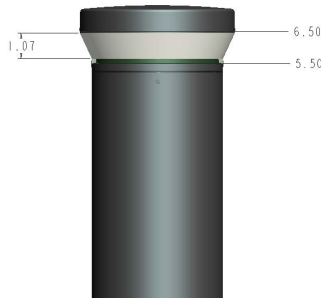


ISOFOOTCANDLE LINES OF HORIZONTAL ILLUMINATION

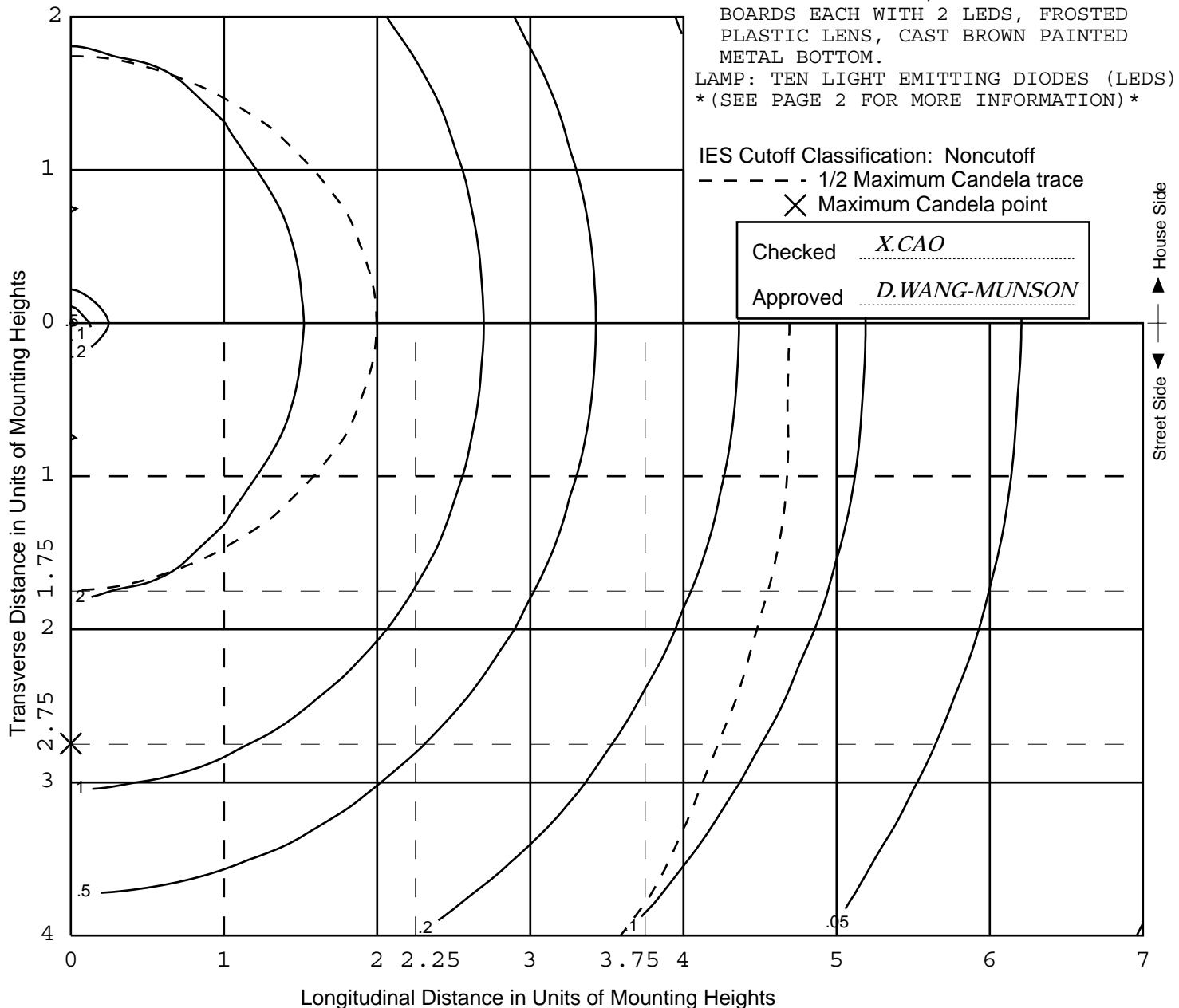
Values based on 3.5 foot mounting height.



REPORT NUMBER: RAB03690
 ISSUE DATE: 08/15/17 PAGE: 1 OF 9
 DATE SAMPLE TESTED: 08/15/17
 PREPARED FOR: RAB LIGHTING INC. RC LIGHTING
 CATALOG NUMBER: BLED12Y-180,
 BLED12Y-180/D10, , BLED12Y-180,
 BLED12Y-180/D10 (42" ROUND BOLLARD)
 LUMINAIRE: EXTRUDED BROWN PAINTED
 CYLINDRICAL METAL LOWER HOUSING, CAST
 METAL TOP, CAST FINNED METAL HEAT
 SINK WITH WHITE PAINTED INTERIOR,
 MOLDED SPECULAR FINISHED PLASTIC
 REFLECTOR, 2 WHITE CIRCUIT BOARDS
 EACH WITH 3 LEDS, 2 WHITE CIRCUIT
 BOARDS EACH WITH 2 LEDS, FROSTED
 PLASTIC LENS, CAST BROWN PAINTED
 METAL BOTTOM.
 LAMP: TEN LIGHT EMITTING DIODES (LEDs) .
 (SEE PAGE 2 FOR MORE INFORMATION)

IES Cutoff Classification: Noncutoff

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



REPORT NUMBER: RAB03690

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DATE SAMPLE TESTED: 08/15/17

PREPARED FOR: RAB LIGHTING INC. RC LIGHTING

ADDITIONAL INFORMATION

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.

TOTAL INPUT WATTS = 11.91 W AT 277.0 VAC.

LED DRIVER: RDD-15W-032SE-A0350

TEST PROCEDURE: IESNA LM-79-08

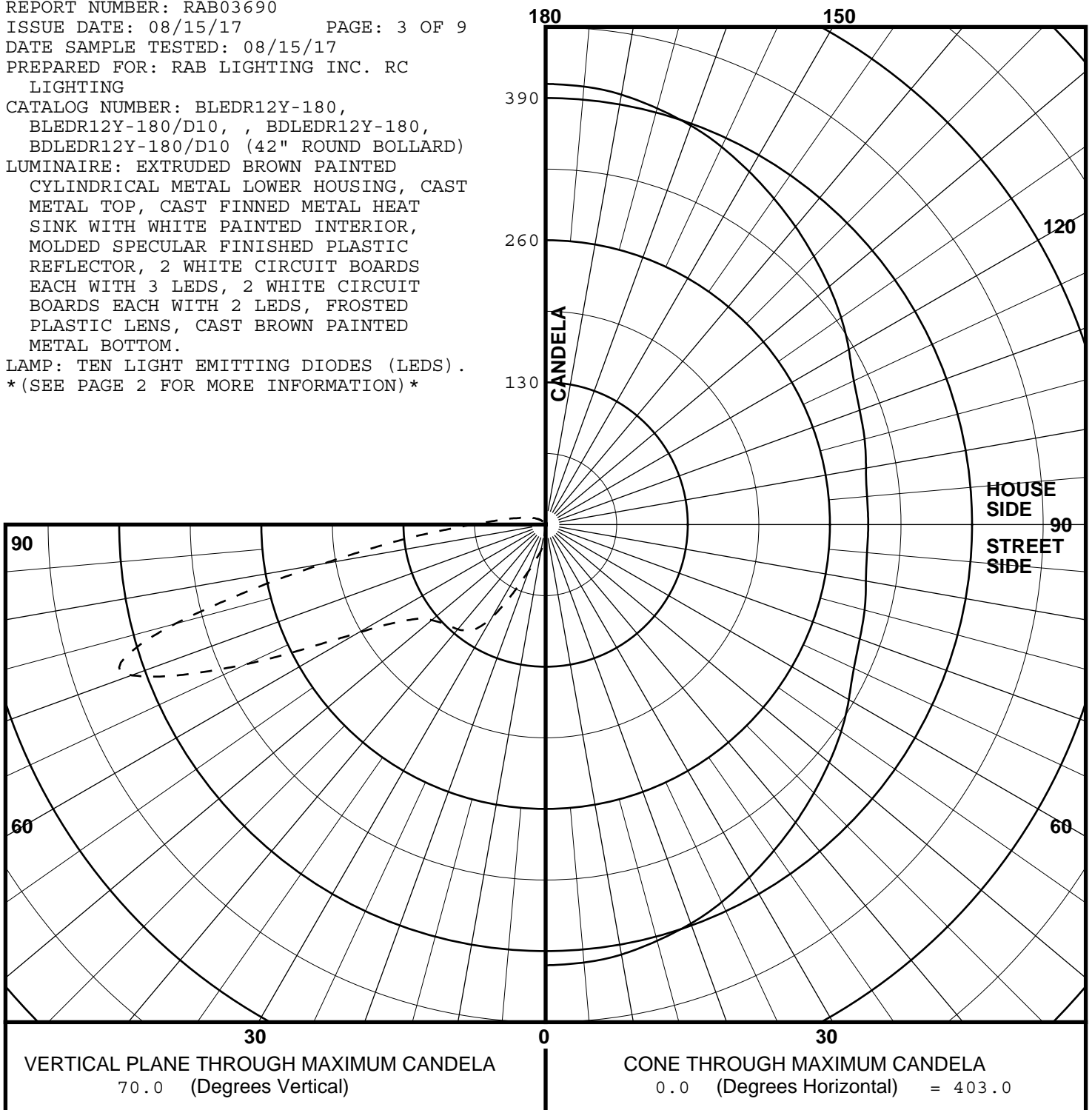
LM-80 DATA AVAILABLE FROM MANUFACTURER FOR SOLID STATE SOURCE

AMBIENT: 24.7

ACCREDITED LABORATORY CODE 201058-0

MAXIMUM PLANE AND MAXIMUM CONE PLOTS OF CANDELA

REPORT NUMBER: RAB03690
 ISSUE DATE: 08/15/17 PAGE: 3 OF 9
 DATE SAMPLE TESTED: 08/15/17
 PREPARED FOR: RAB LIGHTING INC. RC
 LIGHTING
 CATALOG NUMBER: BLEDR12Y-180,
 BLEDR12Y-180/D10, , BDLEDR12Y-180,
 BDLEDR12Y-180/D10 (42" ROUND BOLLARD)
 LUMINAIRE: EXTRUDED BROWN PAINTED
 CYLINDRICAL METAL LOWER HOUSING, CAST
 METAL TOP, CAST FINNED METAL HEAT
 SINK WITH WHITE PAINTED INTERIOR,
 MOLDED SPECULAR FINISHED PLASTIC
 REFLECTOR, 2 WHITE CIRCUIT BOARDS
 EACH WITH 3 LEDS, 2 WHITE CIRCUIT
 BOARDS EACH WITH 2 LEDS, FROSTED
 PLASTIC LENS, CAST BROWN PAINTED
 METAL BOTTOM.
 LAMP: TEN LIGHT EMITTING DIODES (LEDS).
 (SEE PAGE 2 FOR MORE INFORMATION)



REPORT NUMBER: RAB03690

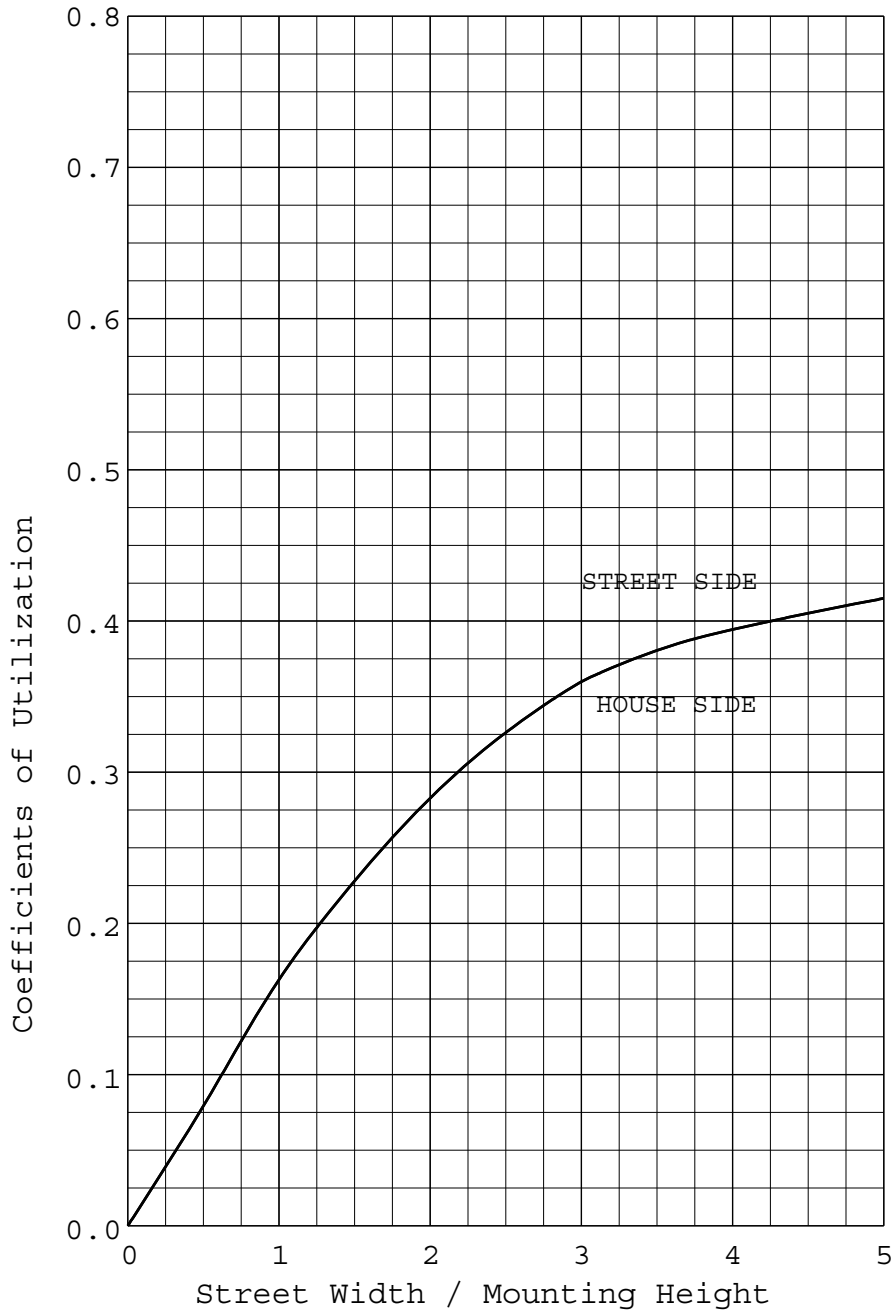
PAGE: 4 OF 9

ISSUE DATE: 08/15/17

DATE SAMPLE TESTED: 08/15/17

PREPARED FOR: RAB LIGHTING INC. RC LIGHTING

COEFFICIENTS OF UTILIZATION AND FLUX DISTRIBUTION



	LUMENS	PERCENT OF FIXTURE
DOWNWARD STREET SIDE	509.	45.5
DOWNWARD HOUSE SIDE	509.	45.5
DOWNWARD TOTAL	1017.	91.1
UPWARD STREET SIDE	50.	4.5
UPWARD HOUSE SIDE	50.	4.5
UPWARD TOTAL	100.	8.9
TOTAL FLUX	1117.	100.0
TOTAL INPUT WATTS = 11.9		
EFFICACY = 93.9 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: RAB03690

ISSUE DATE: 08/15/17

PREPARED FOR: RAB LIGHTING INC. RC LIGHTING

PAGE: 5 OF 9

DATE SAMPLE TESTED: 08/15/17

BUG Rating:

Zonal Summary

Lumens

% of Fixture

B1 U3 G1

Zone Ratings

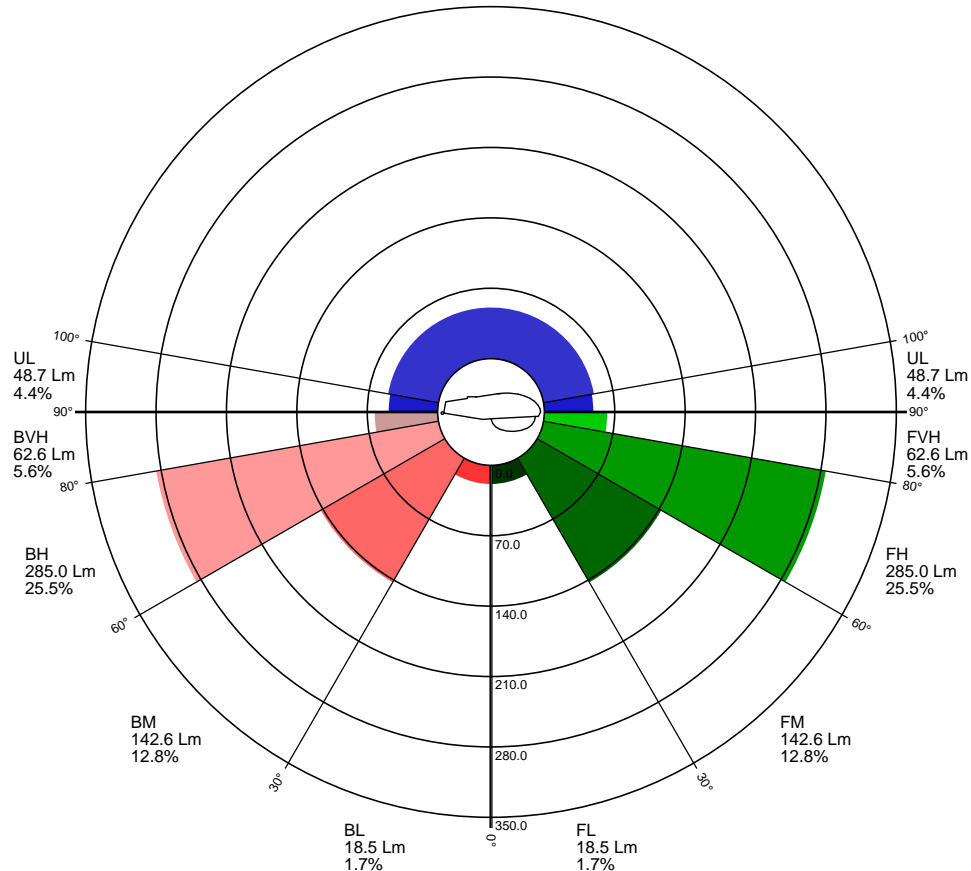
B U G

Forward		509	45.5			
FL	(0° - 30°)	18.5	1.7			
FM	(30° - 60°)	142.6	12.8			
FH	(60° - 80°)	285.0	25.5			G0
FVH	(80° - 90°)	62.6	5.6			G1
Backward		509	45.5			
BL	(0° - 30°)	18.5	1.7	B0		
BM	(30° - 60°)	142.6	12.8	B0		
BH	(60° - 80°)	285.0	25.5	B1		G0
BVH	(80° - 90°)	62.6	5.6			G1
Upward		100	8.9			
UL	(90° - 100°)	48.7	4.4		U2	
UH	(100° - 180°)	50.8	4.6		U3	
Trapped Light		0	0.0			
Total Flux		1117	100.0			

Zonal Lumen Summary

(Linear scale)

UH
50.8 Lm
4.6%



REPORT NUMBER: RAB03690

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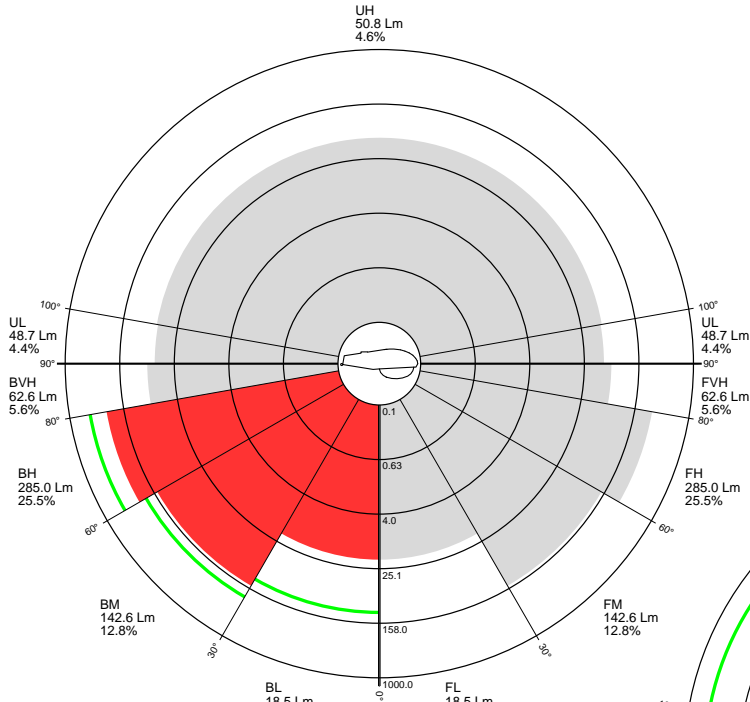
PREPARED FOR: RAB LIGHTING INC. RC LIGHTING

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DATE SAMPLE TESTED: 08/15/17

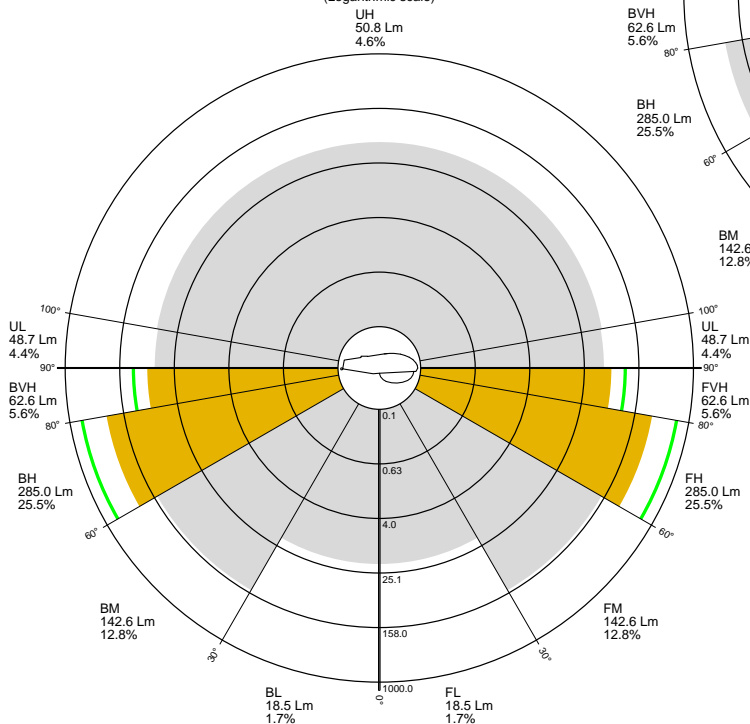
Backlight Rating Details

(Logarithmic scale)



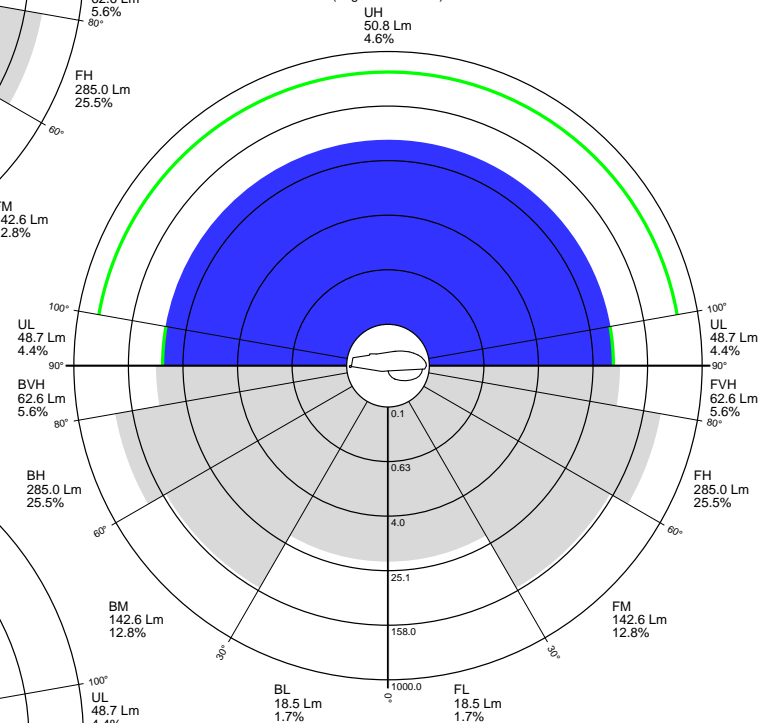
Glare Rating Details

(Logarithmic scale)



Uplight Rating Details

(Logarithmic scale)



REPORT NUMBER: RAB03690

PAGE: 7 OF 9

ISSUE DATE: 08/15/17

DATE SAMPLE TESTED: 08/15/17

PREPARED FOR: RAB LIGHTING INC. RC LIGHTING

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	1.	1.	1.	1.	1.	1.	1.	1.	1.
	175.0	0.	0.	0.	0.	0.	0.	0.	1.	1.
	165.0	0.	0.	0.	0.	0.	0.	0.	0.	0.
	155.0	0.	1.	0.	0.	0.	0.	0.	0.	0.
	145.0	2.	2.	2.	2.	2.	1.	1.	1.	1.
	135.0	5.	5.	5.	4.	4.	4.	4.	4.	3.
	125.0	9.	9.	9.	9.	8.	8.	8.	7.	7.
	115.0	15.	15.	15.	15.	15.	14.	14.	13.	13.
	105.0	24.	24.	24.	24.	24.	23.	23.	23.	22.
	95.0	44.	44.	44.	44.	43.	43.	42.	42.	42.
	90.0	67.	67.	67.	67.	65.	65.	64.	63.	61.
	87.5	87.	87.	88.	86.	85.	84.	81.	80.	78.
	85.0	117.	117.	117.	115.	112.	110.	105.	103.	101.
V	82.5	156.	157.	156.	153.	147.	143.	136.	133.	130.
E	80.0	207.	209.	207.	202.	194.	187.	177.	172.	169.
R	77.5	276.	279.	273.	265.	251.	244.	230.	221.	216.
T	75.0	351.	350.	344.	333.	314.	300.	285.	273.	264.
I	72.5	403.	401.	392.	378.	358.	341.	323.	309.	299.
C	70.0<<	403.	402.	394.	381.	364.	347.	330.	311.	302.
A	67.5	359.	360.	353.	344.	332.	318.	302.	283.	273.
L	65.0	302.	300.	295.	292.	281.	269.	256.	238.	230.
	62.5	243.	242.	239.	237.	230.	220.	211.	200.	194.
A	60.0	198.	197.	195.	194.	190.	183.	178.	172.	168.
N	57.5	169.	169.	167.	166.	164.	158.	156.	154.	152.
G	55.0	152.	151.	150.	149.	147.	143.	142.	142.	140.
L	52.5	141.	141.	140.	138.	136.	133.	132.	132.	132.
E	50.0	136.	135.	134.	132.	129.	127.	126.	125.	125.
	47.5	132.	131.	131.	127.	124.	122.	120.	118.	117.
	45.0	129.	129.	128.	124.	120.	117.	114.	112.	110.
	42.5	127.	127.	125.	120.	116.	111.	108.	105.	102.
	40.0	125.	124.	122.	117.	111.	106.	102.	97.	95.
	37.5	122.	121.	118.	113.	106.	100.	94.	90.	87.
	35.0	118.	117.	113.	108.	100.	93.	87.	82.	79.
	30.0	98.	98.	96.	91.	84.	78.	72.	66.	62.
	25.0	67.	67.	67.	64.	61.	57.	53.	49.	46.
	20.0	45.	45.	44.	43.	42.	40.	39.	37.	35.
	15.0	32.	33.	33.	32.	32.	31.	30.	30.	29.
	10.0	24.	24.	23.	22.	22.	20.	19.	18.	17.
	5.0	5.	5.	4.	4.	4.	3.	3.	2.	2.
	0.0	0.	0.	0.	0.	0.	0.	0.	0.	0.

||
PLANE OF MAXIMUM CANDELA

CONE OF MAXIMUM CANDELA

REPORT NUMBER: RAB03690

PAGE: 8 OF 9

ISSUE DATE: 08/15/17

DATE SAMPLE TESTED: 08/15/17

PREPARED FOR: RAB LIGHTING INC. RC LIGHTING

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
V E R T I C A L A N G L E	180.0	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
	175.0	1.	1.	1.	1.	0.	0.	0.	0.	0.	0.	0.
	165.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	155.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
	145.0	1.	1.	1.	1.	1.	1.	2.	2.	2.	2.	2.
	135.0	3.	3.	3.	4.	4.	4.	4.	4.	5.	5.	5.
	125.0	7.	7.	7.	7.	8.	8.	8.	9.	9.	9.	9.
	115.0	13.	13.	13.	13.	14.	14.	15.	15.	15.	15.	15.
	105.0	22.	22.	22.	23.	23.	23.	24.	24.	24.	24.	24.
	95.0	40.	41.	42.	42.	42.	43.	43.	44.	44.	44.	44.
	90.0	61.	60.	61.	63.	64.	65.	65.	67.	67.	67.	67.
	87.5	77.	76.	78.	80.	81.	84.	85.	86.	88.	87.	87.
	85.0	99.	98.	101.	103.	105.	110.	112.	115.	117.	117.	117.
	82.5	129.	127.	130.	133.	136.	143.	147.	153.	156.	157.	156.
	80.0	164.	164.	169.	172.	177.	187.	194.	202.	207.	209.	207.
	77.5	210.	210.	216.	221.	230.	244.	251.	265.	273.	279.	276.
	75.0	259.	259.	264.	273.	285.	300.	314.	333.	344.	350.	351.
	72.5	294.	294.	299.	309.	323.	341.	358.	378.	392.	401.	403.
	70.0<<	295.	295.	302.	311.	330.	347.	364.	381.	394.	402.	403.
	67.5	265.	265.	273.	283.	302.	318.	332.	344.	353.	360.	359.
	65.0	224.	223.	230.	238.	256.	269.	281.	292.	295.	300.	302.
	62.5	189.	189.	194.	200.	211.	220.	230.	237.	239.	242.	243.
	60.0	166.	166.	168.	172.	178.	183.	190.	194.	195.	197.	198.
	57.5	151.	151.	152.	154.	156.	158.	164.	166.	167.	169.	169.
	55.0	140.	140.	140.	142.	142.	143.	147.	149.	150.	151.	152.
	52.5	130.	130.	132.	132.	132.	133.	136.	138.	140.	141.	141.
	50.0	123.	123.	125.	125.	126.	127.	129.	132.	134.	135.	136.
	47.5	116.	116.	117.	118.	120.	122.	124.	127.	131.	131.	132.
	45.0	110.	110.	110.	112.	114.	117.	120.	124.	128.	129.	129.
	42.5	102.	102.	102.	105.	108.	111.	116.	120.	125.	127.	127.
	40.0	94.	94.	95.	97.	102.	106.	111.	117.	122.	124.	125.
	37.5	85.	85.	87.	90.	94.	100.	106.	113.	118.	121.	122.
35.0	76.	76.	79.	82.	87.	93.	100.	108.	113.	117.	118.	
30.0	59.	60.	62.	66.	72.	78.	84.	91.	96.	98.	98.	
25.0	44.	45.	46.	49.	53.	57.	61.	64.	67.	67.	67.	
20.0	35.	35.	35.	37.	39.	40.	42.	43.	44.	45.	45.	
15.0	29.	28.	29.	30.	30.	31.	32.	32.	33.	33.	32.	
10.0	18.	17.	17.	18.	19.	20.	22.	22.	23.	24.	24.	
5.0	2.	1.	2.	2.	3.	3.	4.	4.	4.	5.	5.	
0.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	

CONE OF MAXIMUM CANDELA

REPORT NUMBER: RAB03690

ISSUE DATE: 08/15/17

PREPARED FOR: RAB LIGHTING INC. RC LIGHTING

PAGE: 9 OF 9

DATE SAMPLE TESTED: 08/15/17

5-DEGREE ZONAL LUMEN SUMMARY

0- 5	0
5- 10	1
10- 15	3
15- 20	6
20- 25	10
25- 30	17
30- 35	26
35- 40	34
40- 45	42
45- 50	50
50- 55	59
55- 60	75
60- 65	108
65- 70	157
70- 75	175
75- 80	130
80- 85	79
85- 90	46
90- 95	29
95-100	20
100-105	14
105-110	11
110-115	8
115-120	6
120-125	4
125-130	3
130-135	2
135-140	1
140-145	1
145-150	0
150-155	0
155-160	0
160-165	0
165-170	0
170-175	0
175-180	0

10-DEGREE ZONAL LUMEN SUMMARY

0- 10	1
0- 20	10
0- 30	37
0- 40	97
0- 50	188
0- 60	322
0- 70	587
0- 80	892
0- 90	1017
0-100	1066
0-110	1091
0-120	1105
0-130	1112
0-140	1116
0-150	1117
0-160	1117
0-170	1117
0-180	1117

REPORT NUMBER: RAB03663
DATE: 7/27/2017
PREPARED FOR: RAB LIGHTING INC. RC LIGHTING
CATALOG NUMBER: BLEDR12Y-180, BLEDR12Y-180/D10, BDLEDR12Y-180, BDLEDR12Y-180/D10
(42" ROUND BOLLARD)

Page 1 of 4

ADDRESS: 170 LUDLOW AVE, NORTHVALE, NJ 07647

LUMINAIRE: EXTRUDED BROWN PAINTED CYLINDRICAL METAL LOWER HOUSING, CAST METAL TOP, CAST FINNED METAL HEAT SINK WITH WHITE PAINTED INTERIOR, MOLDED SPECULAR FINISHED PLASTIC REFLECTOR, 2 WHITE CIRCUIT BOARDS EACH WITH 3 LEDS, 2 WHITE CIRCUIT BOARDS EACH WITH 2 LEDS, FROSTED PLASTIC LENS, CAST BROWN PAINTED METAL BOTTOM.

LAMP: TEN LIGHT EMITTING DIODES (LEDS).

DRIVER: RDD-15W-032SE-A0350

OBJECT OF TEST: DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED AT THE RATED INPUT VOLTAGES (277.0 AND 120.0 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	3/01/18
	OCEAN OPTICS QE65PRO Spectroradiometer	06/22/18
	RAB 2.0 meter Diameter Integrating Sphere, 4PI Geometry	06/22/18

OBJECT OF TEST: Measure the Absolute Flux in lumens*, Total Radiant Flux*, Spectral Power Distribution (SPD), Correlated Color Temperature (CCT), Color Rendering Indices (CRI_a, 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 (120.0 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 X.CAO

Approved D.WANG-MUNSON
Lighting Engineer

REPORT NUMBER: RAB03663
 DATE: 7/27/2017
 PREPARED FOR: RAB LIGHTING INC. RC LIGHTING
 CATALOG NUMBER: BLEDR12Y-180, BLEDR12Y-180/D10, BDLEDR12Y-180, BDLEDR12Y-180/D10
 (42" ROUND BOLLARD)

Page 2 of 4

RESULTS:

PHOTOMETRIC	
Total Integrated Flux (lumens)	1117 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.4388
Chromaticity Ordinate y	0.4085
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2499
Chromaticity Ordinate v'	0.5234
Correlated Color Temp CCT (K)	3004
ANSI C78.377-2008 Duv	0.001
Total Radiant Flux (milliWatts)	3401 *
ELECTRICAL	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.048
Input Power (Watts)	11.9
Input Power Factor (%)	89.0
Input Current THD (%)	22.6
Input Voltage THD (%)	0.2
EFFICACY (Lumens/Watt)	
	93.9
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.096
Input Power (Watts)	11.4
Input Power Factor (%)	98.3
Input Current THD (%)	11.7
Input Voltage THD (%)	0.2
Off-State Power (Watts)	
	0.0

COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	84
R1 Light greyish red	82
R2 Dark greyish yellow	92
R3 Strong yellowish green	96
R4 Moderate yellowish green	81
R5 Light bluish green	83
R6 Light blue	92
R7 Light violet	83
R8 Light reddish purple	60
R9 Strong red	11
R10 Strong yellow	83
R11 Strong green	81
R12 Strong blue	74
R13 Light yellowish pink (skin)	85
R14 Moderate olive green (leaf)	98

*NOTE:

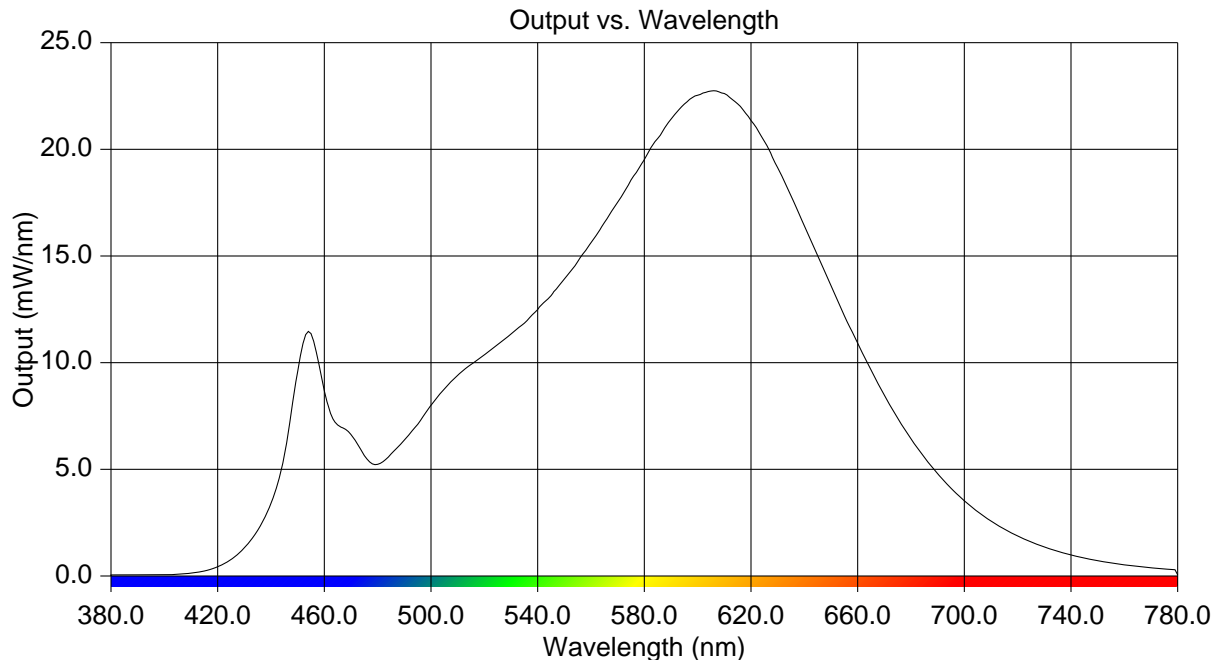
Proper calibration of integrating spheres for measuring total flux output of non-directional samples will produce reliable, repeatable results within the calibration tolerances of the equipment used. However, measurement of test samples with significant self absorption and/or directional output, even 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: RAB03663
 DATE: 7/27/2017
 PREPARED FOR: RAB LIGHTING INC. RC LIGHTING
 CATALOG NUMBER: BLEDR12Y-180, BLEDR12Y-180/D10, BDLEDR12Y-180, BDLEDR12Y-180/D10
 (42" ROUND BOLLARD)

Page 3 of 4

RESULTS:

Wavelength	mW per nm	Wavelength	mW per nm	Wavelength	mW per nm
380	0.050	515	9.914	650	13.600
385	0.053	520	10.366	655	12.201
390	0.052	525	10.830	660	10.921
395	0.052	530	11.344	665	9.651
400	0.063	535	11.849	670	8.492
405	0.081	540	12.489	675	7.398
410	0.130	545	13.158	680	6.442
415	0.234	550	13.908	685	5.559
420	0.433	555	14.733	690	4.792
425	0.772	560	15.624	695	4.114
430	1.324	565	16.563	700	3.525
435	2.138	570	17.523	705	3.013
440	3.378	575	18.561	710	2.575
445	5.691	580	19.523	715	2.196
450	9.578	585	20.506	720	1.880
455	11.364	590	21.416	725	1.595
460	8.678	595	22.122	730	1.361
465	7.078	600	22.535	735	1.153
470	6.624	605	22.733	740	0.989
475	5.644	610	22.617	745	0.840
480	5.235	615	22.132	750	0.719
485	5.717	620	21.351	755	0.612
490	6.367	625	20.384	760	0.527
495	7.105	630	19.139	765	0.446
500	8.004	635	17.828	770	0.383
505	8.769	640	16.425	775	0.328
510	9.421	645	15.030	780	0.050



REPORT NUMBER: RAB03663
 DATE: 7/27/2017
 PREPARED FOR: RAB LIGHTING INC. RC LIGHTING
 CATALOG NUMBER: BLEDR12Y-180, BLEDR12Y-180/D10, BDLEDR12Y-180, BDLEDR12Y-180/D10
 (42" ROUND BOLLARD)

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CIE Chromaticity Diagram

