

REPORT NUMBER: RAB01961
ISSUE DATE: 05/16/16
PREPARED FOR: RAB LIGHTING INC.

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ADDITIONAL INFORMATION

TOTAL INPUT WATTS = 112.53 W AT 480.0 VAC.

LED DRIVER: RD-T150-A-700/480

TEST PROCEDURE: IESNA LM-79-08

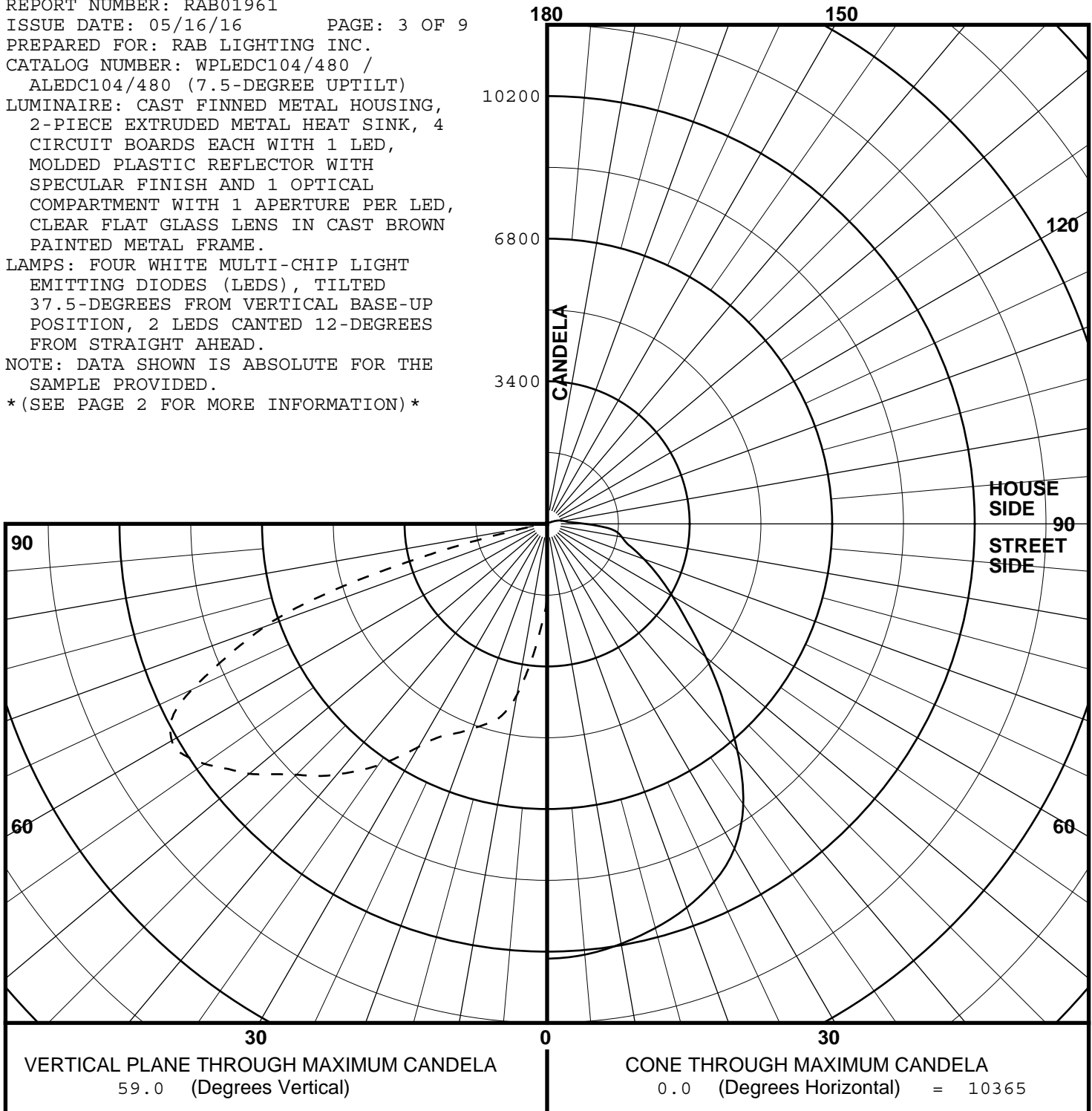
ACCREDITED LABORATORY CODE 201058-0

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

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 PREPARED FOR: RAB LIGHTING INC.
 CATALOG NUMBER: WPLEDC104/480 /
 ALEDC104/480 (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.
 NOTE: DATA SHOWN IS ABSOLUTE FOR THE
 SAMPLE PROVIDED.
 *(SEE PAGE 2 FOR MORE INFORMATION) *

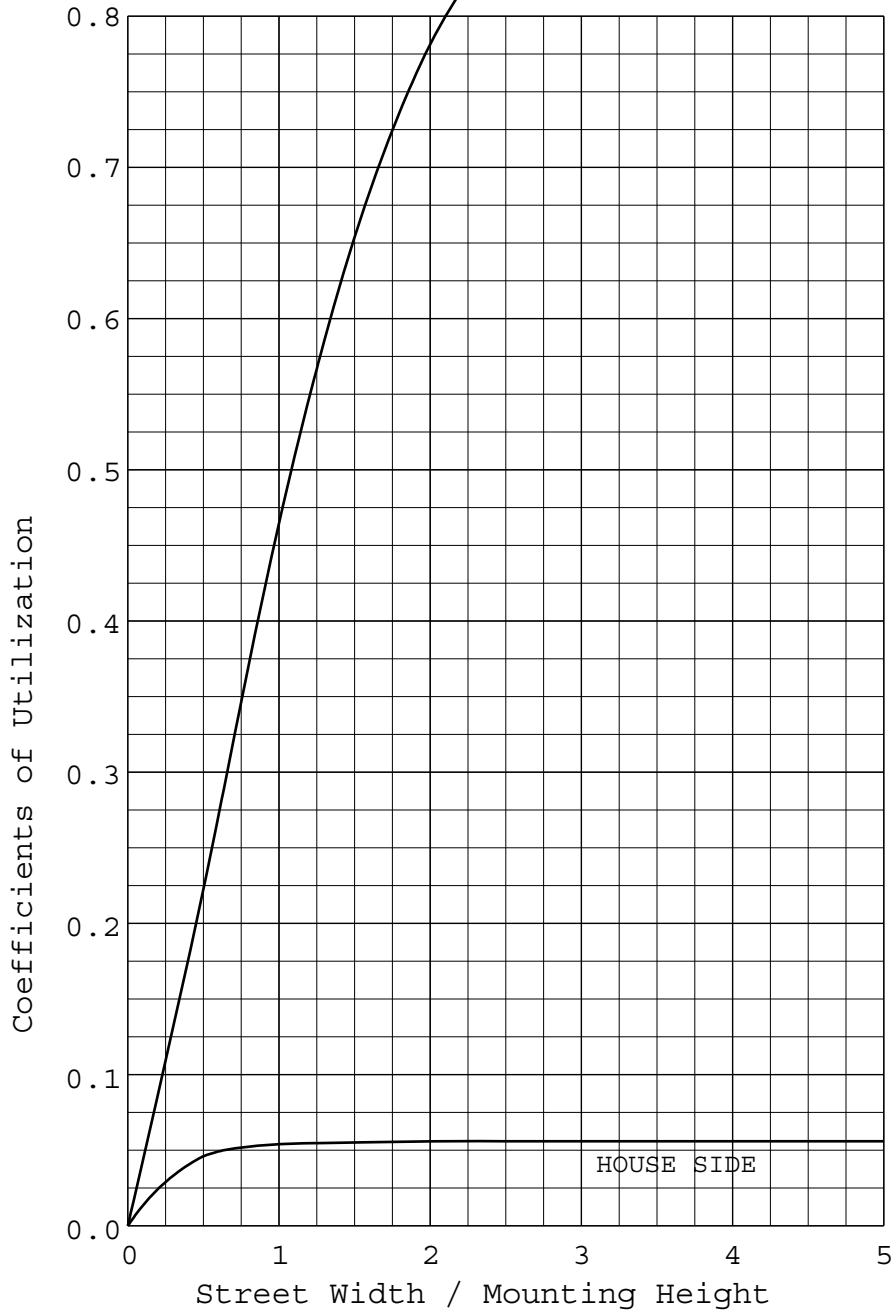


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STREET SIDE

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COEFFICIENTS OF UTILIZATION AND FLUX DISTRIBUTION



	LUMENS	PERCENT OF FIXTURE
DOWNWARD STREET SIDE	12498.	94.3
DOWNWARD HOUSE SIDE	758.	5.7
DOWNWARD TOTAL	13256.	100.0
UPWARD STREET SIDE	0.	0.0
UPWARD HOUSE SIDE	0.	0.0
UPWARD TOTAL	0.	0.0
TOTAL FLUX	13256.	100.0
TOTAL INPUT WATTS = 112.5		
EFFICACY = 117.8 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.

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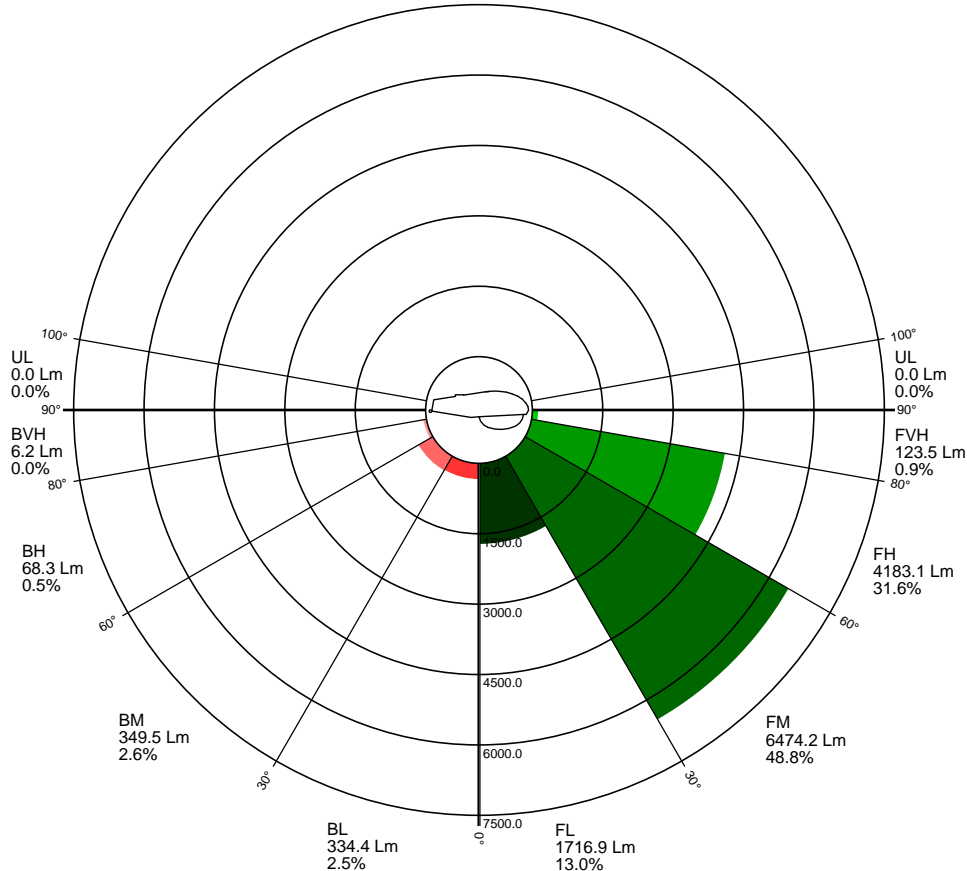
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BUG Rating:				B1 U0 G2		
Zonal Summary		Lumens	% of Fixture	Zone Ratings		
				B	U	G
Forward		12498	94.3			
FL	(0° - 30°)	1716.9	13.0			
FM	(30° - 60°)	6474.2	48.8			
FH	(60° - 80°)	4183.1	31.6			G2
FVH	(80° - 90°)	123.5	0.9			G2
Backward		758	5.7			
BL	(0° - 30°)	334.4	2.5	B1		
BM	(30° - 60°)	349.5	2.6	B1		
BH	(60° - 80°)	68.3	0.5	B0		G0
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		13256	100.0			

Zonal Lumen Summary

(Linear scale)

UH
0.0 Lm
0.0%

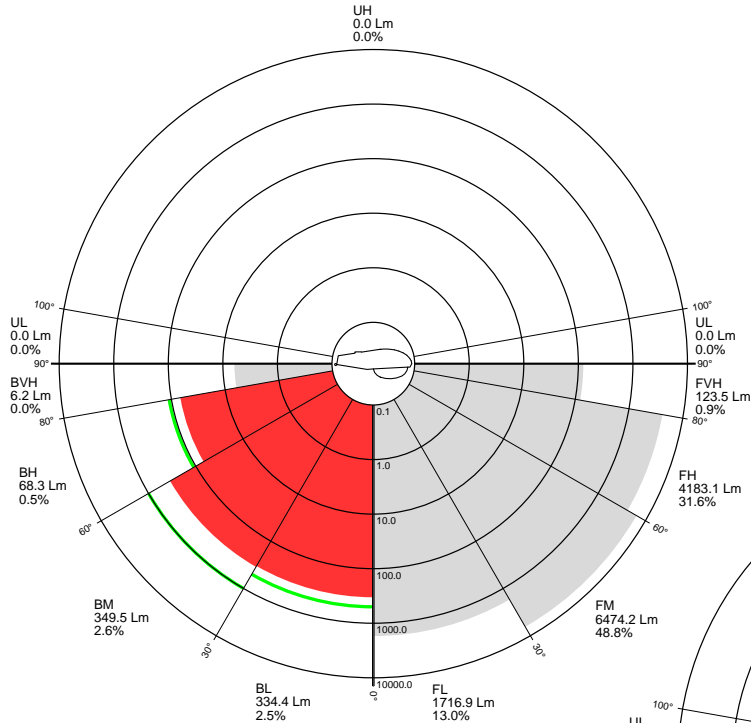


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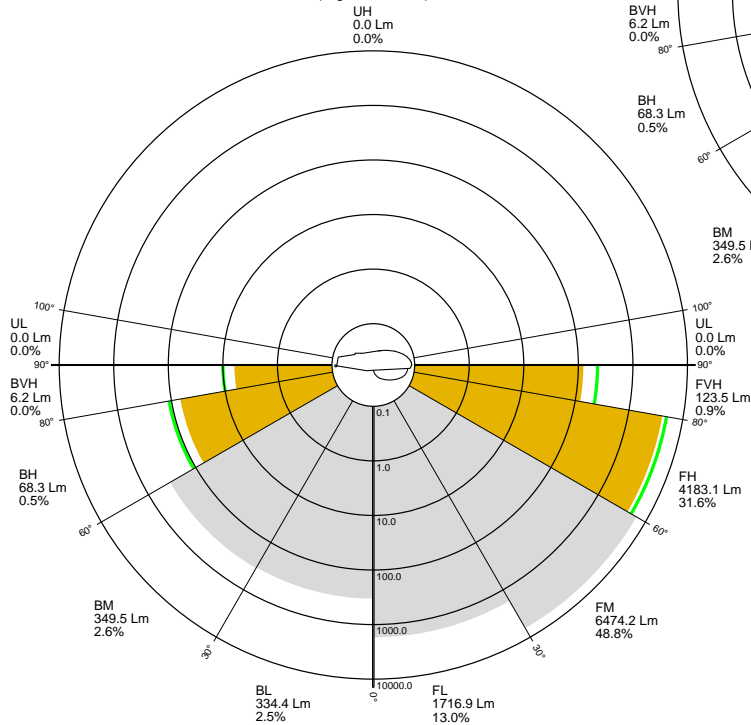
Backlight Rating Details

(Logarithmic scale)



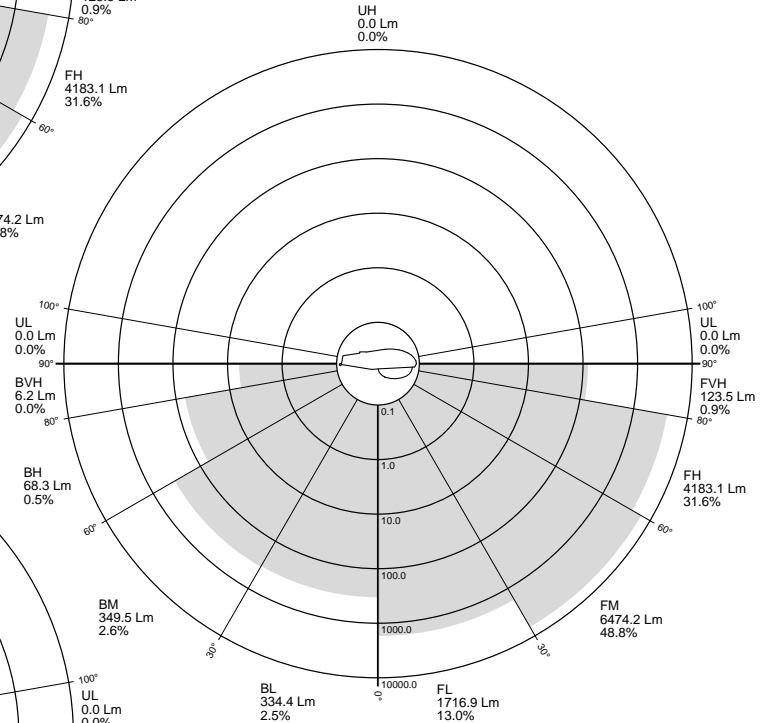
Glare Rating Details

(Logarithmic scale)



Uplight Rating Details

(Logarithmic scale)



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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	23.	21.	20.	18.	17.	18.	18.	34.	39. 24.
	85.0	23.	26.	33.	39.	56.	86.	104.	217.	286. 44.
	82.5	274.	270.	266.	231.	212.	279.	603.	916.	470. 144.
	80.0	450.	449.	456.	600.	690.	1245.	1794.	1381.	631. 234.
	77.5	1271.	1247.	1397.	1841.	2170.	2790.	2545.	1913.	757. 302.
	75.0	3213.	3196.	3459.	4036.	3902.	3768.	3176.	2141.	977. 434.
	72.5	5528.	5483.	5751.	6228.	5047.	4530.	3647.	2277.	1169. 592.
	70.0	7177.	7264.	7278.	7593.	6040.	5183.	3842.	2383.	1352. 846.
V	67.5	8263.	8331.	8318.	8757.	7027.	5466.	3910.	2518.	1521. 1082.
E	65.0	9341.	9398.	9256.	9459.	7664.	5588.	3920.	2654.	1683. 1263.
R	62.5	10097.	10105.	9843.	9627.	8034.	5693.	3962.	2789.	1847. 1425.
T	60.0	10338.	10314.	9999.	9517.	8166.	5841.	4036.	2895.	1992. 1534.
I	59.0	10365.	10311.	9977.	9418.	8158.	5931.	4095.	2929.	2047. 1558.
C	57.5	10263.	10204.	9884.	9231.	8096.	6040.	4225.	2978.	2136. 1589.
A	55.0	9978.	9919.	9603.	8873.	7938.	6186.	4484.	3102.	2293. 1693.
L	52.5	9599.	9546.	9257.	8593.	7604.	6271.	4750.	3265.	2496. 1793.
	50.0	9273.	9255.	8929.	8221.	7277.	6303.	4930.	3462.	2789. 1871.
A	47.5	8832.	8846.	8489.	7891.	6993.	6213.	4997.	3737.	3072. 1949.
N	45.0	8458.	8442.	8123.	7619.	6726.	6001.	4988.	3963.	3314. 2008.
G	42.5	8157.	8098.	7809.	7305.	6519.	5715.	4886.	4127.	3520. 2080.
L	40.0	7803.	7737.	7460.	7005.	6275.	5440.	4776.	4238.	3649. 2164.
E	37.5	7419.	7394.	7184.	6698.	6002.	5292.	4694.	4274.	3664. 2207.
	35.0	7032.	7037.	6787.	6364.	5752.	5133.	4626.	4286.	3604. 2222.
	30.0	6144.	6179.	6034.	5731.	5364.	4987.	4644.	4312.	3464. 2232.
	25.0	5544.	5579.	5545.	5408.	5111.	4849.	4576.	4101.	3191. 2148.
	20.0	5193.	5215.	5178.	5088.	4932.	4706.	4281.	3637.	2800. 2005.
	15.0	4859.	4882.	4831.	4741.	4549.	4262.	3821.	3229.	2604. 2034.
	10.0	4137.	4115.	4018.	3911.	3712.	3410.	3074.	2716.	2337. 1982.
	5.0	2873.	2866.	2797.	2730.	2662.	2531.	2365.	2213.	2062. 1893.
	0.0	1817.	1817.	1817.	1817.	1817.	1817.	1817.	1817.	1817.

||
 PLANE OF MAXIMUM CANDELA

CONE OF MAXIMUM CANDELA

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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.	0.
	87.5	18.	17.	16.	15.	14.	12.	11.	8.	6.	6.	6.
	85.0	21.	19.	16.	15.	13.	12.	10.	8.	5.	5.	4.
	82.5	65.	25.	18.	15.	14.	12.	9.	7.	5.	3.	3.
	80.0	101.	50.	30.	16.	14.	12.	10.	8.	5.	3.	3.
	77.5	151.	71.	41.	24.	13.	12.	10.	8.	6.	5.	5.
	75.0	172.	104.	43.	38.	15.	12.	10.	8.	6.	7.	7.
	72.5	353.	235.	52.	55.	20.	12.	10.	8.	6.	6.	6.
	70.0	502.	284.	86.	60.	26.	14.	11.	8.	6.	6.	6.
V	67.5	629.	360.	174.	58.	37.	21.	13.	10.	9.	8.	8.
E	65.0	716.	442.	248.	43.	47.	26.	22.	15.	13.	14.	14.
R	62.5	848.	483.	273.	40.	50.	35.	27.	24.	21.	20.	21.
T	60.0	919.	498.	297.	70.	44.	44.	35.	29.	30.	31.	32.
I	59.0<<	924.	500.	312.	98.	39.	47.	40.	31.	32.	35.	34.
C	57.5	927.	517.	337.	157.	32.	49.	46.	36.	35.	37.	37.
A	55.0	1020.	597.	405.	291.	36.	46.	52.	46.	45.	46.	46.
L	52.5	1151.	706.	482.	396.	67.	36.	52.	50.	53.	57.	57.
	50.0	1218.	762.	507.	440.	183.	32.	46.	50.	56.	61.	60.
A	47.5	1284.	804.	530.	478.	315.	47.	34.	45.	55.	60.	60.
N	45.0	1324.	827.	558.	506.	400.	119.	33.	34.	47.	53.	54.
G	42.5	1369.	854.	596.	530.	431.	226.	55.	32.	36.	40.	41.
L	40.0	1428.	911.	646.	551.	443.	319.	139.	48.	37.	37.	37.
E	37.5	1519.	992.	691.	567.	459.	363.	242.	141.	73.	54.	50.
	35.0	1607.	1076.	727.	588.	473.	382.	327.	280.	199.	157.	145.
	30.0	1693.	1201.	763.	608.	492.	430.	426.	466.	450.	434.	428.
	25.0	1680.	1238.	796.	612.	542.	524.	540.	534.	514.	504.	504.
	20.0	1642.	1293.	879.	709.	677.	663.	631.	604.	588.	578.	574.
	15.0	1766.	1498.	1112.	941.	804.	757.	723.	700.	684.	674.	673.
	10.0	1806.	1624.	1312.	1106.	988.	916.	843.	810.	794.	786.	785.
	5.0	1805.	1719.	1559.	1419.	1305.	1217.	1169.	1125.	1102.	1089.	1063.
	0.0	1817.	1817.	1817.	1817.	1817.	1817.	1817.	1817.	1817.	1817.	1817.

CONE OF MAXIMUM CANDELA

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5-DEGREE ZONAL LUMEN SUMMARY

0- 5	44
5- 10	144
10- 15	270
15- 20	401
20- 25	529
25- 30	664
30- 35	804
35- 40	945
40- 45	1087
45- 50	1223
50- 55	1339
55- 60	1427
60- 65	1455
65- 70	1329
70- 75	999
75- 80	469
80- 85	117
85- 90	12

10-DEGREE ZONAL LUMEN SUMMARY

0- 10	188
0- 20	858
0- 30	2051
0- 40	3800
0- 50	6110
0- 60	8875
0- 70	11659
0- 80	13126
0- 90	13256

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CATALOG NUMBER: WPLEDC104/480 / ALEDC104/480 (7.5-DEGREE UPTILT)

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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-T150-A-700/480

OBJECT OF TEST: DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED AT THE RATED INPUT VOLTAGES (480.0 AND 347.0 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 (347.0 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

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RESULTS:

PHOTOMETRIC	
Total Integrated Flux (lumens)	13256 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.3449
Chromaticity Ordinate y	0.3614
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2075
Chromaticity Ordinate v'	0.4893
Correlated Color Temp CCT (K)	5040
ANSI C78.377-2008 Duv	0.005
Total Radiant Flux (milliWatts)	39024 *
ELECTRICAL	
Input Voltage (Volts AC)	480.0
Input Current (Amps AC)	0.253
Input Power (Watts)	112.5
Input Power Factor (%)	92.6
Input Current THD (%)	20.4
Input Voltage THD (%)	0.2
EFFICACY (Lumens/Watt)	
	117.8
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	347.0
Input Current (Amps AC)	0.330
Input Power (Watts)	111.6
Input Power Factor (%)	97.5
Input Current THD (%)	17.6
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:

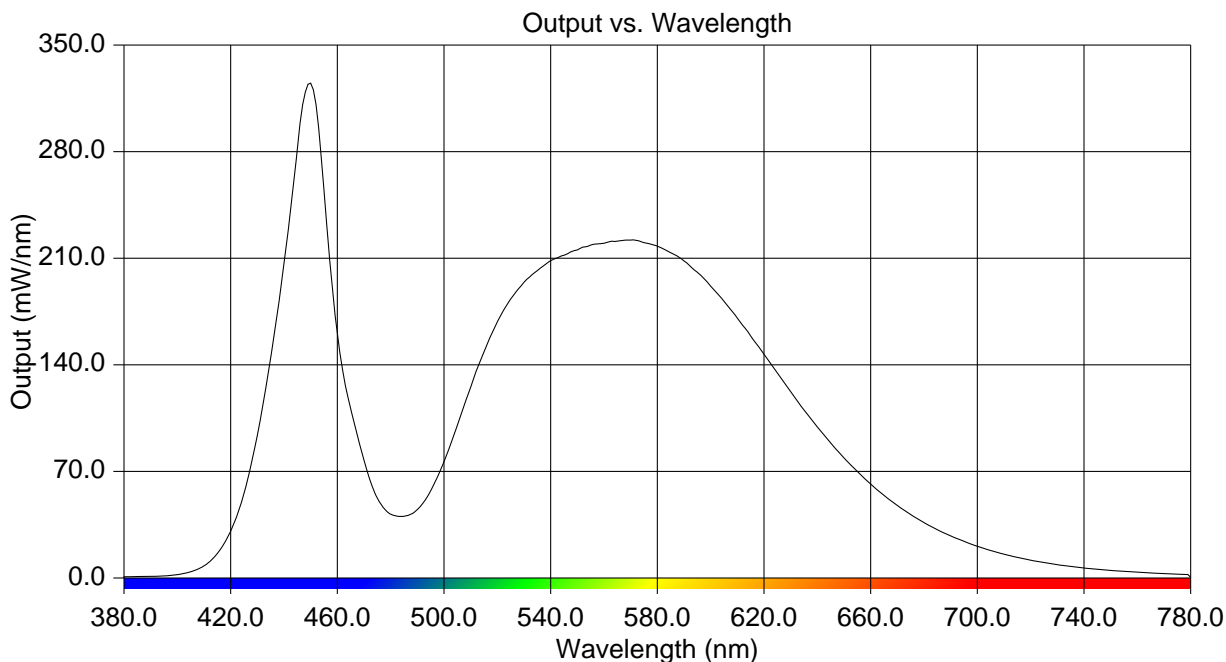
Proper calibration of integrating spheres for measuring total flux output of non-directional samples will produce reliable, repeatable results within the calibration tolerances of the equipment used. However, measurement of test samples with significant self absorption and/or directional output, even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

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RESULTS:

Wavelength	mW per nm	Wavelength	mW per nm	Wavelength	mW per nm
380	0.793	515	148.466	650	78.786
385	0.900	520	168.140	655	69.934
390	1.027	525	183.120	660	61.527
395	1.407	530	194.093	665	54.248
400	2.216	535	201.720	670	47.547
405	3.989	540	208.419	675	41.734
410	8.013	545	211.862	680	36.345
415	16.070	550	215.289	685	31.696
420	30.612	555	218.426	690	27.538
425	55.676	560	219.661	695	24.104
430	93.553	565	221.066	700	20.671
435	144.857	570	221.749	705	17.966
440	205.208	575	220.066	710	15.593
445	282.657	580	217.697	715	13.495
450	324.735	585	213.505	720	11.671
455	254.424	590	208.053	725	10.133
460	160.298	595	200.609	730	8.763
465	111.297	600	191.507	735	7.592
470	77.320	605	181.536	740	6.540
475	52.337	610	170.560	745	5.701
480	41.855	615	158.825	750	4.983
485	40.480	620	146.693	755	4.299
490	44.920	625	134.785	760	3.782
495	57.090	630	122.215	765	3.294
500	76.442	635	110.282	770	2.853
505	100.225	640	99.129	775	2.490
510	125.156	645	88.628	780	0.381



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CIE Chromaticity Diagram

