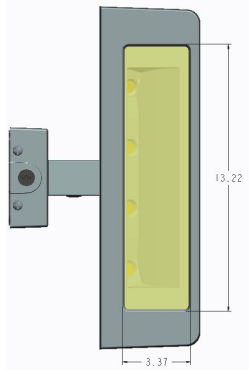


ISOFOOTCANDLE LINES OF HORIZONTAL ILLUMINATION

Values based on 20 foot mounting height.



REPORT NUMBER: RAB01933
 ISSUE DATE: 05/13/16 PAGE: 1 OF 9
 DATE SAMPLE TESTED: 05/13/16
 PREPARED FOR: RAB LIGHTING INC.
 CATALOG NUMBER: WPLED104 / ALED104
 (15-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
 45-DEGREES FROM VERTICAL BASE-UP
 POSITION, 2 LEDES CANTED 12-DEGREES
 FROM STRAIGHT AHEAD.

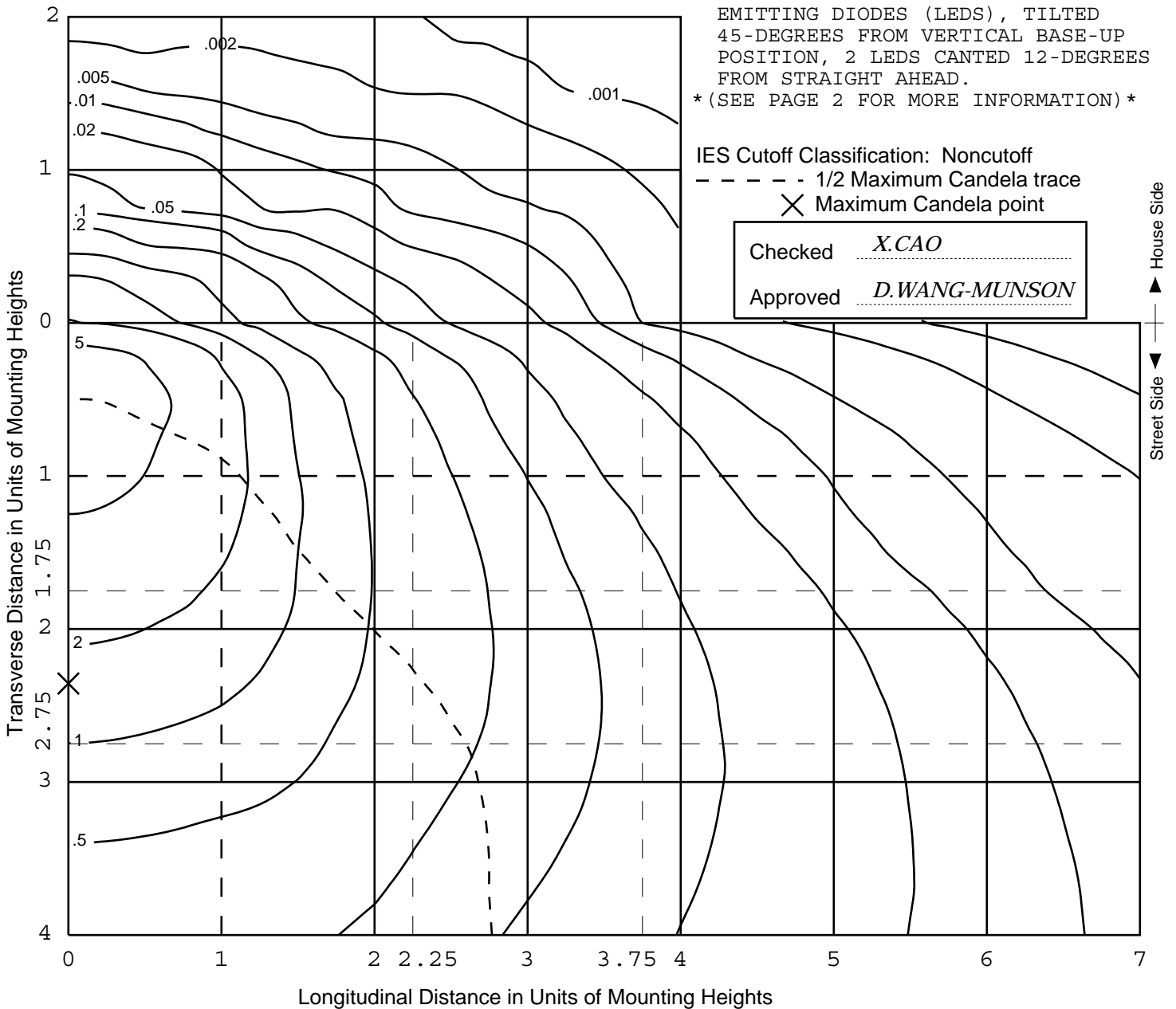
(SEE PAGE 2 FOR MORE INFORMATION)

IES Cutoff Classification: Noncutoff

--- 1/2 Maximum Candela trace

× Maximum Candela point

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



House Side
 Street Side

REPORT NUMBER: RAB01933
ISSUE DATE: 05/13/16
PREPARED FOR: RAB LIGHTING INC.

PAGE: 2 OF 9
DATE SAMPLE TESTED: 05/13/16

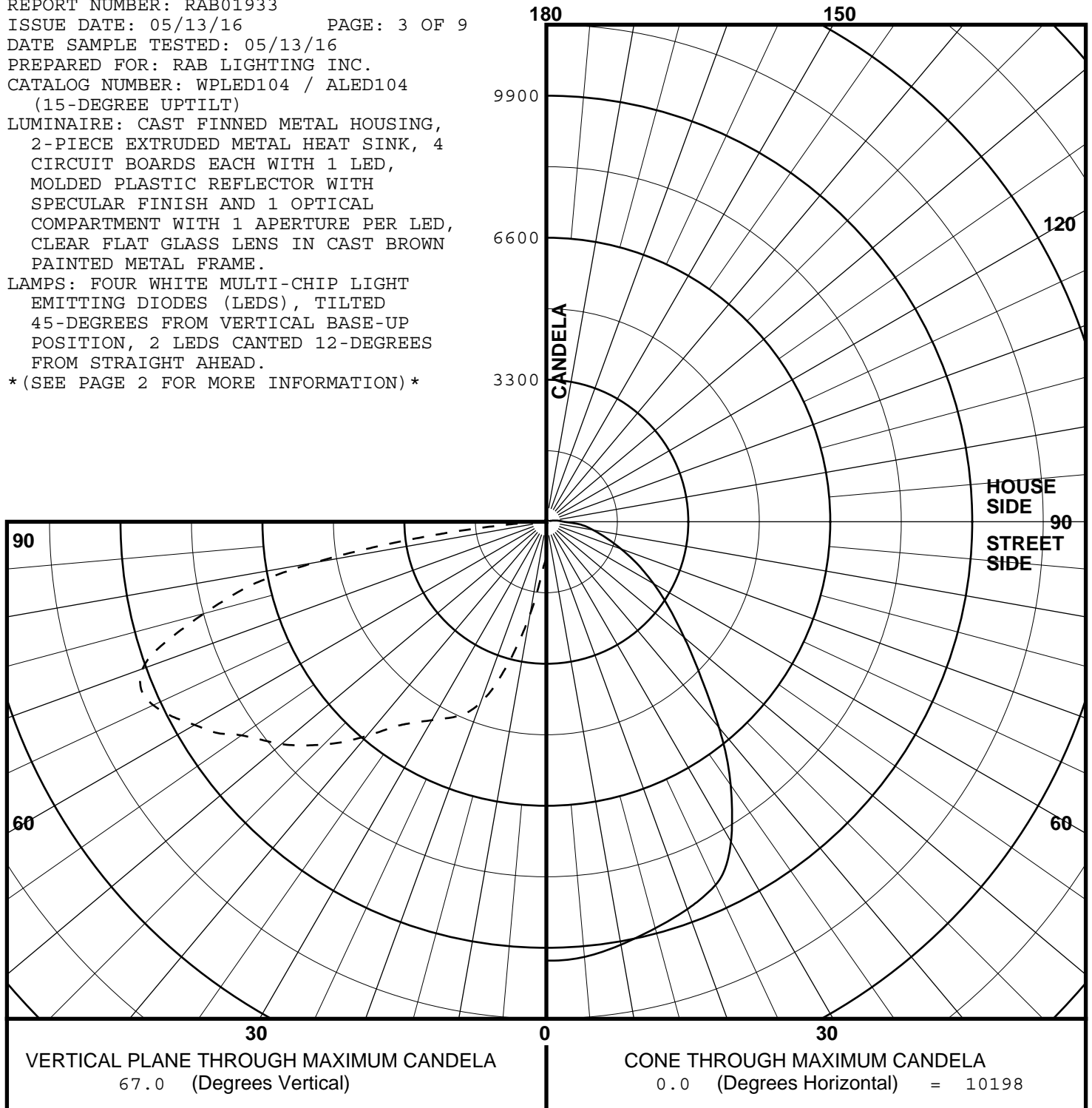
ADDITIONAL INFORMATION

NOTE: DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED.
TOTAL INPUT WATTS = 106.11 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: RAB01933
 ISSUE DATE: 05/13/16 PAGE: 3 OF 9
 DATE SAMPLE TESTED: 05/13/16
 PREPARED FOR: RAB LIGHTING INC.
 CATALOG NUMBER: WPLED104 / ALED104
 (15-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
 45-DEGREES FROM VERTICAL BASE-UP
 POSITION, 2 LEDES CANTED 12-DEGREES
 FROM STRAIGHT AHEAD.
 (SEE PAGE 2 FOR MORE INFORMATION)



REPORT NUMBER: RAB01933

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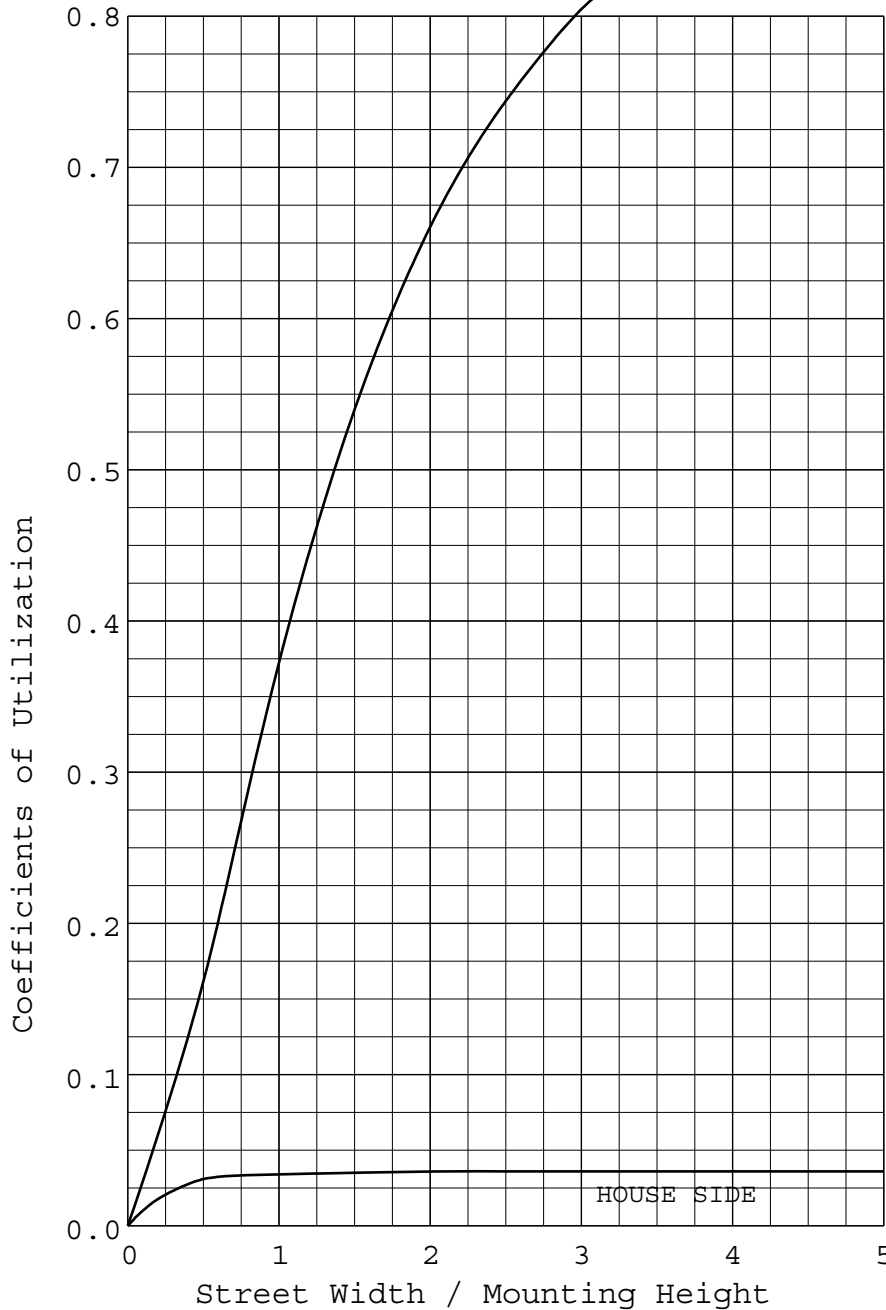
ISSUE DATE: 05/13/16

STREET SIDE

DATE SAMPLE TESTED: 05/13/16

PREPARED FOR: RAB LIGHTING INC.

COEFFICIENTS OF UTILIZATION AND FLUX DISTRIBUTION



	LUMENS	PERCENT OF FIXTURE
DOWNWARD STREET SIDE	12559.	95.7
DOWNWARD HOUSE SIDE	479.	3.6
DOWNWARD TOTAL	13038.	99.3
UPWARD STREET SIDE	40.	0.3
UPWARD HOUSE SIDE	50.	0.4
UPWARD TOTAL	91.	0.7
TOTAL FLUX	13129.	100.0

TOTAL INPUT WATTS = 106.1
EFFICACY = 123.7 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: RAB01933
 ISSUE DATE: 05/13/16
 PREPARED FOR: RAB LIGHTING INC.

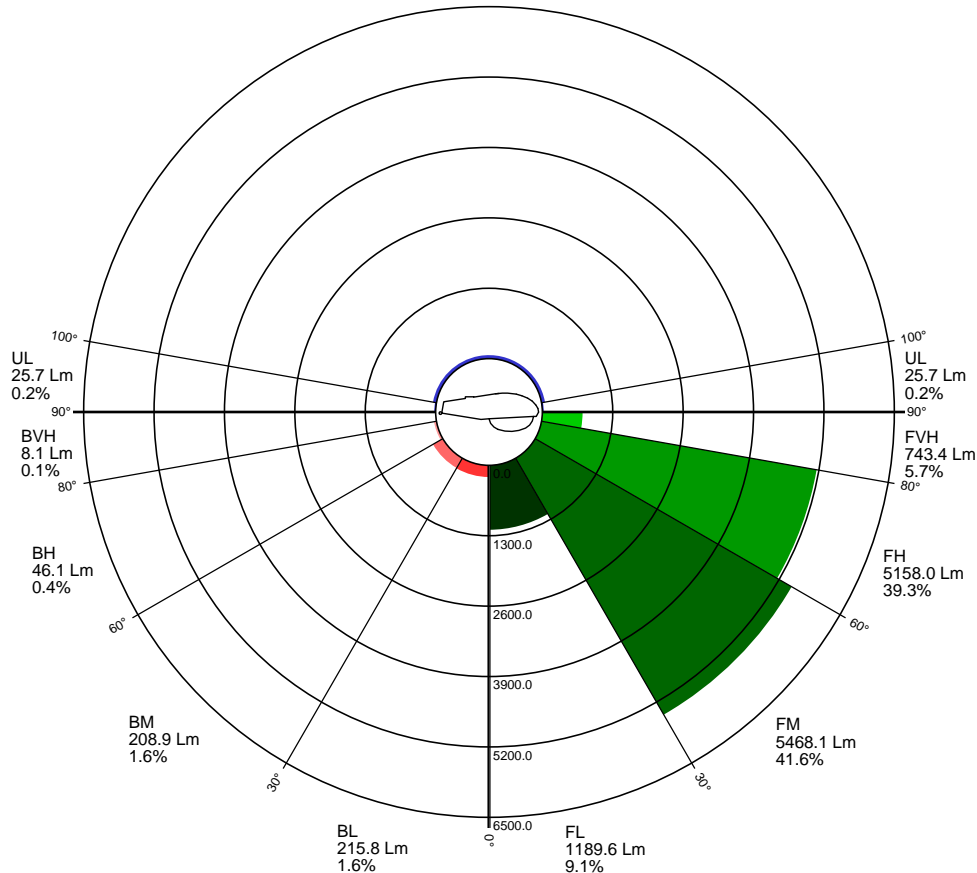
PAGE: 5 OF 9
 DATE SAMPLE TESTED: 05/13/16

BUG Rating:			B1	U3	G4
Zonal Summary	Lumens	% of Fixture	Zone Ratings		
			B	U	G
Forward	12559	95.7			
FL (0° - 30°)	1189.6	9.1			
FM (30° - 60°)	5468.1	41.6			
FH (60° - 80°)	5158.0	39.3			G3
FVH (80° - 90°)	743.4	5.7			G4
Backward	479	3.6			
BL (0° - 30°)	215.8	1.6	B1		
BM (30° - 60°)	208.9	1.6	B0		
BH (60° - 80°)	46.1	0.4	B0		G0
BVH (80° - 90°)	8.1	0.1			G0
Upward	91	0.7			
UL (90° - 100°)	25.7	0.2		U2	
UH (100° - 180°)	65.1	0.5		U3	
Trapped Light	0	0.0			
Total Flux	13129	100.0			

Zonal Lumen Summary

(Linear scale)

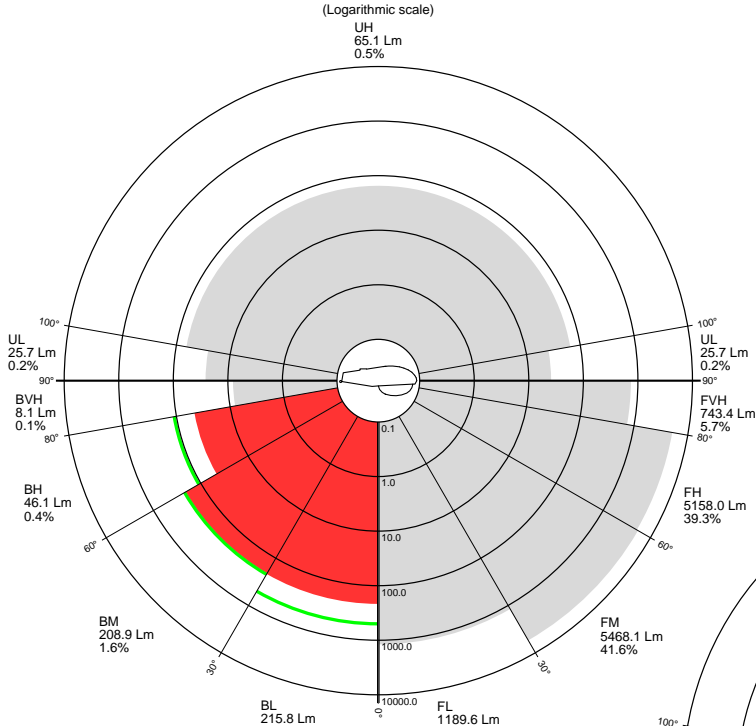
UH
65.1 Lm
0.5%



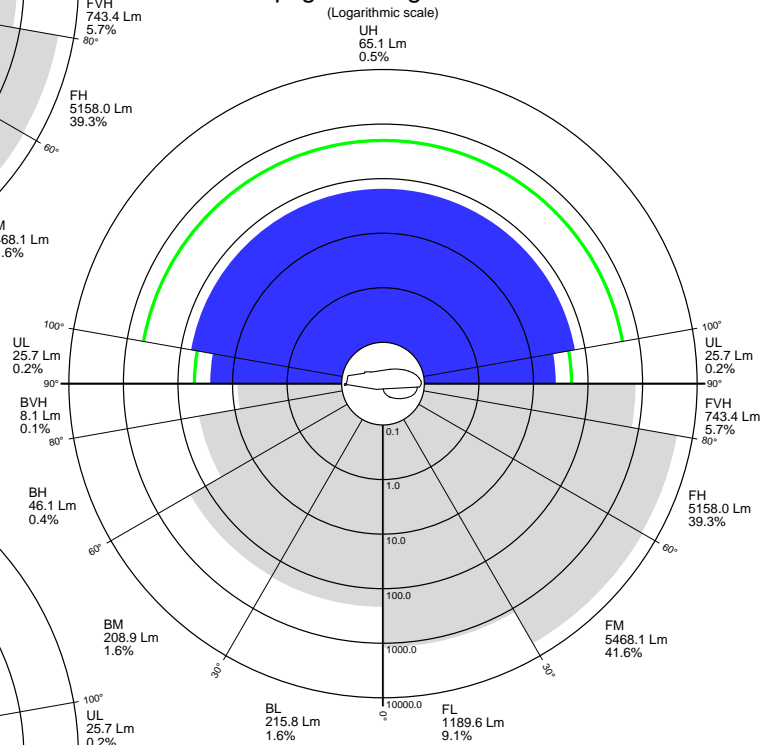
REPORT NUMBER: RAB01933
 ISSUE DATE: 05/13/16
 PREPARED FOR: RAB LIGHTING INC.

PAGE: 6 OF 9
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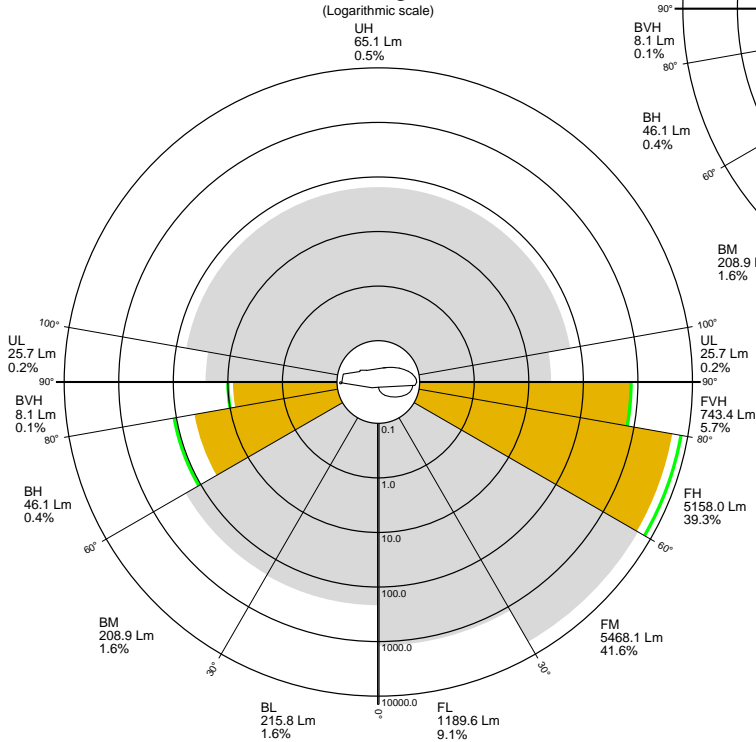
Backlight Rating Details



Uplight Rating Details



Glare Rating Details



REPORT NUMBER: RAB01933
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PAGE: 7 OF 9
 DATE SAMPLE TESTED: 05/13/16

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
180.0	9.	9.	9.	9.	9.	9.	9.	9.	9.	9.
175.0	0.	1.	3.	6.	8.	10.	12.	14.	16.	17.
165.0	0.	1.	3.	6.	8.	11.	12.	14.	16.	17.
155.0	0.	1.	3.	6.	8.	10.	12.	14.	16.	17.
145.0	0.	1.	3.	6.	8.	10.	12.	14.	16.	17.
135.0	0.	1.	3.	5.	8.	10.	12.	14.	15.	16.
125.0	0.	1.	3.	6.	8.	10.	12.	13.	15.	16.
115.0	0.	1.	3.	6.	8.	10.	12.	13.	15.	16.
105.0	0.	1.	3.	6.	8.	10.	12.	14.	15.	16.
95.0	21.	19.	19.	16.	13.	13.	13.	13.	15.	16.
90.0	267.	264.	259.	220.	152.	93.	74.	45.	23.	17.
87.5	487.	479.	496.	448.	436.	354.	414.	358.	228.	24.
85.0	1333.	1283.	1429.	1367.	1433.	1453.	1501.	991.	389.	60.
82.5	3249.	3163.	3451.	3315.	3153.	2892.	2304.	1380.	521.	154.
V 80.0	5484.	5386.	5688.	5547.	4521.	3714.	2875.	1753.	619.	224.
E 77.5	7211.	7154.	7161.	7037.	5325.	4436.	3288.	1864.	805.	262.
R 75.0	8239.	8176.	8157.	8239.	6243.	4921.	3451.	1971.	950.	380.
T 72.5	9277.	9229.	9115.	9099.	6920.	5074.	3489.	2087.	1088.	544.
I 70.0	9990.	9932.	9649.	9417.	7279.	5068.	3471.	2215.	1238.	699.
C 67.5	10195.	10154.	9784.	9354.	7461.	5054.	3471.	2323.	1397.	806.
A 67.0 <	10198.	10151.	9779.	9312.	7471.	5068.	3478.	2339.	1430.	813.
L 65.0	10085.	10055.	9692.	9058.	7478.	5134.	3534.	2397.	1577.	872.
62.5	9803.	9768.	9421.	8679.	7427.	5305.	3622.	2454.	1794.	939.
A 60.0	9443.	9422.	9090.	8345.	7253.	5507.	3768.	2518.	1960.	952.
N 57.5	9120.	9107.	8743.	7950.	7020.	5636.	3920.	2600.	2122.	913.
G 55.0	8652.	8658.	8288.	7621.	6758.	5659.	4037.	2777.	2243.	953.
L 52.5	8328.	8293.	7934.	7347.	6458.	5600.	4130.	2983.	2328.	1017.
E 50.0	8040.	7967.	7626.	7047.	6184.	5439.	4233.	3225.	2389.	1026.
47.5	7694.	7622.	7283.	6760.	5916.	5179.	4341.	3497.	2386.	1011.
45.0	7321.	7278.	6942.	6571.	5660.	4915.	4371.	3696.	2361.	976.
42.5	6929.	6910.	6574.	6099.	5411.	4773.	4337.	3753.	2320.	946.
40.0	6499.	6486.	6220.	5777.	5221.	4691.	4293.	3696.	2243.	946.
37.5	6070.	6069.	5891.	5519.	5129.	4631.	4280.	3544.	2144.	966.
35.0	5744.	5753.	5631.	5370.	5005.	4635.	4269.	3354.	2037.	978.
30.0	5326.	5345.	5280.	5107.	4826.	4509.	3962.	2912.	1802.	957.
25.0	4998.	5019.	4969.	4830.	4537.	4004.	3206.	2313.	1455.	872.
20.0	4469.	4496.	4395.	4181.	3801.	3226.	2533.	1847.	1175.	821.
15.0	3390.	3411.	3267.	3088.	2753.	2373.	1950.	1480.	1097.	901.
10.0	2193.	2208.	2123.	2027.	1833.	1596.	1344.	1142.	981.	882.
5.0	1200.	1212.	1179.	1157.	1101.	1050.	985.	947.	920.	851.
0.0	831.	831.	831.	831.	831.	831.	831.	831.	831.	831.
	PLANE OF MAXIMUM CANDELA									
	CONE OF MAXIMUM CANDELA									

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PAGE: 8 OF 9
 DATE SAMPLE TESTED: 05/13/16

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	9.	9.	9.	9.	9.	9.	9.	9.	9.	9.	9.
175.0	17.	17.	16.	15.	13.	12.	10.	7.	5.	4.	4.
165.0	17.	18.	17.	16.	15.	13.	11.	9.	7.	7.	7.
155.0	18.	18.	17.	16.	15.	14.	12.	11.	10.	10.	10.
145.0	17.	17.	17.	16.	15.	14.	13.	12.	12.	12.	12.
135.0	16.	16.	16.	16.	15.	14.	13.	13.	14.	14.	14.
125.0	16.	16.	16.	15.	15.	14.	15.	16.	16.	17.	16.
115.0	16.	16.	16.	16.	16.	16.	17.	18.	19.	20.	20.
105.0	17.	17.	17.	17.	17.	17.	19.	20.	21.	21.	21.
95.0	17.	17.	17.	17.	17.	17.	19.	20.	20.	20.	20.
90.0	16.	17.	17.	17.	16.	16.	16.	16.	17.	17.	17.
87.5	16.	16.	16.	16.	16.	15.	15.	14.	14.	14.	14.
85.0	19.	17.	16.	16.	15.	15.	13.	12.	12.	11.	12.
82.5	41.	21.	16.	15.	14.	14.	12.	10.	9.	9.	9.
V 80.0	73.	32.	18.	16.	14.	13.	11.	9.	7.	7.	7.
E 77.5	92.	51.	32.	16.	14.	12.	10.	8.	6.	4.	4.
R 75.0	116.	79.	50.	18.	14.	13.	10.	7.	5.	3.	3.
T 72.5	277.	183.	59.	28.	14.	13.	11.	8.	5.	2.	2.
I 70.0	333.	221.	66.	41.	15.	12.	11.	8.	6.	5.	4.
C 67.5	391.	261.	61.	49.	18.	13.	10.	8.	6.	6.	6.
A 67.0 <<	408.	278.	62.	50.	19.	13.	10.	8.	6.	6.	6.
L 65.0	460.	340.	83.	55.	24.	14.	11.	8.	6.	6.	6.
62.5	507.	355.	144.	57.	32.	17.	12.	9.	6.	6.	6.
A 60.0	506.	367.	201.	50.	42.	23.	15.	11.	8.	8.	8.
N 57.5	504.	376.	244.	41.	46.	29.	24.	16.	13.	13.	13.
G 55.0	552.	424.	283.	42.	47.	39.	30.	24.	21.	20.	19.
L 52.5	640.	501.	358.	74.	45.	46.	39.	29.	30.	30.	29.
E 50.0	677.	541.	419.	153.	39.	50.	49.	36.	36.	37.	36.
47.5	686.	554.	450.	266.	37.	49.	54.	45.	46.	45.	44.
45.0	684.	565.	480.	359.	50.	41.	54.	48.	54.	55.	54.
42.5	691.	593.	509.	412.	121.	35.	50.	50.	57.	59.	58.
40.0	713.	628.	534.	437.	217.	39.	40.	48.	57.	59.	59.
37.5	750.	663.	550.	450.	298.	77.	36.	39.	51.	54.	55.
35.0	778.	686.	559.	453.	350.	161.	45.	35.	42.	45.	45.
30.0	786.	691.	558.	459.	379.	318.	210.	122.	67.	52.	50.
25.0	731.	651.	543.	465.	412.	398.	415.	387.	321.	285.	277.
20.0	707.	645.	575.	527.	510.	509.	498.	481.	469.	463.	461.
15.0	808.	754.	697.	652.	610.	582.	562.	547.	531.	521.	516.
10.0	824.	787.	739.	703.	676.	653.	631.	617.	601.	596.	594.
5.0	816.	798.	767.	747.	735.	722.	710.	706.	699.	699.	696.
0.0	831.	831.	831.	831.	831.	831.	831.	831.	831.	831.	831.

CONE OF MAXIMUM CANDELA

REPORT NUMBER: RAB01933
ISSUE DATE: 05/13/16
PREPARED FOR: RAB LIGHTING INC.

PAGE: 9 OF 9
DATE SAMPLE TESTED: 05/13/16

5-DEGREE
ZONAL LUMEN SUMMARY

0- 5	21
5- 10	72
10- 15	152
15- 20	262
20- 25	388
25- 30	511
30- 35	630
35- 40	750
40- 45	885
45- 50	1021
50- 55	1140
55- 60	1251
60- 65	1349
65- 70	1407
70- 75	1349
75- 80	1100
80- 85	614
85- 90	137
90- 95	17
95-100	8
100-105	7
105-110	7
110-115	7
115-120	6
120-125	6
125-130	5
130-135	5
135-140	4
140-145	4
145-150	4
150-155	3
155-160	2
160-165	2
165-170	1
170-175	1
175-180	0

10-DEGREE
ZONAL LUMEN SUMMARY

0- 10	92
0- 20	506
0- 30	1405
0- 40	2785
0- 50	4691
0- 60	7082
0- 70	9838
0- 80	12287
0- 90	13038
0-100	13064
0-110	13078
0-120	13091
0-130	13102
0-140	13112
0-150	13119
0-160	13125
0-170	13128
0-180	13129

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:

PHOTOMETRIC	
Total Integrated Flux (lumens)	13129 *
SPECTRORADIOMETRIC	
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)	38597 *
ELECTRICAL	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.888
Input Power (Watts)	106.1
Input Power Factor (%)	99.6
Input Current THD (%)	5.1
Input Voltage THD (%)	0.2
EFFICACY (Lumens/Watt)	
123.7	
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.410
Input Power (Watts)	104.5
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

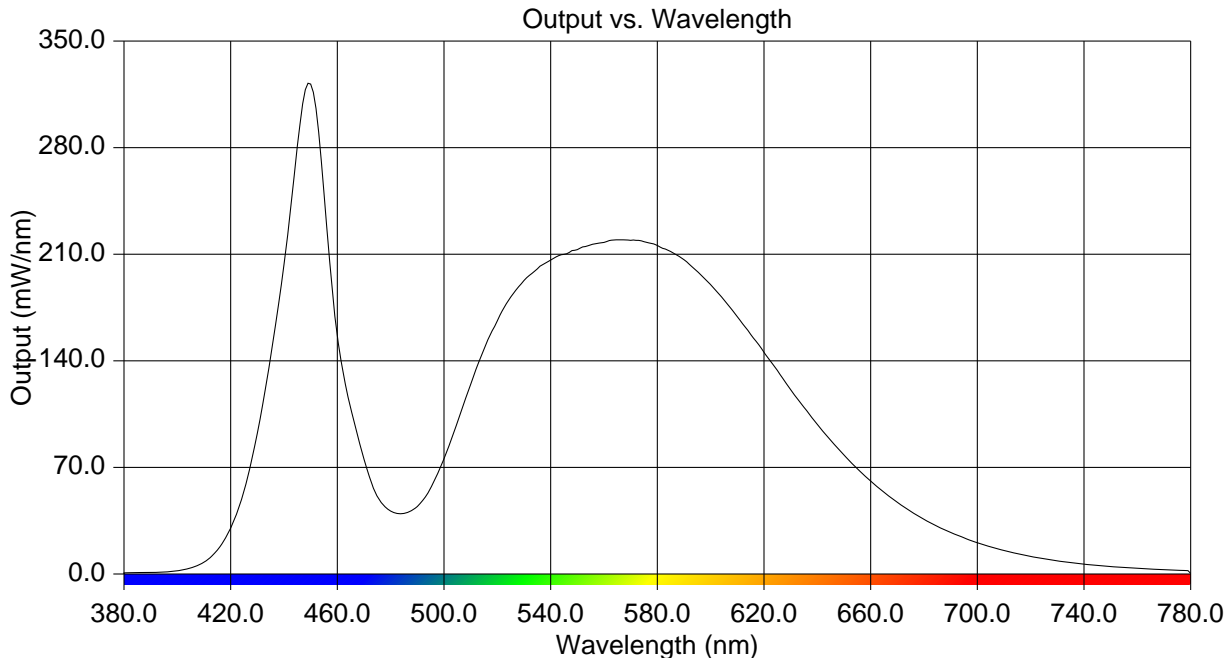
*NOTE:

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

RESULTS:

Wavelength	mW per nm	Wavelength	mW per nm	Wavelength	mW per nm
380	0.717	515	147.548	650	78.146
385	0.850	520	166.148	655	69.098
390	0.985	525	181.822	660	60.955
395	1.319	530	192.614	665	53.649
400	2.145	535	200.233	670	46.996
405	3.905	540	206.126	675	41.102
410	7.800	545	209.771	680	35.836
415	15.657	550	212.864	685	31.247
420	30.144	555	215.907	690	27.254
425	54.787	560	217.593	695	23.755
430	92.364	565	219.371	700	20.482
435	142.484	570	218.962	705	17.751
440	203.096	575	218.074	710	15.414
445	280.819	580	215.501	715	13.360
450	321.519	585	211.486	720	11.510
455	249.906	590	206.249	725	9.946
460	156.013	595	198.760	730	8.658
465	108.813	600	189.686	735	7.478
470	75.354	605	179.859	740	6.476
475	51.169	610	168.831	745	5.604
480	41.215	615	157.249	750	4.902
485	39.801	620	145.680	755	4.245
490	44.290	625	133.636	760	3.700
495	56.287	630	120.905	765	3.218
500	75.918	635	109.374	770	2.817
505	99.706	640	98.022	775	2.452
510	124.411	645	87.819	780	0.371



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CIE Chromaticity Diagram

