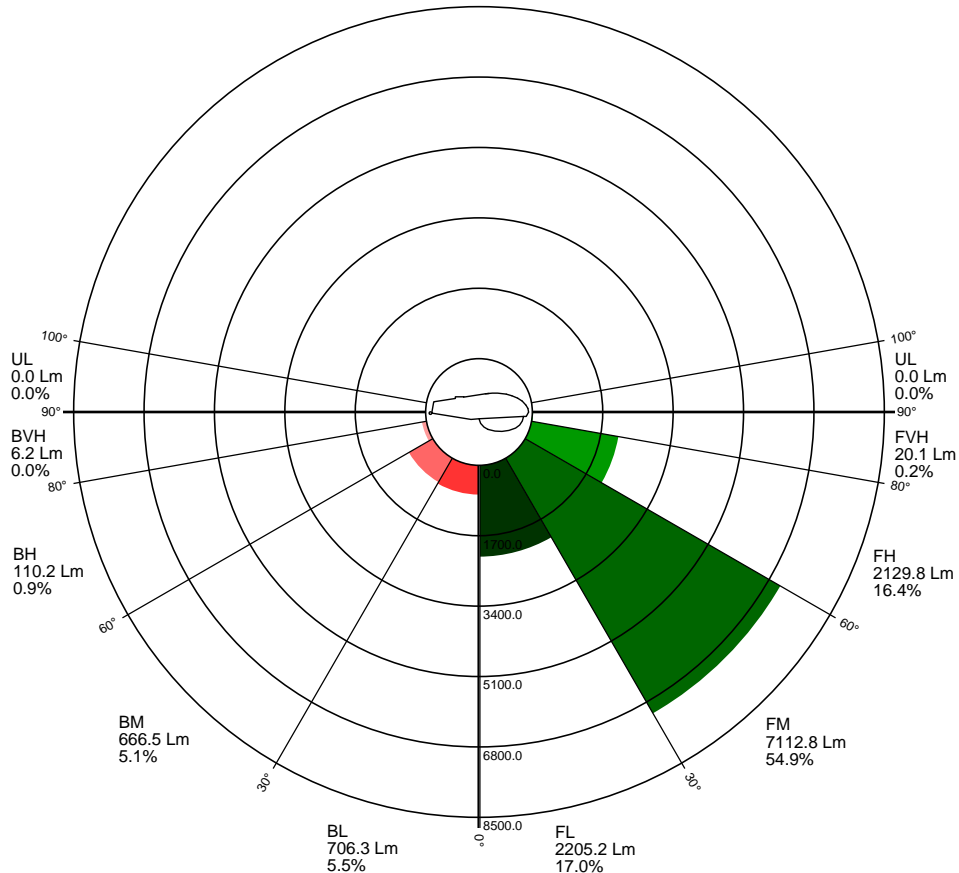
PAGE: 5 OF 9
 DATE SAMPLE TESTED: 05/09/16

BUG Rating:				B2 U0 G2		
Zonal Summary		Lumens	% of Fixture	Zone Ratings		
				B	U	G
Forward		11468	88.5			
FL	(0° - 30°)	2205.2	17.0			
FM	(30° - 60°)	7112.8	54.9			
FH	(60° - 80°)	2129.8	16.4			G2
FVH	(80° - 90°)	20.1	0.2			G1
Backward		1489	11.5			
BL	(0° - 30°)	706.3	5.5	B2		
BM	(30° - 60°)	666.5	5.1	B1		
BH	(60° - 80°)	110.2	0.9	B1		G1
BVH	(80° - 90°)	6.2	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		12957	100.0			

Zonal Lumen Summary

(Linear scale)

UH
0.0 Lm
0.0%

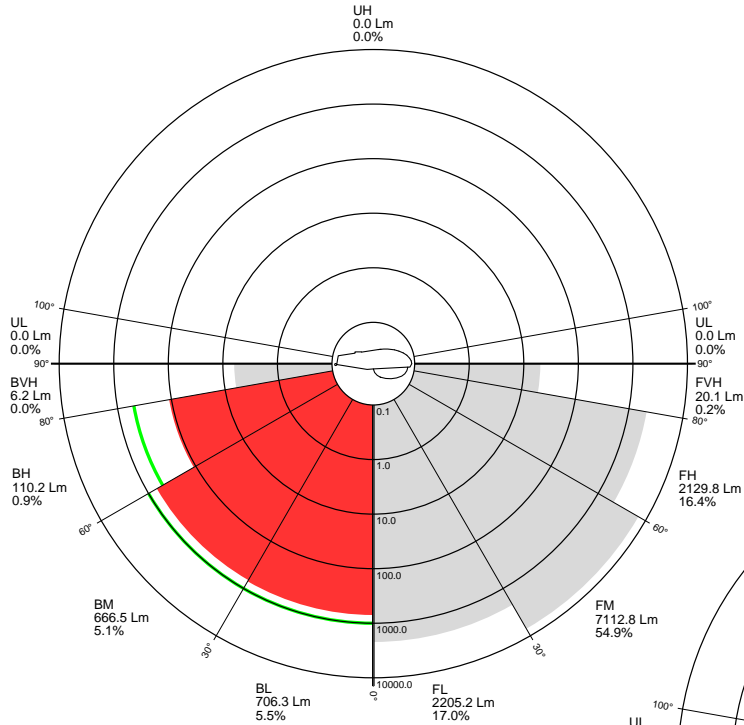


REPORT NUMBER: RAB01939
 ISSUE DATE: 05/09/16
 PREPARED FOR: RAB LIGHTING INC.

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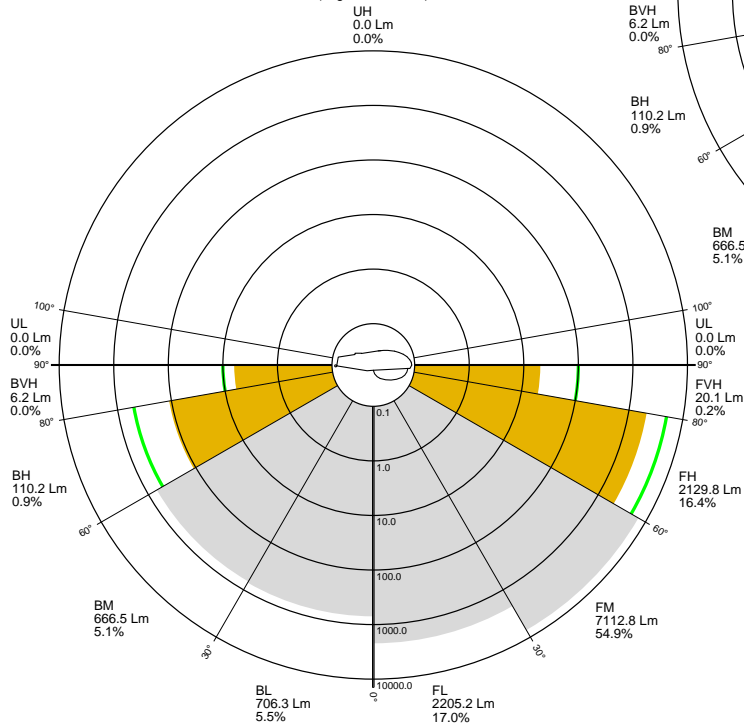
Backlight Rating Details

(Logarithmic scale)



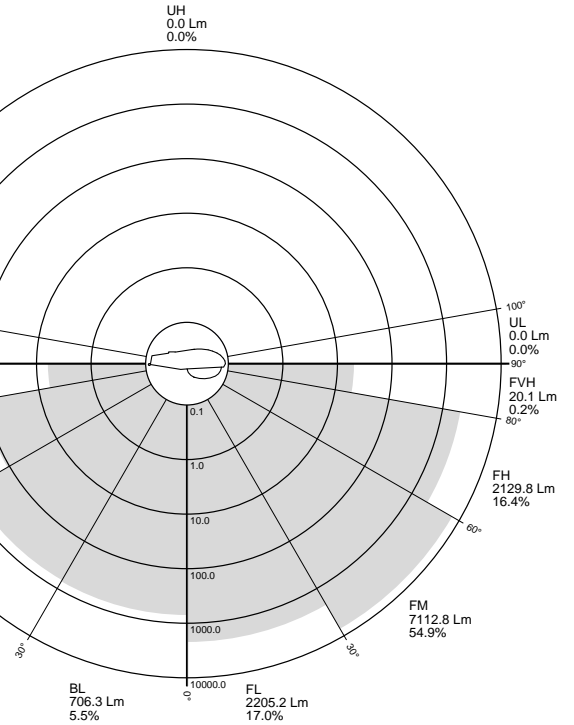
Glare Rating Details

(Logarithmic scale)



Uplight Rating Details

(Logarithmic scale)



[illegible]

CONE OF MAXIMUM CANDELA

REPORT NUMBER: RAB01939
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 PREPARED FOR: RAB LIGHTING INC.

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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	14.	14.	14.	13.	12.	10.	8.	6.	4.	3.
	85.0	18.	16.	16.	13.	12.	10.	9.	7.	5.	5.
	82.5	83.	33.	20.	19.	12.	10.	8.	7.	5.	5.
	80.0	136.	65.	30.	36.	15.	11.	9.	7.	5.	5.
	77.5	192.	95.	28.	53.	23.	12.	10.	8.	7.	6.
	75.0	274.	141.	94.	59.	30.	19.	14.	13.	12.	12.
	72.5	454.	309.	166.	36.	43.	23.	21.	20.	18.	19.
	70.0	707.	394.	211.	39.	43.	34.	24.	25.	26.	29.
V	67.5	922.	544.	291.	77.	30.	38.	35.	29.	28.	31.
E	65.0	1101.	689.	325.	170.	20.	35.	41.	40.	35.	37.
R	62.5	1323.	836.	354.	247.	34.	25.	40.	44.	45.	51.
T	60.0	1485.	937.	401.	295.	109.	17.	30.	40.	44.	52.
I	57.5	1615.	1029.	457.	384.	269.	30.	18.	31.	38.	46.
C	55.0	1786.	1199.	572.	443.	396.	98.	24.	19.	26.	33.
A	52.5	1999.	1388.	641.	475.	444.	239.	44.	21.	17.	21.
L	51.0<<	2098.	1477.	677.	493.	464.	315.	87.	28.	20.	18.
	50.0	2167.	1545.	704.	510.	481.	357.	129.	36.	26.	22.
A	47.5	2396.	1729.	762.	556.	512.	404.	248.	103.	57.	38.
N	45.0	2617.	1908.	825.	610.	532.	422.	333.	226.	178.	117.
G	42.5	2858.	2123.	924.	665.	560.	445.	366.	342.	333.	269.
L	40.0	3058.	2363.	1082.	719.	594.	463.	390.	409.	441.	409.
E	37.5	3226.	2534.	1282.	772.	625.	487.	420.	458.	476.	470.
	35.0	3331.	2675.	1483.	866.	650.	515.	465.	505.	509.	497.
	30.0	3515.	2969.	1866.	1032.	700.	596.	599.	603.	582.	568.
	25.0	3686.	3217.	2188.	1325.	885.	745.	738.	708.	685.	666.
	20.0	3705.	3325.	2511.	1841.	1319.	1050.	942.	827.	796.	775.
	15.0	3852.	3573.	2990.	2440.	1974.	1590.	1322.	1162.	1086.	1053.
	10.0	3960.	3770.	3376.	2979.	2637.	2360.	2149.	1969.	1876.	1794.
	5.0	3984.	3892.	3705.	3531.	3368.	3222.	3102.	3005.	2938.	2875.
	0.0	4007.	4007.	4007.	4007.	4007.	4007.	4007.	4007.	4007.	4007.

CONE OF MAXIMUM CANDELA

REPORT NUMBER: RAB01939
ISSUE DATE: 05/09/16
PREPARED FOR: RAB LIGHTING INC.

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

5-DEGREE ZONAL LUMEN SUMMARY

0- 5	94
5- 10	269
10- 15	420
15- 20	558
20- 25	706
25- 30	865
30- 35	1021
35- 40	1179
40- 45	1319
45- 50	1421
50- 55	1462
55- 60	1377
60- 65	1140
65- 70	699
70- 75	303
75- 80	98
80- 85	22
85- 90	4

10-DEGREE ZONAL LUMEN SUMMARY

0- 10	363
0- 20	1340
0- 30	2911
0- 40	5111
0- 50	7851
0- 60	10691
0- 70	12530
0- 80	12931
0- 90	12957

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)	12957 *
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)	36189 *
ELECTRICAL	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.906
Input Power (Watts)	108.3
Input Power Factor (%)	99.6
Input Current THD (%)	4.9
Input Voltage THD (%)	0.2
EFFICACY (Lumens/Watt)	
	119.6
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 (%)	9.8
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:

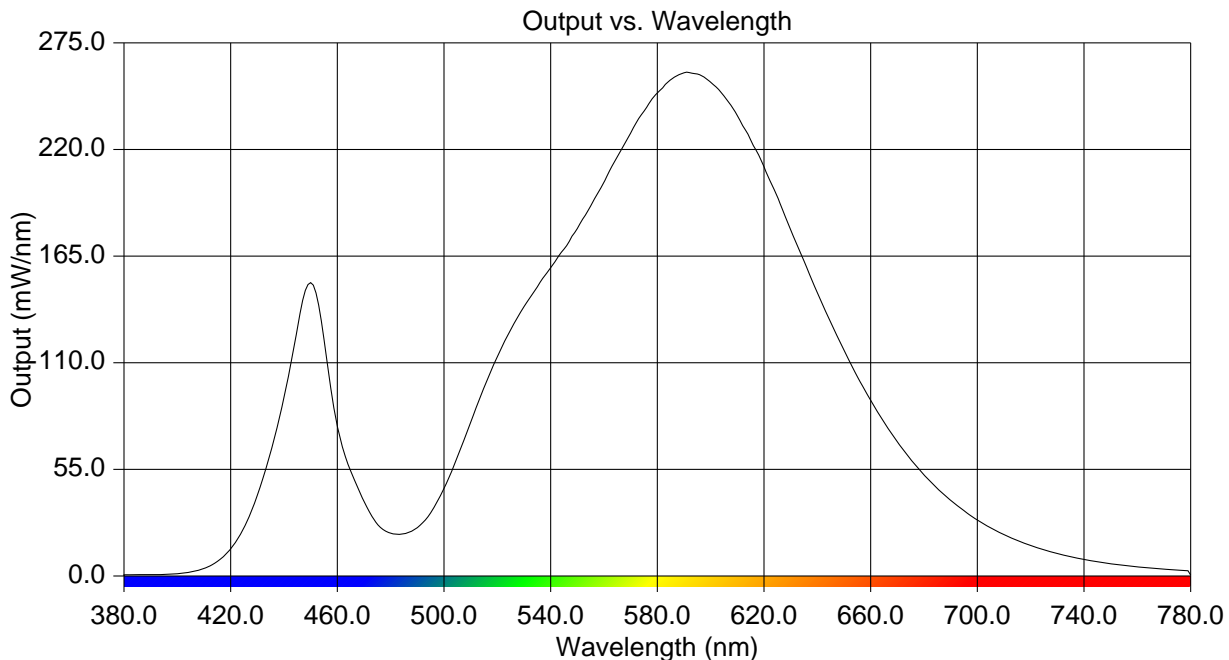
Proper calibration of integrating spheres for measuring total flux output of non-directional samples will produce reliable, repeatable results within the calibration tolerances of the equipment used. However, measurement of test samples with significant self absorption and/or directional output, even 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.

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 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	0.600	515	97.169	650	116.538
385	0.613	520	112.853	655	102.803
390	0.710	525	127.263	660	90.548
395	0.839	530	138.888	665	79.318
400	1.167	535	149.076	670	69.281
405	2.038	540	158.972	675	60.122
410	3.849	545	168.542	680	52.150
415	7.504	550	179.168	685	45.108
420	14.049	555	190.785	690	38.965
425	25.006	560	203.066	695	33.697
430	41.650	565	216.324	700	28.821
435	63.993	570	228.391	705	24.832
440	91.754	575	239.652	710	21.315
445	128.275	580	249.020	715	18.384
450	151.274	585	255.696	720	15.732
455	122.029	590	259.468	725	13.468
460	77.249	595	258.848	730	11.543
465	54.168	600	254.505	735	9.921
470	38.513	605	247.470	740	8.490
475	26.885	610	237.385	745	7.322
480	22.014	615	224.840	750	6.354
485	21.807	620	211.029	755	5.465
490	24.881	625	195.580	760	4.707
495	32.560	630	178.561	765	4.084
500	45.214	635	162.447	770	3.541
505	61.233	640	146.103	775	3.039
510	79.159	645	130.976	780	0.459



REPORT NUMBER: RAB01938
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CIE Chromaticity Diagram

