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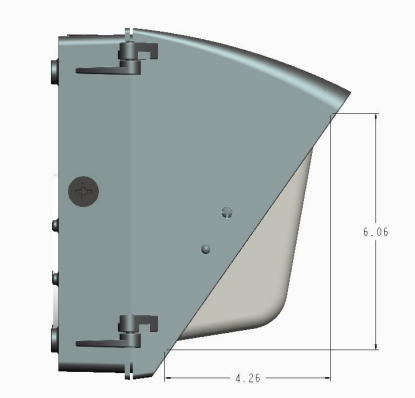
NVLAP LAB CODE: 201058-0

ISOFOOTCANDLE LINES OF HORIZONTAL ILLUMINATION

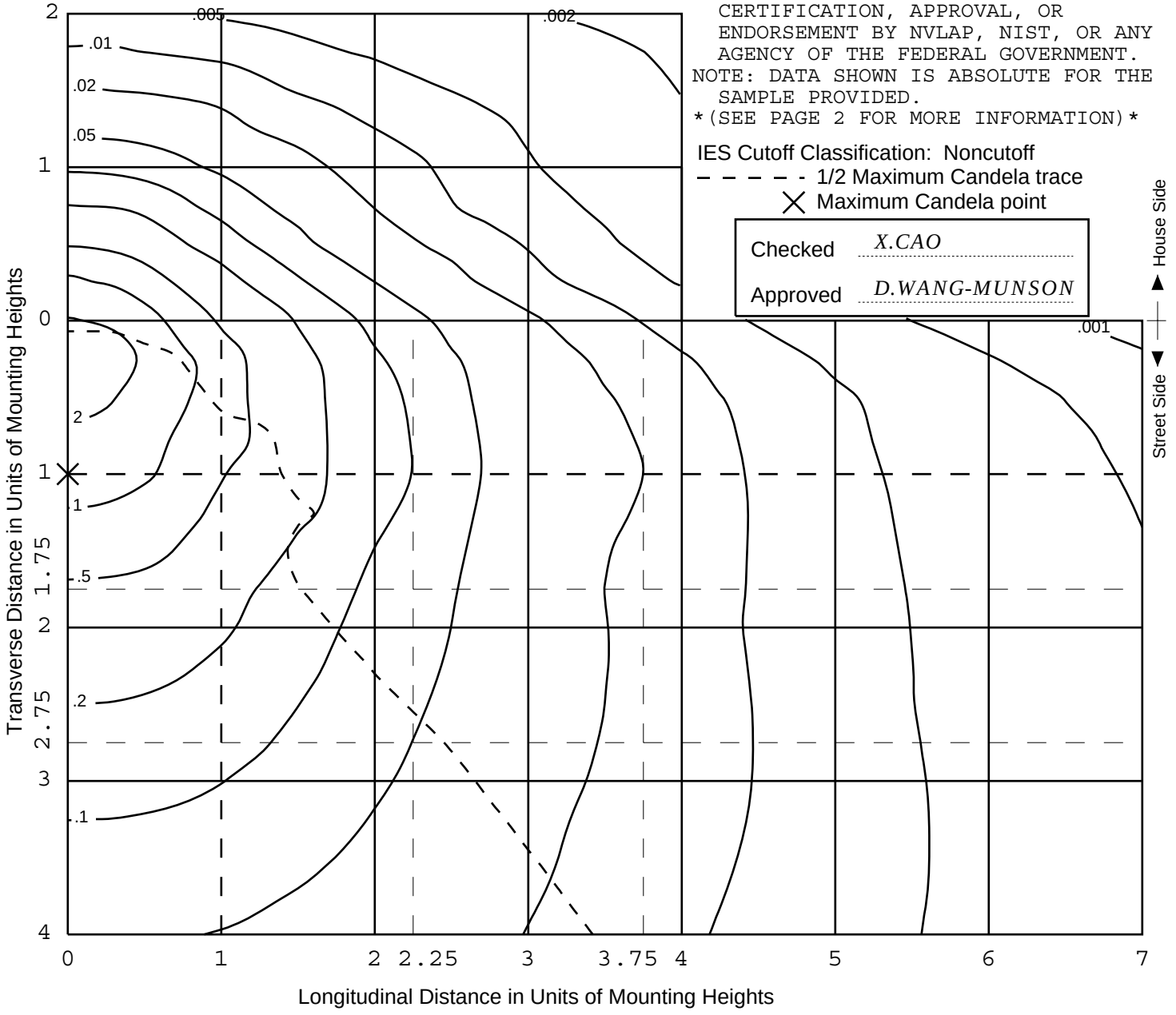
Values based on 16 foot mounting height.



REPORT NUMBER: RAB03131
ISSUE DATE: 03/31/17 PAGE: 1 OF 9
DATE SAMPLE TESTED: 03/31/17
PREPARED FOR: RAB LIGHTING INC.
CATALOG NUMBER: WP2LED24N/347 (STANDARD CUTOFF - PRISMATIC GLASS LENS)
LUMINAIRE: MID SIZED WALLPACK. ALL ALUMINUM PRECISION DIE CAST CONSTRUCTION WITH TEMPERED GLASS REFRACTOR.
LAMP: NINETY 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

Checked	X.CAO
Approved	D.WANG-MUNSON



REPORT NUMBER: RAB03131 PAGE: 2 OF 9
ISSUE DATE: 03/31/17 DATE SAMPLE TESTED: 03/31/17
PREPARED FOR: RAB LIGHTING INC.

ADDITIONAL INFORMATION

TOTAL INPUT WATTS = 25.769 W AT 347.0 VAC.
LED DRIVER: RD-026-A0450-N
TEST PROCEDURE: IESNA LM-79-08
LM-80 DATA AVAILABLE FROM MANUFACTURER FOR SOLID STATE SOURCE
AMBIENT: 24.9
ACCREDITED LABORATORY CODE 201058-0

RAB LIGHTING

NVLAP LAB CODE: 201058-0

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MAXIMUM PLANE AND MAXIMUM CONE PLOTS OF CANDELA

REPORT NUMBER: RAB03131
ISSUE DATE: 03/31/17 PAGE: 3 OF 9
DATE SAMPLE TESTED: 03/31/17
PREPARED FOR: RAB LIGHTING INC.
CATALOG NUMBER: WP2LED24N/347 (STANDARD CUTOFF - PRISMATIC GLASS LENS)
LUMINAIRE: MID SIZED WALLPACK. ALL ALUMINUM PRECISION DIE CAST CONSTRUCTION WITH TEMPERED GLASS REFRACTOR.
LAMP: NINETY WHITE LIGHT EMITTING DIODES (LEDS).
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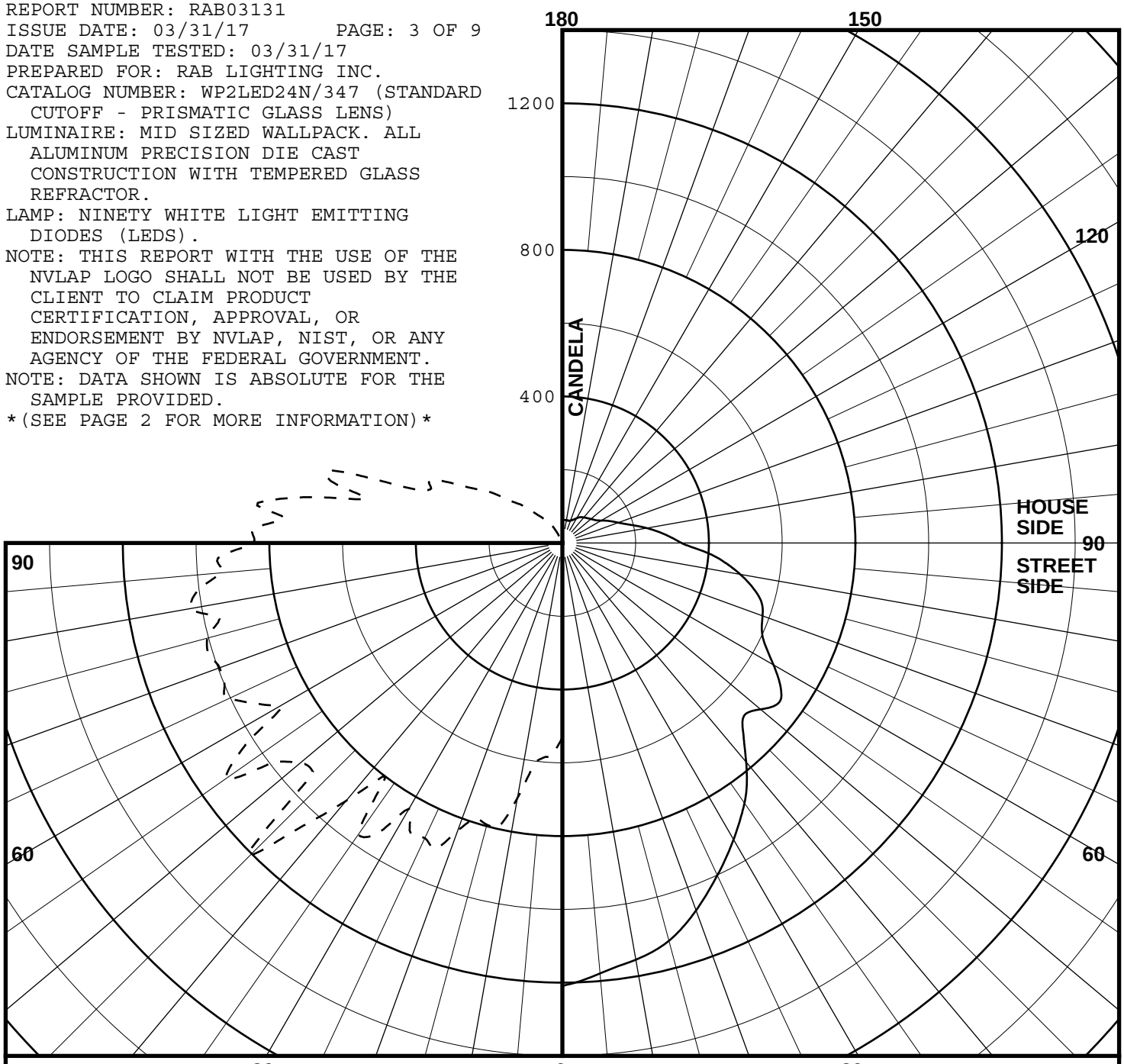
NOTE: DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED.
(SEE PAGE 2 FOR MORE INFORMATION)



VERTICAL PLANE THROUGH MAXIMUM CANDELA
45.0 (Degrees Vertical)

CONE THROUGH MAXIMUM CANDELA
0.0 (Degrees Horizontal) = 1209

RAB LIGHTING

NVLAP LAB CODE: 201058-0

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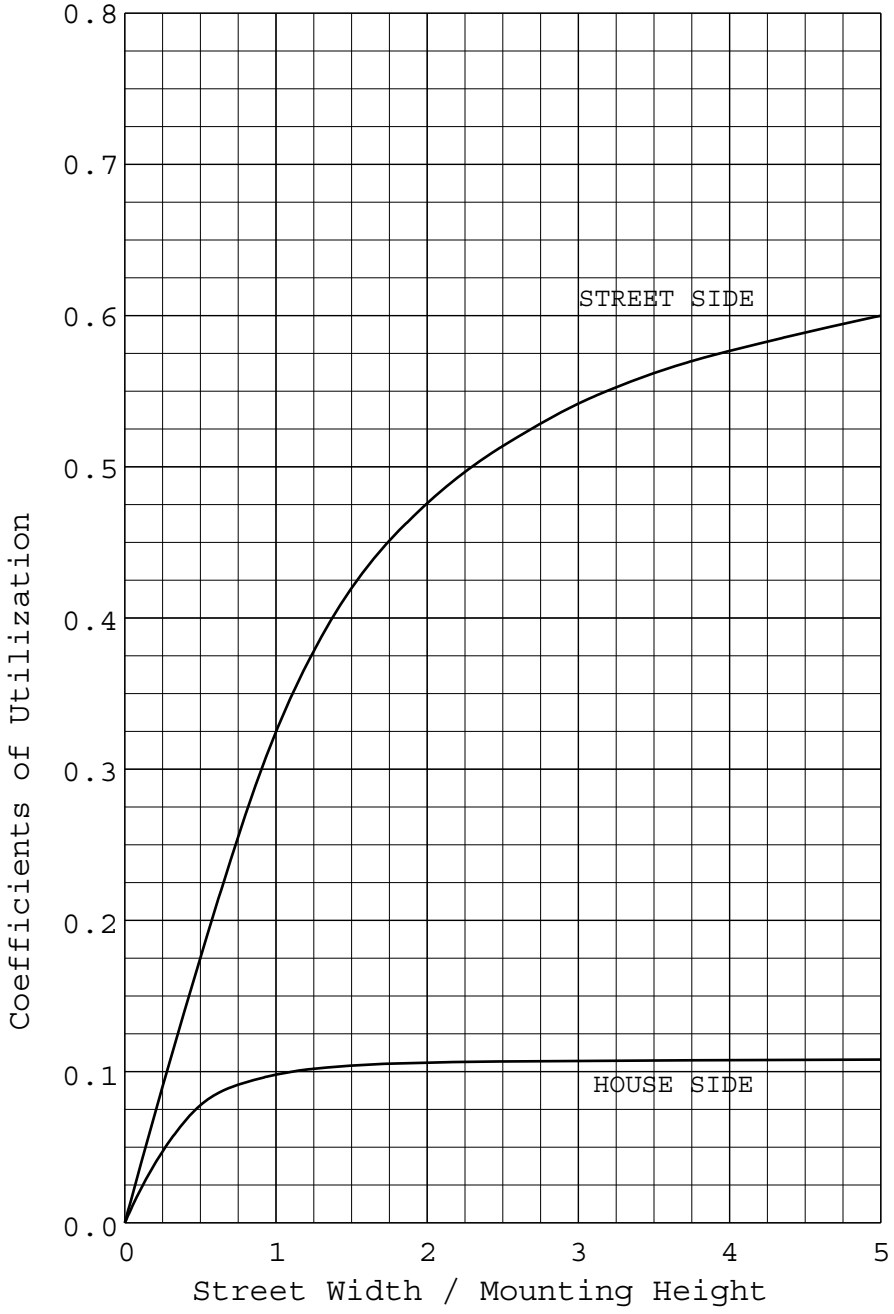
REPORT NUMBER: RAB03131 PAGE: 4 OF 9
ISSUE DATE: 03/31/17 DATE SAMPLE TESTED: 03/31/17
PREPARED FOR: RAB LIGHTING INC.

COEFFICIENTS OF UTILIZATION AND FLUX DISTRIBUTION



	LUMENS	PERCENT OF FIXTURE
DOWNWARD STREET SIDE	2057.	68.8
DOWNWARD HOUSE SIDE	328.	11.0
DOWNWARD TOTAL	2386.	79.8
UPWARD STREET SIDE	584.	19.5
UPWARD HOUSE SIDE	19.	0.6
UPWARD TOTAL	604.	20.2
TOTAL FLUX	2990.	100.0

TOTAL INPUT WATTS = 25.8
EFFICACY = 115.9 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.

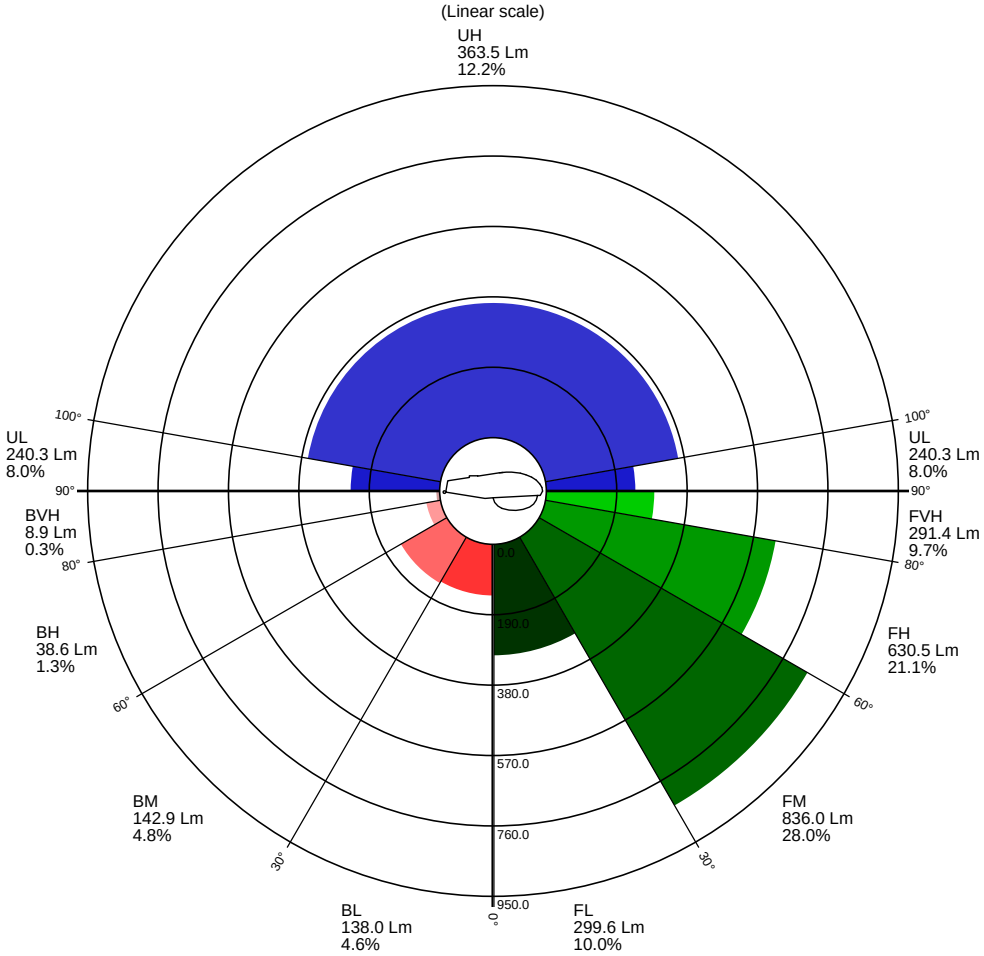
REPORT NUMBER: RAB03131 PAGE: 5 OF 9
ISSUE DATE: 03/31/17 DATE SAMPLE TESTED: 03/31/17
PREPARED FOR: RAB LIGHTING INC.

BUG Rating: B1 U3 G3

Zonal Summary		Lumens	% of Fixture	Zone Ratings B	U	G
Forward		2057	68.8			
FL	(0° – 30°)	299.6	10.0			
FM	(30° – 60°)	836.0	28.0			
FH	(60° – 80°)	630.5	21.1			G0
FVH	(80° – 90°)	291.4	9.7			G3
Backward		328	11.0			
BL	(0° – 30°)	138.0	4.6	B1		
BM	(30° – 60°)	142.9	4.8	B0		
BH	(60° – 80°)	38.6	1.3	B0		G0
BVH	(80° – 90°)	8.9	0.3			G0
Upward		604	20.2			
UL	(90° – 100°)	240.3	8.0		U3	
UH	(100° – 180°)	363.5	12.2		U3	
Trapped Light		0	0.0			
Total Flux		2990	100.0			

Zonal Lumen Summary

(Linear scale)



RAB LIGHTING

NVLAP LAB CODE: 201058-0

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REPORT NUMBER: RAB03131
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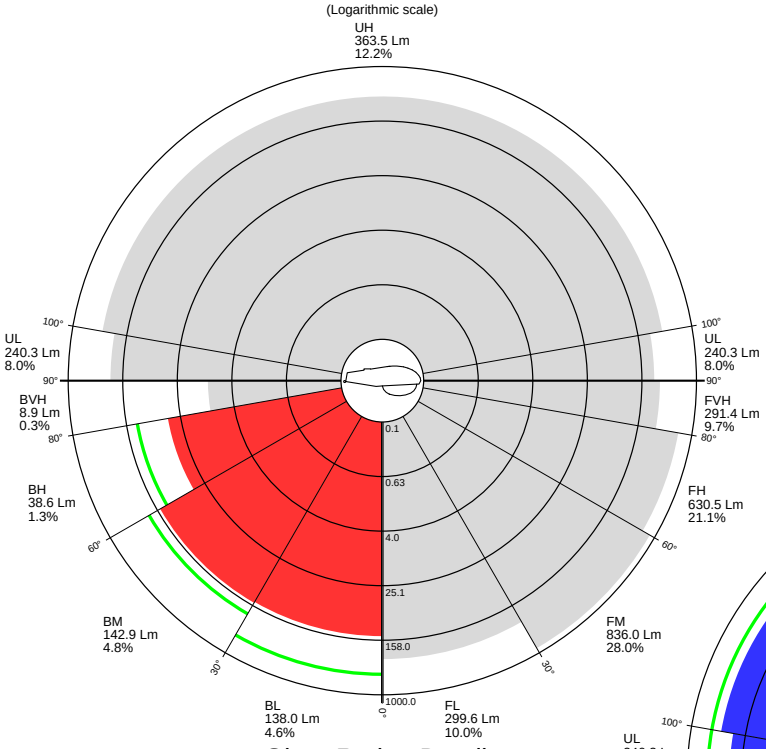
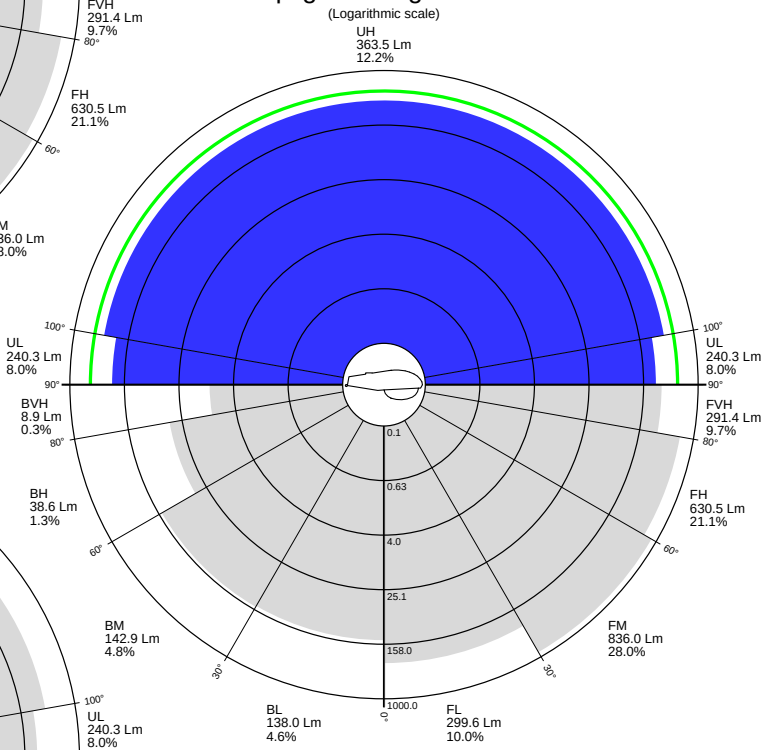
PREPARED FOR: RAB LIGHTING INC.

DATE SAMPLE TESTED: 03/31/17

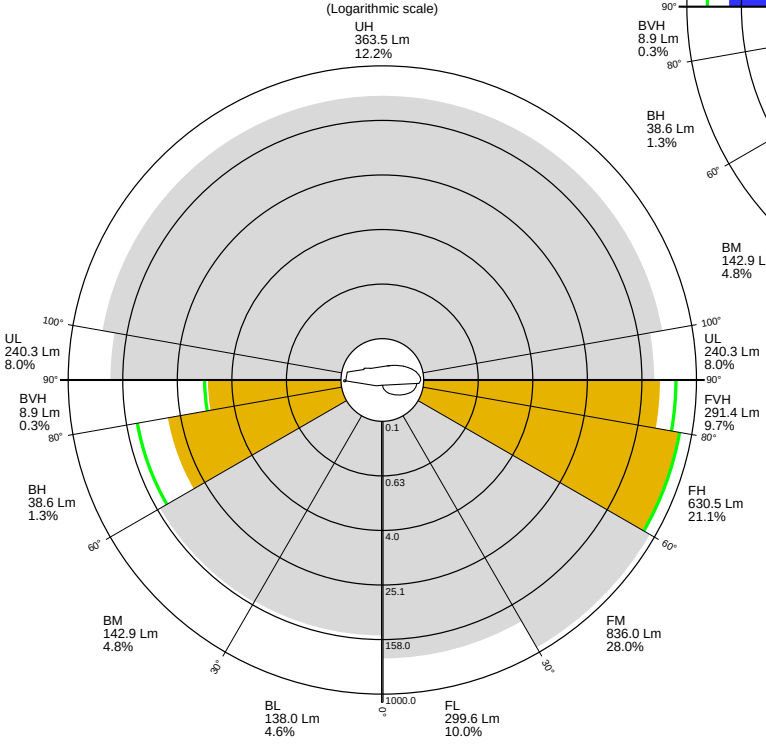
Backlight Rating Details



Uplight Rating Details



Glare Rating Details



REPORT NUMBER: RAB03131 PAGE: 7 OF 9
ISSUE DATE: 03/31/17 DATE SAMPLE TESTED: 03/31/17
PREPARED FOR: RAB LIGHTING INC.

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	2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
175.0	0.	0.	1.	1.	2.	2.	2.	3.	3.	3.
165.0	0.	0.	1.	1.	2.	2.	2.	3.	3.	3.
155.0	13.	11.	9.	6.	4.	2.	2.	3.	3.	3.
145.0	71.	69.	65.	56.	34.	17.	6.	3.	4.	4.
135.0	135.	131.	133.	109.	85.	51.	29.	12.	7.	5.
125.0	243.	239.	238.	198.	158.	110.	62.	31.	16.	12.
115.0	399.	401.	376.	309.	241.	206.	124.	64.	28.	19.
105.0	655.	665.	564.	454.	376.	316.	210.	134.	49.	22.
95.0	764.	766.	710.	663.	517.	425.	323.	210.	123.	26.
90.0	845.	857.	799.	770.	618.	476.	365.	246.	168.	49.
87.5	941.	946.	924.	788.	653.	479.	378.	263.	185.	73.
85.0	937.	945.	872.	814.	657.	510.	395.	277.	206.	102.
V 82.5	1005.	1016.	967.	857.	674.	512.	411.	295.	221.	139.
E 80.0	1030.	1031.	958.	835.	685.	532.	429.	302.	232.	171.
R 77.5	959.	977.	948.	874.	703.	541.	434.	312.	265.	201.
T 75.0	1004.	1009.	954.	859.	710.	554.	435.	319.	348.	223.
I 72.5	1012.	1020.	988.	866.	684.	554.	439.	335.	350.	243.
C 70.0	996.	1003.	948.	845.	692.	542.	440.	404.	303.	251.
A 67.5	999.	999.	965.	847.	678.	559.	490.	500.	361.	269.
L 65.0	1005.	1018.	981.	852.	664.	560.	584.	522.	429.	288.
62.5	948.	953.	922.	811.	711.	695.	570.	461.	384.	295.
A 60.0	891.	893.	899.	887.	819.	719.	603.	488.	368.	312.
N 57.5	1026.	1010.	1046.	935.	803.	638.	648.	546.	425.	338.
G 55.0	1121.	1099.	1026.	890.	757.	681.	728.	541.	479.	359.
L 52.5	980.	982.	930.	833.	749.	759.	644.	527.	468.	364.
E 50.0	934.	929.	866.	844.	877.	836.	622.	517.	428.	385.
47.5	924.	912.	985.	990.	946.	726.	659.	574.	490.	404.
45.0<<	1209.	1179.	1124.	1001.	867.	695.	730.	603.	554.	418.
42.5 |	1046.	1039.	963.	928.	732.	722.	678.	626.	588.	404.
40.0 |	919.	913.	874.	791.	814.	815.	684.	658.	563.	397.
37.5 |	801.	792.	803.	854.	863.	734.	704.	676.	556.	415.
35.0 |	972.	954.	948.	939.	831.	705.	770.	725.	582.	426.
30.0 |	838.	835.	828.	809.	818.	837.	744.	710.	589.	465.
25.0 |	889.	874.	852.	862.	806.	801.	778.	681.	554.	492.
20.0 |	835.	827.	860.	824.	792.	805.	729.	651.	553.	515.
15.0 |	796.	805.	797.	825.	763.	733.	672.	579.	586.	540.
10.0 |	707.	706.	690.	677.	661.	613.	584.	579.	570.	539.
5.0 |	588.	588.	586.	587.	594.	616.	607.	574.	568.	550.
0.0 |	531.	531.	531.	531.	531.	531.	531.	531.	531.	531.
|	||									

\| PLANE OF MAXIMUM CANDELA

\|

CONE OF MAXIMUM CANDELA

REPORT NUMBER: RAB03131 PAGE: 8 OF 9
ISSUE DATE: 03/31/17 DATE SAMPLE TESTED: 03/31/17
PREPARED FOR: RAB LIGHTING INC.

CANDELA TABULATION

VERTICAL ANGLE	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	2.	2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
175.0	3.	3.	3.	3.	3.	2.	2.	1.	1.	1.	1.
165.0	3.	3.	3.	3.	3.	2.	2.	2.	1.	1.	1.
155.0	3.	3.	3.	3.	3.	3.	2.	2.	2.	2.	2.
145.0	4.	3.	3.	3.	3.	3.	2.	2.	2.	2.	2.
135.0	5.	4.	3.	3.	3.	3.	2.	2.	2.	2.	2.
125.0	10.	9.	6.	4.	3.	3.	2.	2.	2.	2.	2.
115.0	18.	18.	12.	6.	4.	3.	3.	2.	3.	3.	3.
105.0	24.	25.	21.	11.	6.	4.	3.	3.	4.	4.	4.
95.0	21.	29.	31.	22.	10.	6.	4.	4.	5.	5.	5.
90.0	21.	27.	35.	28.	14.	7.	5.	5.	5.	5.	5.
87.5	26.	26.	36.	30.	15.	8.	5.	4.	5.	5.	5.
85.0	39.	29.	38.	31.	17.	9.	5.	4.	5.	5.	5.
82.5	60.	34.	41.	33.	18.	9.	5.	4.	4.	4.	4.
80.0	85.	42.	43.	35.	19.	10.	5.	3.	4.	4.	4.
77.5	116.	55.	46.	38.	21.	10.	5.	3.	3.	4.	3.
75.0	145.	73.	48.	42.	24.	12.	5.	3.	3.	3.	3.
72.5	172.	94.	52.	45.	28.	17.	6.	3.	3.	3.	3.
70.0	196.	115.	56.	49.	32.	22.	12.	5.	2.	2.	3.
67.5	212.	138.	63.	54.	37.	26.	18.	12.	10.	8.	8.
65.0	225.	156.	72.	59.	43.	31.	24.	18.	15.	15.	15.
62.5	242.	172.	82.	64.	49.	36.	30.	23.	20.	19.	18.
60.0	257.	189.	97.	71.	57.	42.	38.	29.	25.	24.	23.
57.5	272.	200.	114.	79.	63.	49.	43.	35.	30.	29.	29.
55.0	295.	213.	130.	87.	70.	57.	47.	43.	35.	34.	34.
52.5	303.	226.	147.	98.	77.	66.	53.	50.	42.	38.	38.
50.0	307.	245.	161.	113.	86.	76.	62.	53.	51.	46.	45.
47.5	310.	256.	178.	127.	97.	86.	74.	59.	58.	56.	55.
45.0<<	325.	279.	192.	142.	109.	96.	86.	70.	63.	63.	62.
42.5 |	336.	298.	211.	159.	122.	109.	98.	84.	73.	69.	68.
40.0 |	352.	313.	233.	174.	137.	121.	111.	100.	87.	80.	78.
37.5 |	376.	338.	254.	192.	149.	132.	124.	113.	104.	98.	95.
35.0 |	393.	361.	283.	214.	163.	145.	135.	129.	122.	119.	117.
30.0 |	431.	401.	335.	265.	203.	174.	158.	153.	152.	152.	152.
25.0 |	463.	443.	385.	326.	257.	214.	190.	176.	173.	169.	169.
20.0 |	491.	480.	440.	392.	335.	281.	249.	224.	212.	207.	204.
15.0 |	524.	508.	480.	454.	420.	367.	342.	321.	299.	293.	290.
10.0 |	522.	516.	508.	484.	486.	468.	445.	431.	414.	406.	404.
5.0 |	540.	530.	533.	542.	522.	501.	498.	499.	503.	506.	506.
0.0 |	531.	531.	531.	531.	531.	531.	531.	531.	531.	531.	531.

CONE OF MAXIMUM CANDELA

REPORT NUMBER: RAB03131 PAGE: 9 OF 9
ISSUE DATE: 03/31/17 DATE SAMPLE TESTED: 03/31/17
PREPARED FOR: RAB LIGHTING INC.

5-DEGREE ZONAL LUMEN SUMMARY

0- 5	13
5- 10	39
10- 15	65
15- 20	87
20- 25	108
25- 30	125
30- 35	141
35- 40	149
40- 45	164
45- 50	173
50- 55	173
55- 60	179
60- 65	172
65- 70	170
70- 75	165
75- 80	162
80- 85	156
85- 90	144
90- 95	127
95-100	113
100-105	91
105-110	78
110-115	56
115-120	44
120-125	32
125-130	23
130-135	16
135-140	10
140-145	6
145-150	4
150-155	2
155-160	1
160-165	0
165-170	0
170-175	0
175-180	0

10-DEGREE ZONAL LUMEN SUMMARY

0- 10	52
0- 20	204
0- 30	438
0- 40	728
0- 50	1065
0- 60	1416
0- 70	1758
0- 80	2086
0- 90	2386
0-100	2626
0-110	2795
0-120	2896
0-130	2951
0-140	2977
0-150	2987
0-160	2989
0-170	2989
0-180	2990

RAB LIGHTING

NVLAP LAB CODE: 201058-0

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REPORT NUMBER: RAB03132
DATE: 3/30/2017
PREPARED FOR: RAB LIGHTING INC.
CATALOG NUMBER: WP2LED24N/347 (STANDARD CUTOFF - PRISMATIC GLASS LENS)

ADDRESS: 170 LUDLOW AVE, NORTHVALE, NJ 07647

LUMINAIRE: MID SIZED WALLPACK. ALL ALUMINUM PRECISION DIE CAST CONSTRUCTION WITH TEMPERED GLASS REFRACTOR.

LAMP: NINETY WHITE LIGHT EMITTING DIODES (LEDS).

DRIVER: RD-026-A0450-N

NOTE: DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED AT RATED INPUT VOLTAGE (347.0 VAC , 60Hz) TO THE TEST SAMPLE.

INSTRUMENTS:		Calibration Due:
	GWINSTEK PROGRAMMABLE AC POWER SOURCE APS-7100	N/A
	CHROMA PROGRAMMABLE DIGITAL POWER METER MODEL 66202	3/01/18
	OCEAN OPTICS QE65PRO Spectroradiometer	03/07/18
	RAB 2.0 meter Diameter Integrating Sphere, 4PI Geometry	03/07/18

OBJECT OF TEST: Measure the 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. Report Off-State Power.

PROCEDURE: The test sample was provided by the customer and had an unknown number of burn hours. The test sample was mounted inside the integrating sphere 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 347.0 VAC input in a 25 +/-1 degree Celsius free air ambient and in accordance with IESNA LM-79-08. 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 X.CAO

Approved D.WANG-MUNSON
Lighting Engineer

REPORT NUMBER: RAB03132 Page 2 of 4
DATE: 3/30/2017
PREPARED FOR: RAB LIGHTING INC.
CATALOG NUMBER: WP2LED24N/347 (STANDARD CUTOFF - PRISMATIC GLASS LENS)

RESULTS:

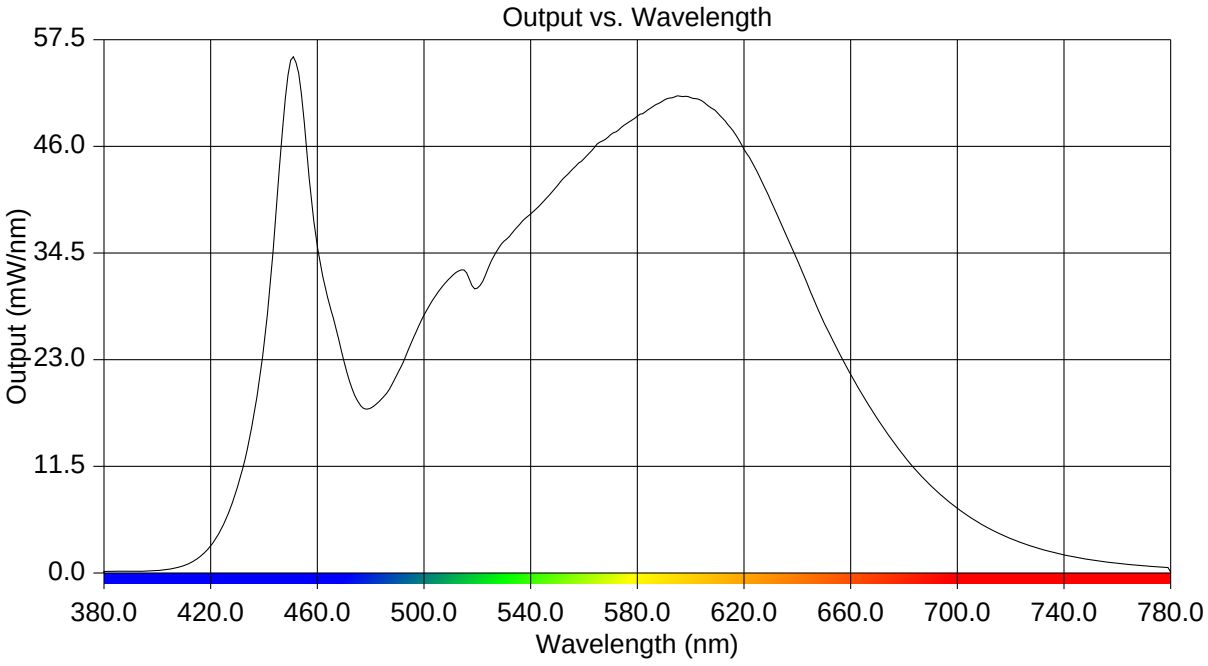
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.3795
Chromaticity Ordinate y	0.3753
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2251
Chromaticity Ordinate v'	0.5008
Correlated Color Temp CCT (K)	4014
Color Rendering Index (CRIa)	85
Color Rendering Index 1 (Light greyish red)	83
Color Rendering Index 2 (Dark greyish yellow)	91
Color Rendering Index 3 (Strong yellowish green)	96
Color Rendering Index 4 (Moderate yellowish green)	83
Color Rendering Index 5 (Light bluish green)	84
Color Rendering Index 6 (Light blue)	88
Color Rendering Index 7 (Light violet)	86
Color Rendering Index 8 (Light reddish purple)	66
Color Rendering Index 9 (Strong red)	15
Color Rendering Index 10 (Strong yellow)	79
Color Rendering Index 11 (Strong green)	82
Color Rendering Index 12 (Strong blue)	67
Color Rendering Index 13 (Light yellowish pink (skin))	85
Color Rendering Index 14 (Moderate olive green (leaf))	98
ANSI C78.377-2008 Duv	0.000
Total Radiant Flux (milliWatts)	9213 *
ELECTRICAL FOR SPECTRORADIOMETRIC TEST	
Input Voltage (Volts AC)	347.0
Input Current (Amps AC)	0.075
Input Power (Watts)	25.8
Input Power Factor (%)	98.4
Input Current THD (%)	14.5
Input Voltage THD (%)	0.2
Off-State Power (Watts)	0.0

*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: RAB03132 Page 3 of 4
DATE: 3/30/2017
PREPARED FOR: RAB LIGHTING INC.
CATALOG NUMBER: WP2LED24N/347 (STANDARD CUTOFF - PRISMATIC GLASS LENS)

RESULTS:

Wavelength	mW per nm	Wavelength	mW per nm	Wavelength	mW per nm
380	0.162	515	32.673	650	26.983
385	0.179	520	30.711	655	24.061
390	0.183	525	33.496	660	21.397
395	0.201	530	35.773	665	18.965
400	0.268	535	37.307	670	16.643
405	0.425	540	38.744	675	14.508
410	0.798	545	40.092	680	12.631
415	1.547	550	41.745	685	10.939
420	2.917	555	43.323	690	9.426
425	5.361	560	44.664	695	8.137
430	9.259	565	46.270	700	6.967
435	15.010	570	47.257	705	5.976
440	24.573	575	48.268	710	5.092
445	40.525	580	49.245	715	4.350
450	55.275	585	50.126	720	3.710
455	48.715	590	50.976	725	3.162
460	35.153	595	51.447	730	2.692
465	28.588	600	51.256	735	2.285
470	22.807	605	50.746	740	1.949
475	18.603	610	49.636	745	1.673
480	17.776	615	47.997	750	1.431
485	19.046	620	45.677	755	1.213
490	21.453	625	43.225	760	1.045
495	24.661	630	40.163	765	0.898
500	27.816	635	36.944	770	0.770
505	30.156	640	33.720	775	0.667
510	31.868	645	30.267	780	0.100



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DATE: 3/30/2017
PREPARED FOR: RAB LIGHTING INC.
CATALOG NUMBER: WP2LED24N/347 (STANDARD CUTOFF - PRISMATIC GLASS LENS)

CIE Chromaticity Diagram