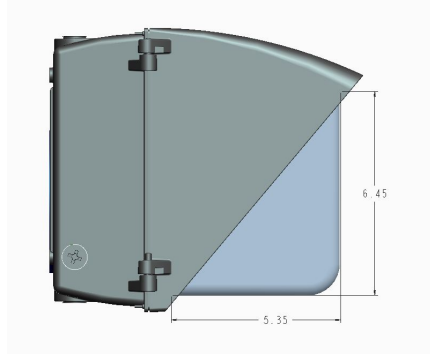


ISOFOOTCANDLE LINES OF HORIZONTAL ILLUMINATION

Values based on 20 foot mounting height.



REPORT NUMBER: RAB03172
 ISSUE DATE: 04/12/17 PAGE: 1 OF 9
 DATE SAMPLE TESTED: 04/12/17
 PREPARED FOR: RAB LIGHTING INC.
 CATALOG NUMBER: WP3LED82N, WP3LED82N/D10
 (STANDARD CUTOFF - PRISMATIC GLASS LENS)

LUMINAIRE: LARGE WALLPACK WITH ALUMINUM PRECISION DIE CAST CONSTRUCTION AND TEMPERED GLASS REFRACTOR.

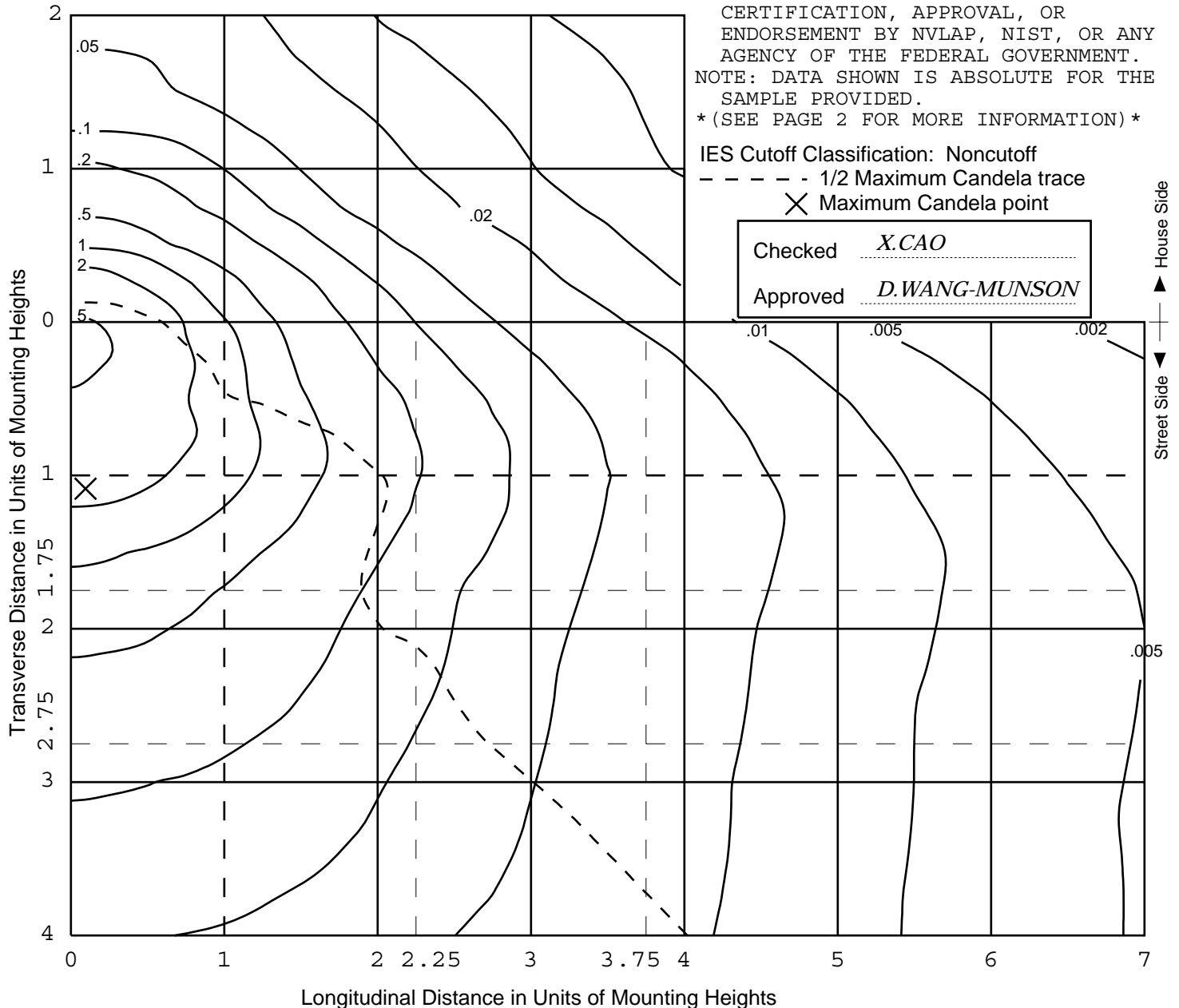
LAMP: ONE HUNDRED FORTY FOUR WHITE LIGHT EMITTING DIODES (LEDs).

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.
 NOTE: DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED.

(SEE PAGE 2 FOR MORE INFORMATION)

IES Cutoff Classification: Noncutoff

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



REPORT NUMBER: RAB03172
ISSUE DATE: 04/12/17
PREPARED FOR: RAB LIGHTING INC.

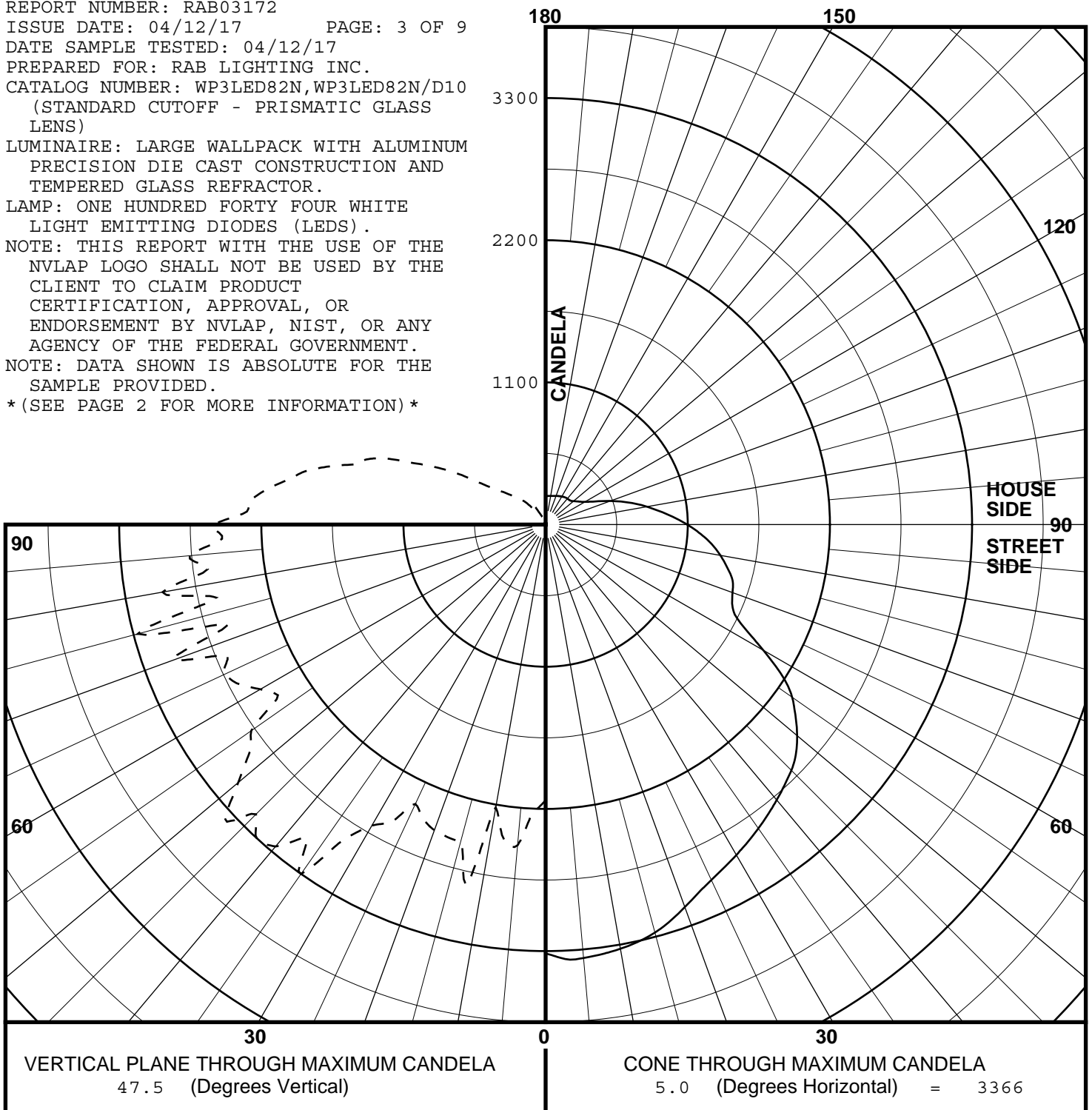
PAGE: 2 OF 9
DATE SAMPLE TESTED: 04/12/17

ADDITIONAL INFORMATION

TOTAL INPUT WATTS = 79.087 W AT 120.0 VAC.
LED DRIVER: RD-G075-A2800-C
TEST PROCEDURE: IESNA LM-79-08
LM-80 DATA AVAILABLE FROM MANUFACTURER FOR SOLID STATE SOURCE
AMBIENT: 25.2
ACCREDITED LABORATORY CODE 201058-0

MAXIMUM PLANE AND MAXIMUM CONE PLOTS OF CANDELA

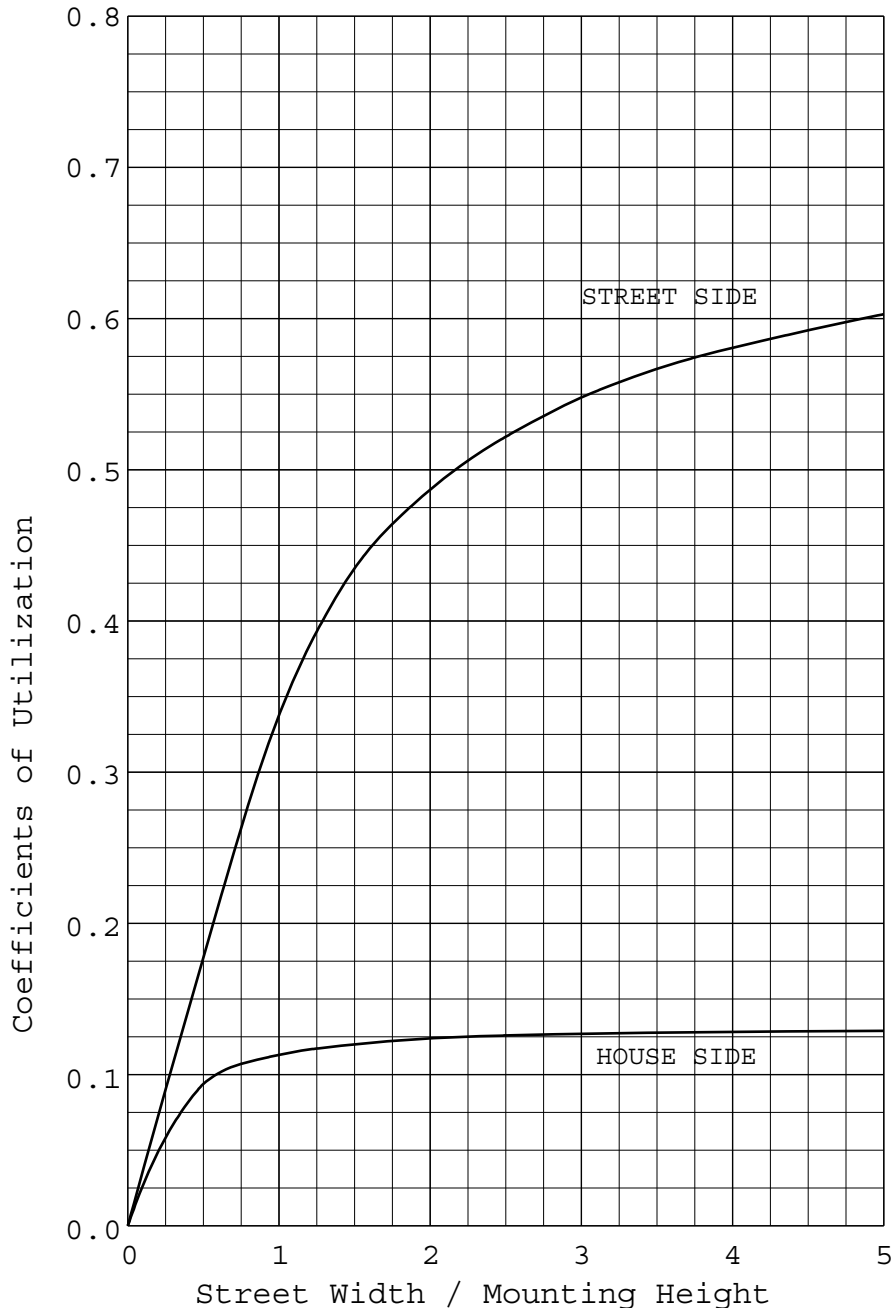
REPORT NUMBER: RAB03172
 ISSUE DATE: 04/12/17 PAGE: 3 OF 9
 DATE SAMPLE TESTED: 04/12/17
 PREPARED FOR: RAB LIGHTING INC.
 CATALOG NUMBER: WP3LED82N, WP3LED82N/D10
 (STANDARD CUTOFF - PRISMATIC GLASS LENS)
 LUMINAIRE: LARGE WALLPACK WITH ALUMINUM PRECISION DIE CAST CONSTRUCTION AND TEMPERED GLASS REFRACTOR.
 LAMP: ONE HUNDRED FORTY FOUR WHITE LIGHT EMITTING DIODES (LEDs).
 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.
 NOTE: DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED.
 (SEE PAGE 2 FOR MORE INFORMATION)



REPORT NUMBER: RAB03172
ISSUE DATE: 04/12/17
PREPARED FOR: RAB LIGHTING INC.

PAGE: 4 OF 9
DATE SAMPLE TESTED: 04/12/17

COEFFICIENTS OF UTILIZATION AND FLUX DISTRIBUTION



	LUMENS	PERCENT OF FIXTURE
DOWNWARD STREET SIDE	6418.	68.7
DOWNWARD HOUSE SIDE	1228.	13.1
DOWNWARD TOTAL	7646.	81.8
UPWARD STREET SIDE	1639.	17.5
UPWARD HOUSE SIDE	62.	0.7
UPWARD TOTAL	1702.	18.2
TOTAL FLUX	9347.	100.0

TOTAL INPUT WATTS = 79.1
EFFICACY = 118.2 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.

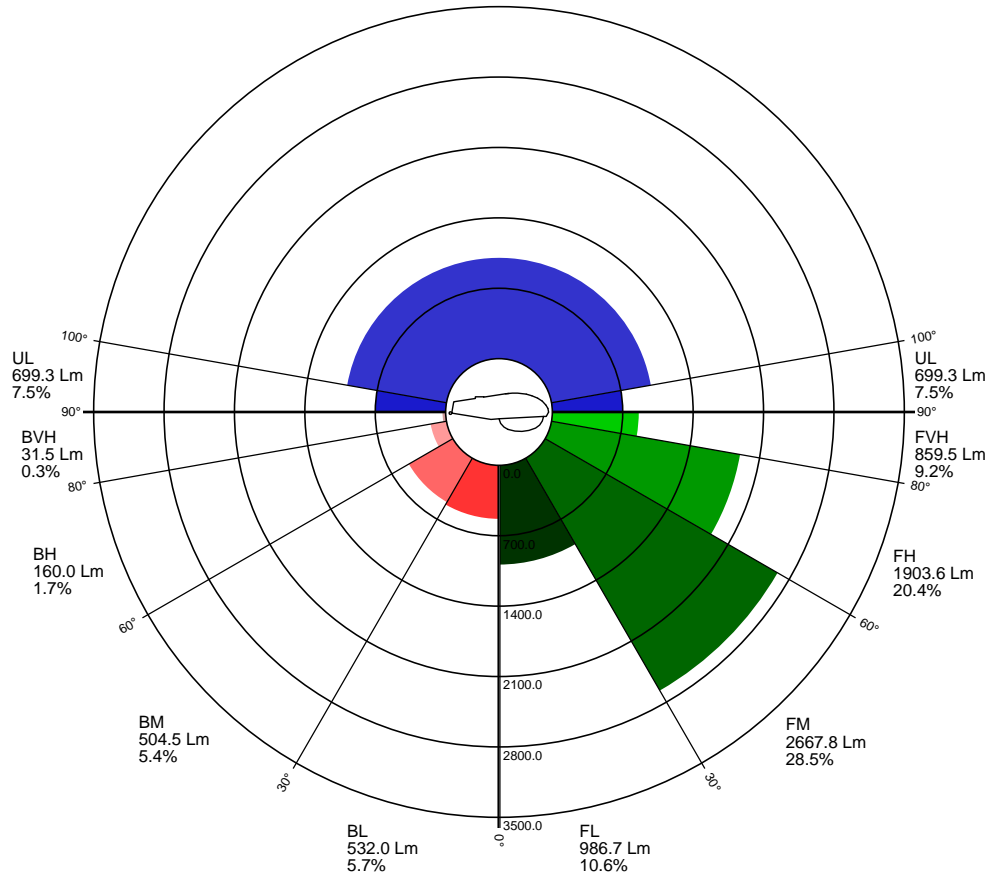
REPORT NUMBER: RAB03172
 ISSUE DATE: 04/12/17
 PREPARED FOR: RAB LIGHTING INC.

PAGE: 5 OF 9
 DATE SAMPLE TESTED: 04/12/17

BUG Rating:				B2	U5	G5
Zonal Summary				Zone Ratings		
		Lumens	% of Fixture	B	U	G
Forward		6418	68.7			
FL	(0° - 30°)	986.7	10.6			
FM	(30° - 60°)	2667.8	28.5			
FH	(60° - 80°)	1903.6	20.4			G2
FVH	(80° - 90°)	859.5	9.2			G5
Backward		1228	13.1			
BL	(0° - 30°)	532.0	5.7	B2		
BM	(30° - 60°)	504.5	5.4	B1		
BH	(60° - 80°)	160.0	1.7	B1		G1
BVH	(80° - 90°)	31.5	0.3			G1
Upward		1702	18.2			
UL	(90° - 100°)	699.3	7.5		U4	
UH	(100° - 180°)	1002.4	10.7		U5	
Trapped Light		0	0.0			
Total Flux		9347	100.0			

Zonal Lumen Summary

(Linear scale)
 UH
 1002.4 Lm
 10.7%

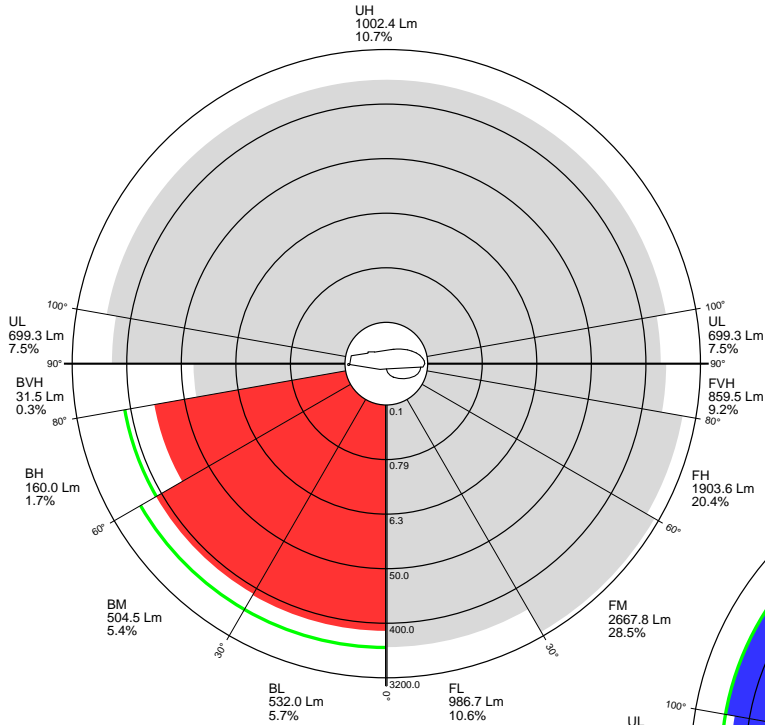


REPORT NUMBER: RAB03172
 ISSUE DATE: 04/12/17
 PREPARED FOR: RAB LIGHTING INC.

PAGE: 6 OF 9
 DATE SAMPLE TESTED: 04/12/17

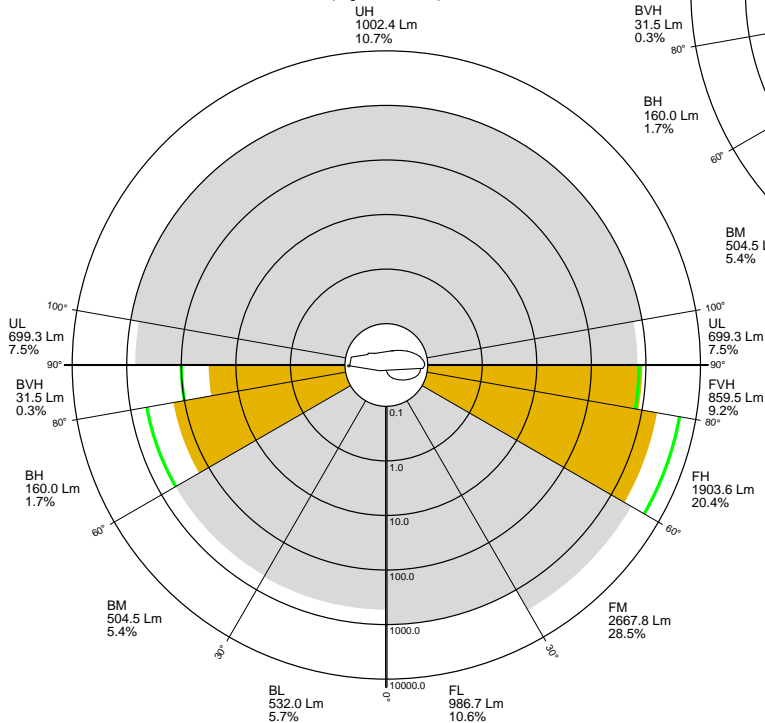
Backlight Rating Details

(Logarithmic scale)



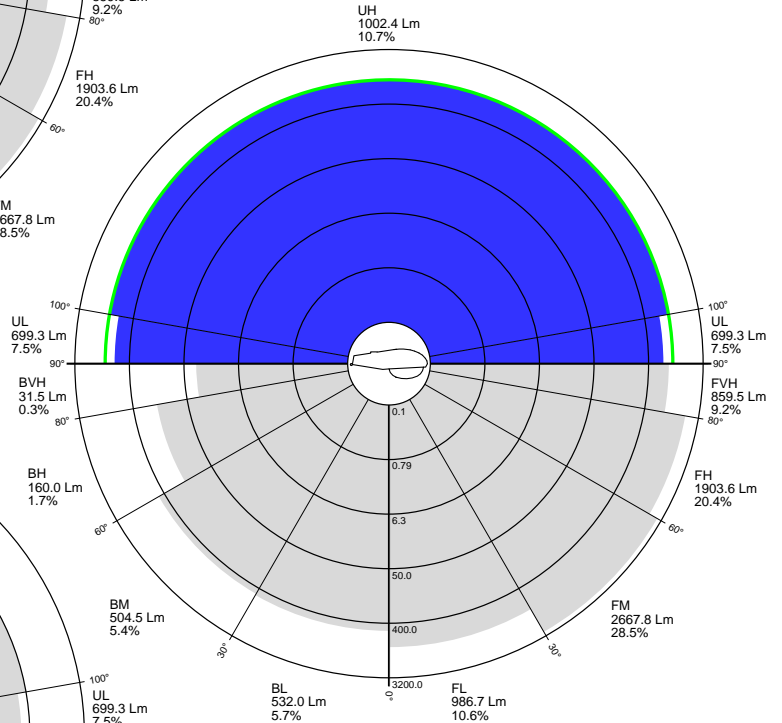
Glare Rating Details

(Logarithmic scale)



Uplight Rating Details

(Logarithmic scale)



REPORT NUMBER: RAB03172
 ISSUE DATE: 04/12/17
 PREPARED FOR: RAB LIGHTING INC.

PAGE: 7 OF 9
 DATE SAMPLE TESTED: 04/12/17

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
	180.0	5.	5.	5.	5.	5.	5.	5.	5.	5.
	175.0	1.	1.	2.	4.	5.	6.	7.	8.	9.
	165.0	32.	32.	30.	27.	23.	18.	12.	9.	8. 9.
	155.0	73.	74.	71.	68.	60.	52.	41.	29.	13. 10.
	145.0	181.	177.	178.	169.	155.	121.	85.	64.	37. 17.
	135.0	279.	276.	262.	221.	176.	125.	107.	98.	65. 32.
	125.0	490.	482.	463.	417.	331.	247.	156.	93.	81. 56.
	115.0	1145.	1126.	1051.	884.	628.	451.	278.	147.	103. 83.
	105.0	1768.	1737.	1668.	1476.	1157.	838.	523.	301.	138. 86.
	95.0	2326.	2279.	2167.	2034.	1702.	1266.	854.	564.	317. 96.
	90.0	2575.	2561.	2453.	2247.	1940.	1472.	1019.	700.	473. 146.
	87.5	2549.	2506.	2441.	2287.	1992.	1550.	1081.	745.	570. 205.
	85.0	2785.	2766.	2677.	2429.	2071.	1593.	1120.	825.	663. 278.
V	82.5	2702.	2637.	2525.	2400.	2164.	1634.	1176.	872.	772. 375.
E	80.0	2990.	3010.	3018.	2664.	2085.	1690.	1211.	945.	879. 483.
R	77.5	2684.	2611.	2513.	2305.	2220.	1701.	1245.	1039.	986. 575.
T	75.0	3358.	3268.	3176.	2774.	2097.	1662.	1288.	1132.	1073. 647.
I	72.5	2644.	2578.	2489.	2284.	2168.	1765.	1336.	1359.	1163. 682.
C	70.0	3111.	3056.	2934.	2553.	2074.	1675.	1465.	1532.	1227. 709.
A	67.5	2702.	2664.	2637.	2425.	2128.	1776.	1681.	1599.	1248. 739.
L	65.0	2784.	2738.	2614.	2323.	2013.	1867.	1948.	1716.	1246. 755.
	62.5	2723.	2674.	2568.	2286.	2106.	2157.	2122.	1783.	1180. 796.
A	60.0	2571.	2549.	2461.	2303.	2358.	2372.	2229.	1787.	1156. 852.
N	57.5	2514.	2457.	2460.	2502.	2538.	2596.	2259.	1824.	1183. 902.
G	55.0	2797.	2780.	2776.	2702.	2740.	2639.	2367.	1819.	1238. 976.
L	52.5	2896.	2885.	2882.	2926.	2854.	2616.	2372.	1722.	1303. 1055.
E	50.0	3111.	3105.	3078.	3125.	2898.	2737.	2309.	1599.	1383. 1147.
	47.5<<	3317.	3366.	3268.	3034.	2870.	2689.	2329.	1608.	1481. 1247.
	45.0	3147.	3170.	3205.	3113.	3016.	2767.	2135.	1670.	1595. 1343.
	42.5	3261.	3303.	3136.	3110.	2912.	2621.	2070.	1762.	1690. 1437.
	40.0	3197.	3250.	3294.	3002.	2861.	2453.	1916.	1851.	1760. 1528.
	37.5	2986.	3052.	3104.	3127.	2744.	2333.	1939.	1889.	1813. 1620.
	35.0	3238.	3300.	3048.	2852.	2511.	2177.	2066.	1963.	1857. 1695.
	30.0	2673.	2689.	2654.	2559.	2290.	2222.	2282.	2282.	1925. 1815.
	25.0	2411.	2386.	2397.	2447.	2423.	2394.	2182.	2052.	2127. 1908.
	20.0	2544.	2516.	2589.	2484.	2633.	2267.	2395.	2533.	2303. 2010.
	15.0	2564.	2544.	2375.	2347.	2814.	2256.	2702.	2176.	2238. 2068.
	10.0	2250.	2222.	2285.	2639.	2727.	2231.	2326.	2395.	2209. 2094.
	5.0	2483.	2490.	2462.	2428.	2354.	2227.	2172.	2182.	2084. 2082.
	0.0	2133.	2133.	2133.	2133.	2133.	2133.	2133.	2133.	2133. 2133.

||
 PLANE OF MAXIMUM CANDELA

CONE OF MAXIMUM CANDELA

REPORT NUMBER: RAB03172
 ISSUE DATE: 04/12/17
 PREPARED FOR: RAB LIGHTING INC.

PAGE: 8 OF 9
 DATE SAMPLE TESTED: 04/12/17

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	5.	5.	5.	5.	5.	5.	5.	5.	5.	5.	5.
175.0	9.	9.	9.	8.	7.	6.	5.	4.	3.	2.	2.
165.0	9.	9.	9.	8.	8.	7.	6.	5.	3.	3.	3.
155.0	10.	9.	9.	9.	8.	7.	6.	5.	4.	4.	4.
145.0	14.	11.	11.	11.	9.	8.	7.	5.	5.	5.	5.
135.0	24.	19.	14.	14.	12.	9.	7.	5.	5.	5.	5.
125.0	42.	35.	24.	22.	17.	12.	7.	6.	6.	5.	5.
115.0	67.	55.	43.	32.	23.	16.	10.	7.	7.	7.	7.
105.0	70.	60.	53.	47.	31.	21.	14.	11.	10.	11.	11.
95.0	67.	70.	65.	62.	41.	26.	18.	14.	13.	13.	13.
90.0	75.	71.	79.	73.	48.	30.	21.	15.	13.	13.	14.
87.5	98.	79.	89.	83.	56.	35.	23.	16.	13.	14.	14.
85.0	136.	95.	98.	95.	64.	43.	25.	16.	13.	13.	13.
V 82.5	189.	121.	109.	109.	72.	64.	41.	31.	28.	29.	31.
E 80.0	259.	153.	121.	122.	85.	82.	57.	50.	45.	46.	48.
R 77.5	337.	195.	132.	131.	96.	92.	81.	65.	65.	61.	62.
T 75.0	407.	249.	142.	134.	106.	98.	106.	78.	79.	80.	82.
I 72.5	468.	304.	156.	137.	115.	101.	127.	90.	88.	96.	97.
C 70.0	515.	360.	177.	140.	122.	106.	137.	113.	96.	102.	103.
A 67.5	561.	415.	209.	147.	134.	112.	133.	140.	109.	106.	106.
L 65.0	609.	478.	247.	158.	146.	120.	123.	162.	132.	117.	115.
62.5	658.	528.	292.	178.	160.	138.	122.	159.	164.	140.	137.
A 60.0	706.	585.	342.	203.	174.	157.	134.	143.	186.	180.	180.
N 57.5	773.	646.	400.	238.	192.	181.	154.	140.	164.	198.	200.
G 55.0	843.	706.	461.	280.	213.	204.	180.	157.	151.	167.	174.
L 52.5	920.	785.	519.	329.	240.	224.	209.	183.	161.	152.	151.
E 50.0	1001.	860.	585.	372.	273.	243.	233.	212.	192.	180.	175.
47.5<<	1096.	939.	662.	424.	311.	265.	258.	243.	229.	222.	219.
45.0	1182.	1037.	745.	486.	351.	292.	271.	268.	258.	257.	253.
42.5	1279.	1128.	826.	560.	397.	325.	286.	284.	272.	268.	266.
40.0	1373.	1222.	914.	653.	449.	360.	308.	299.	282.	276.	275.
37.5	1461.	1318.	1010.	745.	521.	404.	344.	316.	299.	288.	286.
35.0	1547.	1406.	1098.	852.	621.	461.	394.	341.	326.	315.	312.
30.0	1698.	1579.	1280.	1056.	849.	680.	522.	451.	400.	388.	383.
25.0	1842.	1707.	1459.	1269.	1122.	955.	822.	713.	611.	579.	561.
20.0	2008.	1827.	1649.	1498.	1312.	1191.	1083.	1015.	948.	919.	906.
15.0	2105.	1915.	1765.	1648.	1551.	1408.	1376.	1267.	1207.	1177.	1159.
10.0	2155.	2077.	1912.	1799.	1748.	1636.	1599.	1542.	1519.	1495.	1494.
5.0	2135.	2165.	2014.	1911.	1887.	1837.	1805.	1799.	1788.	1782.	1768.
0.0	2133.	2133.	2133.	2133.	2133.	2133.	2133.	2133.	2133.	2133.	2133.

CONE OF MAXIMUM CANDELA

REPORT NUMBER: RAB03172
 ISSUE DATE: 04/12/17
 PREPARED FOR: RAB LIGHTING INC.

PAGE: 9 OF 9
 DATE SAMPLE TESTED: 04/12/17

5-DEGREE ZONAL LUMEN SUMMARY

0- 5	50
5- 10	146
10- 15	238
15- 20	312
20- 25	369
25- 30	403
30- 35	451
35- 40	499
40- 45	542
45- 50	569
50- 55	567
55- 60	545
60- 65	528
65- 70	523
70- 75	514
75- 80	499
80- 85	467
85- 90	424
90- 95	375
95-100	324
100-105	268
105-110	213
110-115	163
115-120	113
120-125	75
125-130	52
130-135	37
135-140	27
140-145	20
145-150	16
150-155	9
155-160	5
160-165	3
165-170	1
170-175	0
175-180	0

10-DEGREE ZONAL LUMEN SUMMARY

0- 10	196
0- 20	746
0- 30	1519
0- 40	2468
0- 50	3579
0- 60	4691
0- 70	5742
0- 80	6755
0- 90	7646
0-100	8345
0-110	8827
0-120	9103
0-130	9230
0-140	9294
0-150	9329
0-160	9343
0-170	9347
0-180	9347

REPORT NUMBER: RAB03173
 DATE: 4/12/2017
 PREPARED FOR: RAB LIGHTING INC.
 CATALOG NUMBER: WP3LED82N, WP3LED82N/D10 (STANDARD CUTOFF - PRISMATIC GLASS LENS)

ADDRESS: 170 LUDLOW AVE, NORTHVALE, NJ 07647

LUMINAIRE: LARGE WALLPACK WITH ALUMINUM PRECISION DIE CAST CONSTRUCTION AND TEMPERED GLASS REFRACTOR.

LAMP: ONE HUNDRED FORTY FOUR WHITE LIGHT EMITTING DIODES (LEDs).

DRIVER: RD-G075-A2800-C

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:
	CHROMA PROGRAMMABLE DIGITAL POWER METER MODEL 66202	N/A
	OCEAN OPTICS QE65PRO Spectroradiometer	3/01/18
	RAB 2.0 meter Diameter Integrating Sphere, 4PI Geometry	04/10/18

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: RAB03173
 DATE: 4/12/2017
 PREPARED FOR: RAB LIGHTING INC.
 CATALOG NUMBER: WP3LED82N, WP3LED82N/D10 (STANDARD CUTOFF - PRISMATIC GLASS LENS)

Page 2 of 4

RESULTS:

PHOTOMETRIC	
Total Integrated Flux (lumens)	9347 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.3763
Chromaticity Ordinate y	0.3758
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2228
Chromaticity Ordinate v'	0.5005
Correlated Color Temp CCT (K)	4108
ANSI C78.377-2008 Duv	0.001
Total Radiant Flux (milliWatts)	28627 *
ELECTRICAL	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.661
Input Power (Watts)	79.1
Input Power Factor (%)	99.8
Input Current THD (%)	5.8
Input Voltage THD (%)	0.3
EFFICACY (Lumens/Watt)	
	118.2
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.293
Input Power (Watts)	77.4
Input Power Factor (%)	95.4
Input Current THD (%)	8.7
Input Voltage THD (%)	0.2
Off-State Power (Watts)	0.0

COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	83
R1 Light greyish red	81
R2 Dark greyish yellow	89
R3 Strong yellowish green	95
R4 Moderate yellowish green	82
R5 Light bluish green	82
R6 Light blue	85
R7 Light violet	86
R8 Light reddish purple	65
R9 Strong red	8
R10 Strong yellow	73
R11 Strong green	81
R12 Strong blue	67
R13 Light yellowish pink (skin)	82
R14 Moderate olive green (leaf)	97

*NOTE:

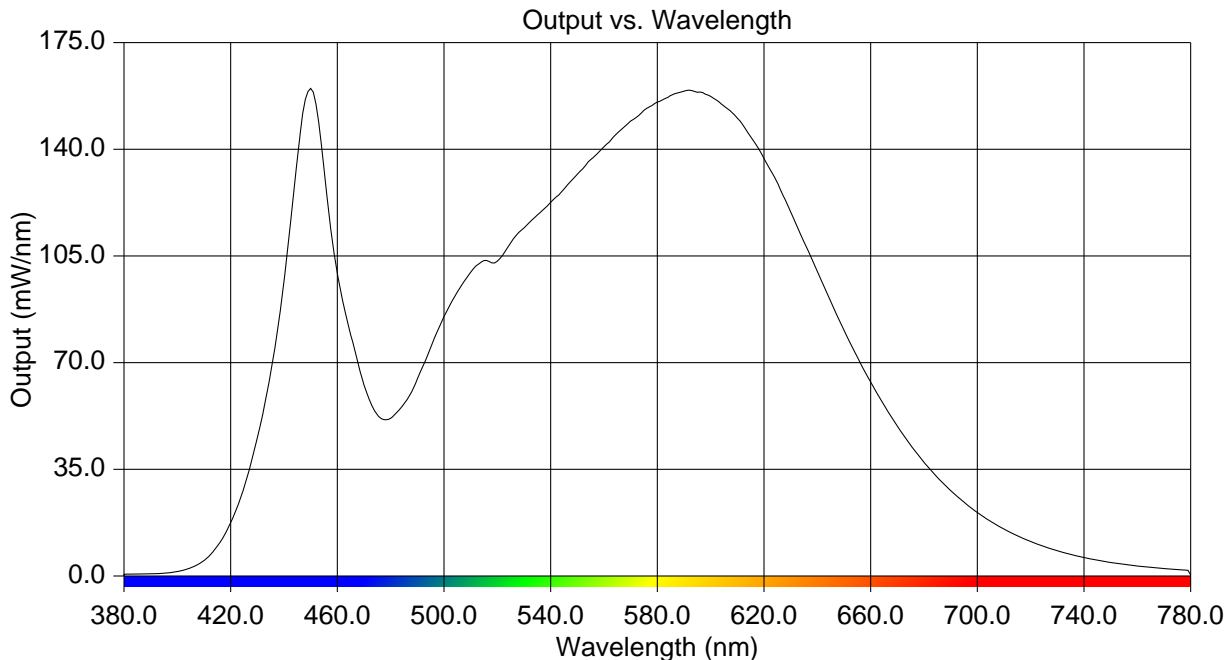
Proper calibration of integrating spheres for measuring total flux output of non-directional samples will produce reliable, repeatable results within the calibration tolerances of the equipment used. However, measurement of test samples with significant self absorption and/or directional output, even 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: RAB03173
 DATE: 4/12/2017
 PREPARED FOR: RAB LIGHTING INC.
 CATALOG NUMBER: WP3LED82N, WP3LED82N/D10 (STANDARD CUTOFF - PRISMATIC GLASS LENS)

Page 3 of 4

RESULTS:

Wavelength	mW per nm	Wavelength	mW per nm	Wavelength	mW per nm
380	0.547	515	103.516	650	80.623
385	0.631	520	103.308	655	71.855
390	0.701	525	109.355	660	63.664
395	0.943	530	114.210	665	56.044
400	1.501	535	118.447	670	49.240
405	2.611	540	122.568	675	42.938
410	5.142	545	126.956	680	37.336
415	9.818	550	131.854	685	32.426
420	17.369	555	136.625	690	27.991
425	28.872	560	140.869	695	24.246
430	45.289	565	145.320	700	20.843
435	66.929	570	149.292	705	17.927
440	96.588	575	152.821	710	15.374
445	137.421	580	155.522	715	13.178
450	159.993	585	157.586	720	11.268
455	133.641	590	159.067	725	9.689
460	99.231	595	158.713	730	8.288
465	79.126	600	157.385	735	7.077
470	62.781	605	154.120	740	6.034
475	52.919	610	150.229	745	5.203
480	51.733	615	144.131	750	4.464
485	56.494	620	136.986	755	3.810
490	64.649	625	129.123	760	3.290
495	74.958	630	119.441	765	2.822
500	85.223	635	109.608	770	2.440
505	93.194	640	99.941	775	2.099
510	99.727	645	90.203	780	0.316



REPORT NUMBER: RAB03173
DATE: 4/12/2017
PREPARED FOR: RAB LIGHTING INC.
CATALOG NUMBER: WP3LED82N, WP3LED82N/D10 (STANDARD CUTOFF - PRISMATIC GLASS LENS)

Page 4 of 4

CIE Chromaticity Diagram

