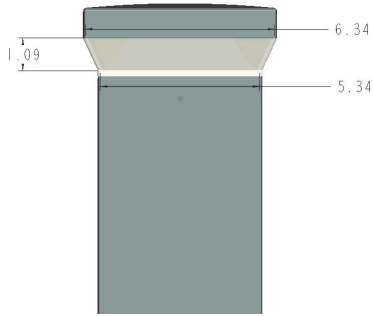


ISOFOOTCANDLE LINES OF HORIZONTAL ILLUMINATION

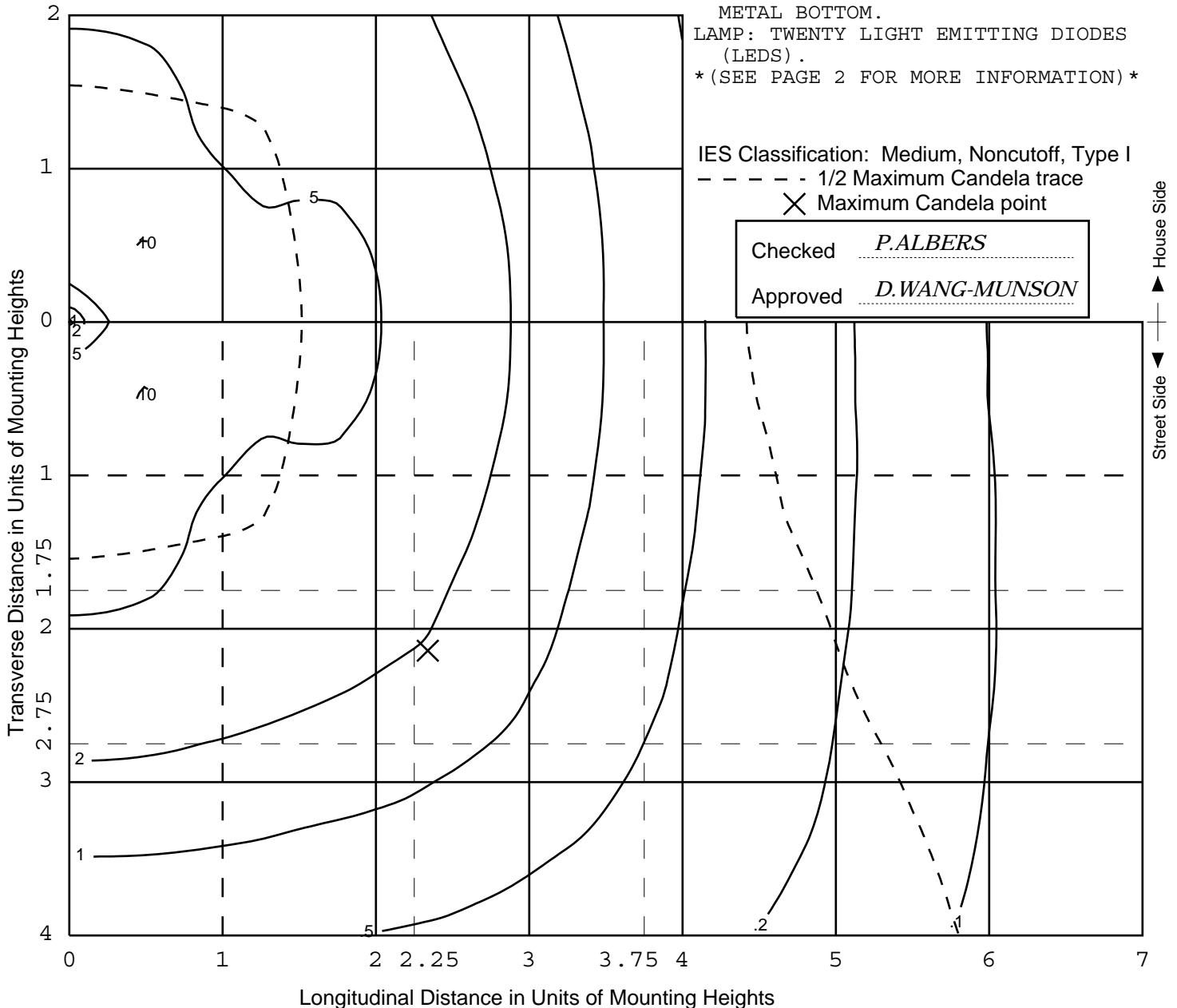
Values based on 3.5 foot mounting height.



REPORT NUMBER: RAB03688
 ISSUE DATE: 08/11/17 PAGE: 1 OF 9
 DATE SAMPLE TESTED: 08/11/17
 CATALOG NUMBER: BLED24, BLED24/D10 (42" SQUARE BOLLARD)
 LUMINAIRE: EXTRUDED BROWN PAINTED SQUARE METAL LOWER HOUSING, CAST METAL TOP, CAST FINNED METAL HEAT SINK WITH WHITE PAINTED INTERIOR, MOLDED SPECULAR FINISHED PLASTIC REFLECTOR WITH WHITE CORNER DIVIDERS CREATING 4 OPTICAL COMPARTMENTS, EACH OPTICAL COMPARTMENT CONTAINS 1 WHITE CIRCUIT BOARD WITH 5 LEDS, FROSTED PLASTIC LENS, CAST BROWN PAINTED METAL BOTTOM.
 LAMP: TWENTY LIGHT EMITTING DIODES (LEDS).
 (SEE PAGE 2 FOR MORE INFORMATION)

IES Classification: Medium, Noncutoff, Type I

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



REPORT NUMBER: RAB03688

PAGE: 2 OF 9

ISSUE DATE: 08/11/17

DATE SAMPLE TESTED: 08/11/17

CATALOG NUMBER: BLED24, BLED24/D10 (42" SQUARE BOLLARD)

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 = 22.925 W AT 277.0 VAC.

LED DRIVER: RDF25U7-39

TEST PROCEDURE: IESNA LM-79-08

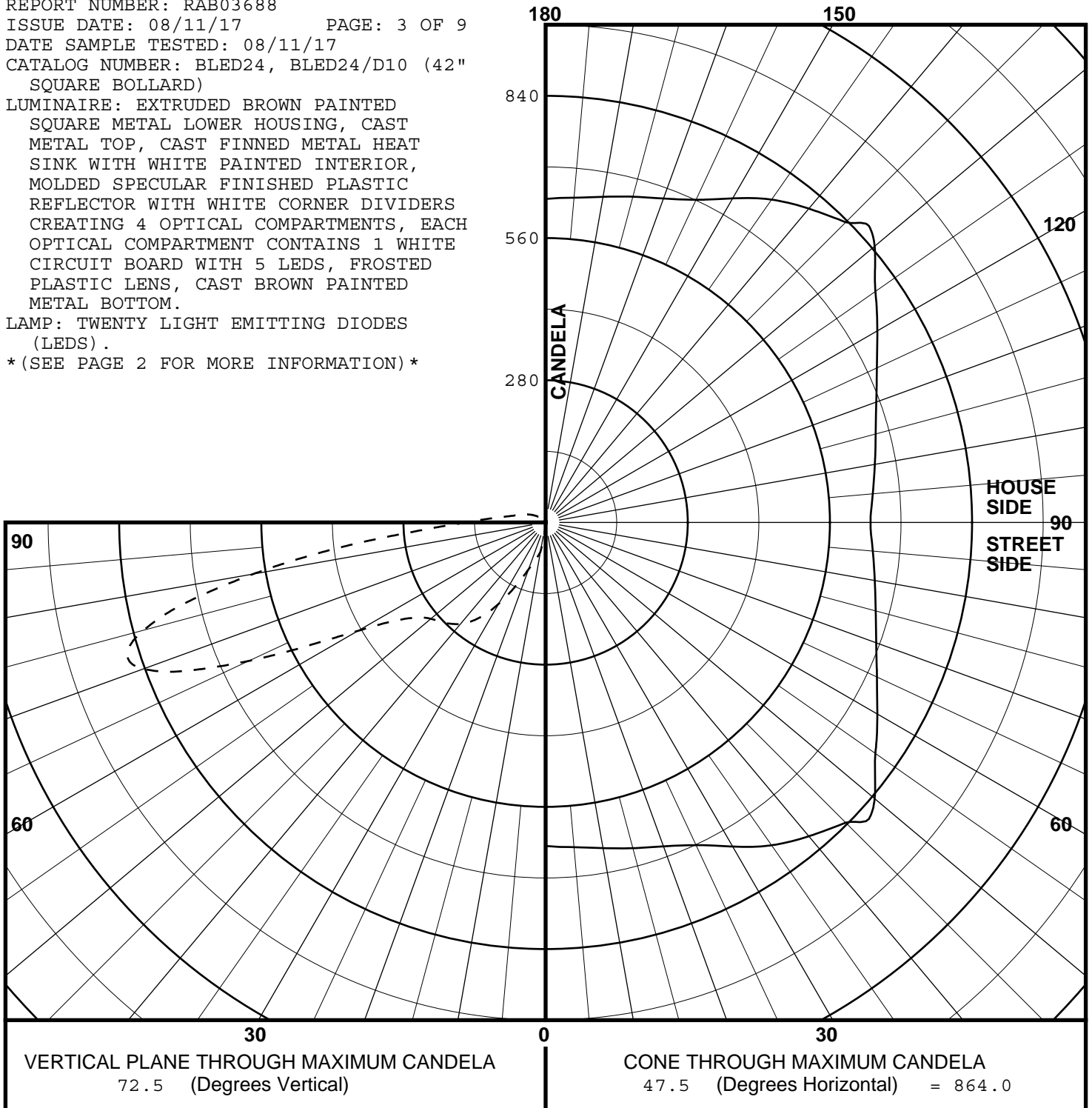
LM-80 DATA AVAILABLE FROM MANUFACTURER FOR SOLID STATE SOURCE

AMBIENT: 24.2

ACCREDITED LABORATORY CODE 201058-0

MAXIMUM PLANE AND MAXIMUM CONE PLOTS OF CANDELA

REPORT NUMBER: RAB03688
 ISSUE DATE: 08/11/17 PAGE: 3 OF 9
 DATE SAMPLE TESTED: 08/11/17
 CATALOG NUMBER: BLED24, BLED24/D10 (42" SQUARE BOLLARD)
 LUMINAIRE: EXTRUDED BROWN PAINTED SQUARE METAL LOWER HOUSING, CAST METAL TOP, CAST FINNED METAL HEAT SINK WITH WHITE PAINTED INTERIOR, MOLDED SPECULAR FINISHED PLASTIC REFLECTOR WITH WHITE CORNER DIVIDERS CREATING 4 OPTICAL COMPARTMENTS, EACH OPTICAL COMPARTMENT CONTAINS 1 WHITE CIRCUIT BOARD WITH 5 LEDS, FROSTED PLASTIC LENS, CAST BROWN PAINTED METAL BOTTOM.
 LAMP: TWENTY LIGHT EMITTING DIODES (LEDs).
 (SEE PAGE 2 FOR MORE INFORMATION)



REPORT NUMBER: RAB03688

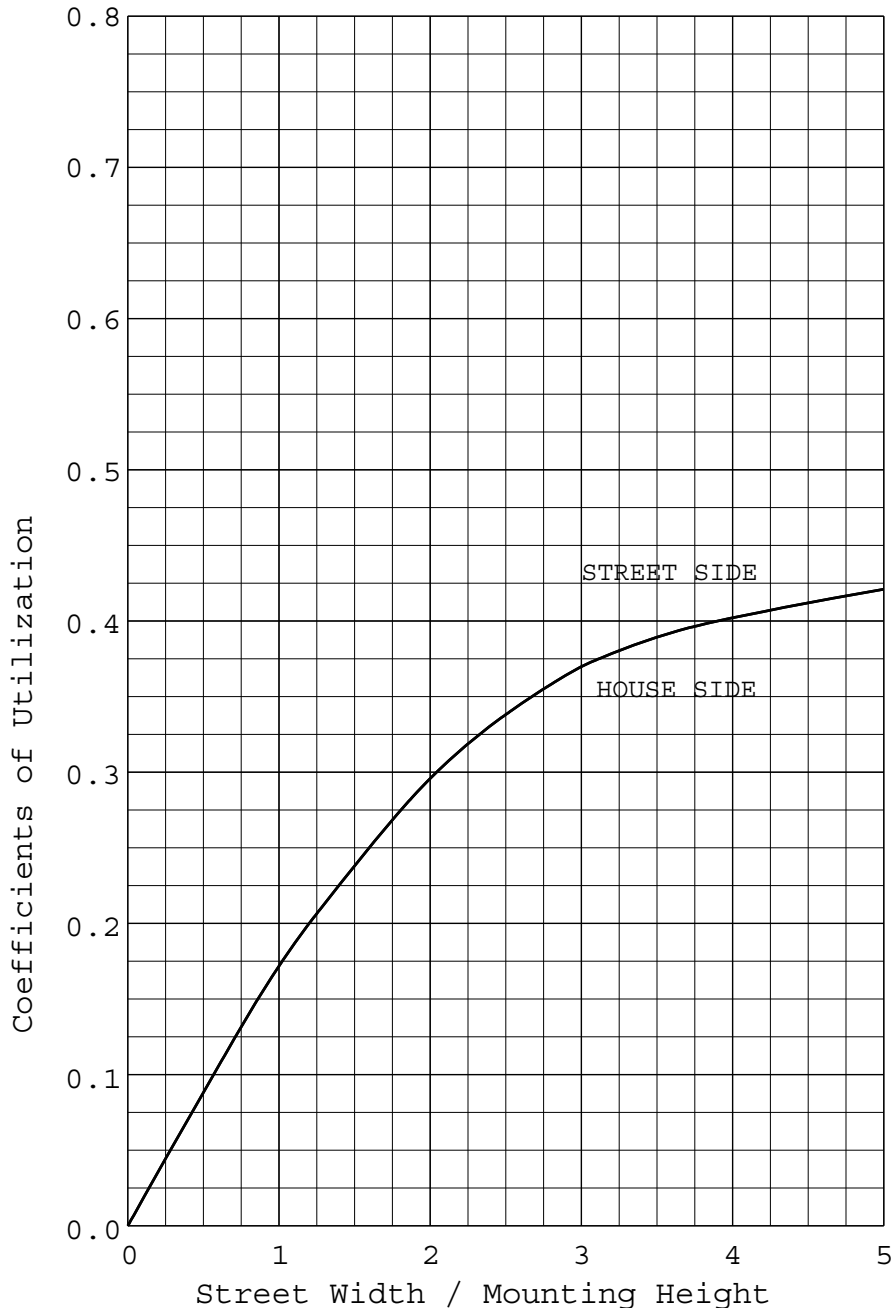
PAGE: 4 OF 9

ISSUE DATE: 08/11/17

DATE SAMPLE TESTED: 08/11/17

CATALOG NUMBER: BLED24, BLED24/D10 (42" SQUARE BOLLARD)

COEFFICIENTS OF UTILIZATION AND FLUX DISTRIBUTION



	LUMENS	PERCENT OF FIXTURE
DOWNWARD STREET SIDE	1160.	45.8
DOWNWARD HOUSE SIDE	1160.	45.8
DOWNWARD TOTAL	2320.	91.6
UPWARD STREET SIDE	106.	4.2
UPWARD HOUSE SIDE	106.	4.2
UPWARD TOTAL	213.	8.4
TOTAL FLUX	2533.	100.0
TOTAL INPUT WATTS = 22.9		
EFFICACY = 110.6 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: RAB03688

ISSUE DATE: 08/11/17

PAGE: 5 OF 9

DATE SAMPLE TESTED: 08/11/17

CATALOG NUMBER: BLED24, BLED24/D10 (42" SQUARE BOLLARD)

BUG Rating:

B2 U3 G2

Zonal Summary

Lumens

% of Fixture

Zone Ratings

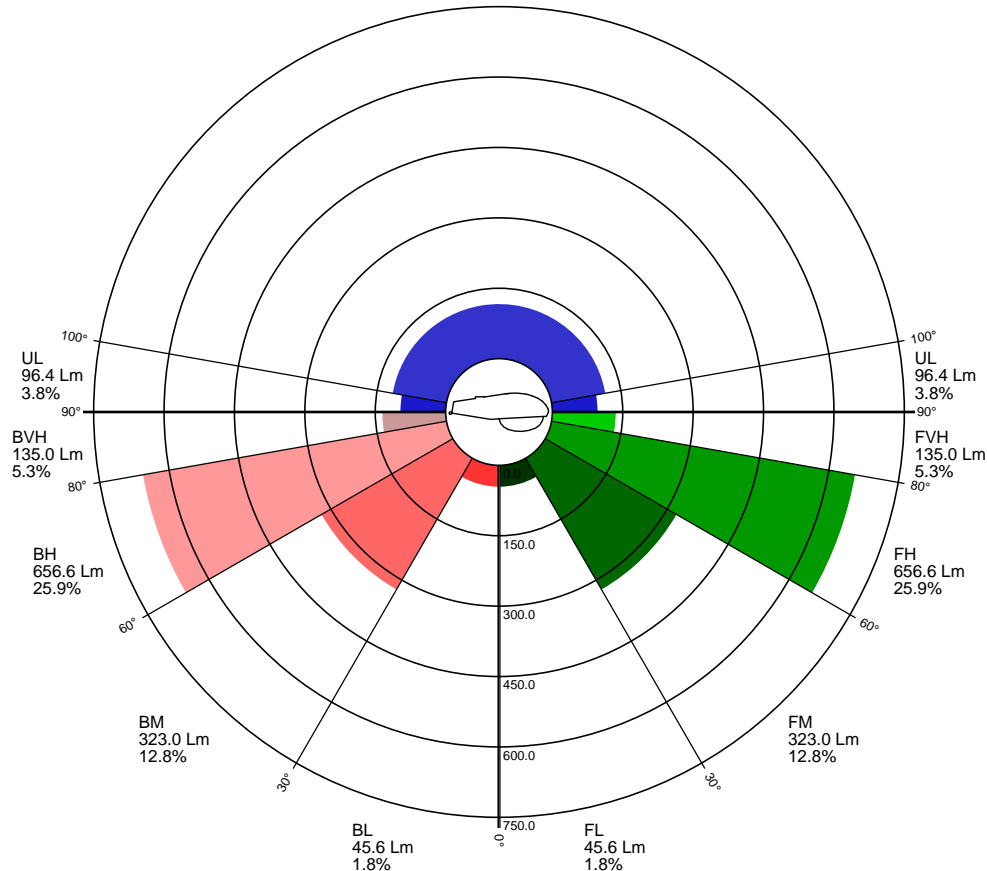
B U G

Forward		1160	45.8			
FL	(0° - 30°)	45.6	1.8			
FM	(30° - 60°)	323.0	12.8			
FH	(60° - 80°)	656.6	25.9			G0
FVH	(80° - 90°)	135.0	5.3			G2
Backward		1160	45.8			
BL	(0° - 30°)	45.6	1.8	B0		
BM	(30° - 60°)	323.0	12.8	B1		
BH	(60° - 80°)	656.6	25.9	B2		G0
BVH	(80° - 90°)	135.0	5.3			G2
Upward		213	8.4			
UL	(90° - 100°)	96.4	3.8		U3	
UH	(100° - 180°)	116.3	4.6		U3	
Trapped Light		0	0.0			
Total Flux		2533	100.0			

Zonal Lumen Summary

(Linear scale)

UH
116.3 Lm
4.6%



REPORT NUMBER: RAB03688

ISSUE DATE: 08/11/17

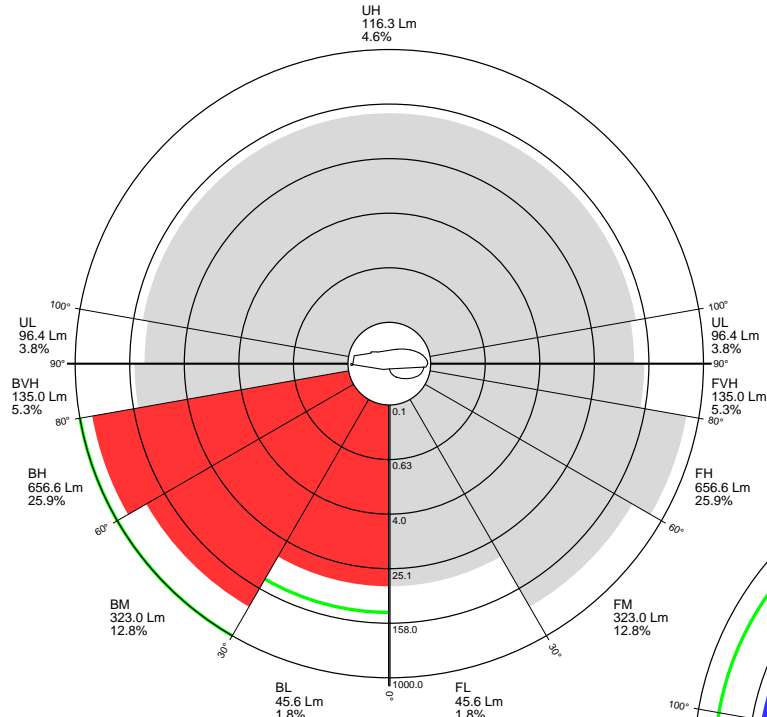
PAGE: 6 OF 9

DATE SAMPLE TESTED: 08/11/17

CATALOG NUMBER: BLED24, BLED24/D10 (42" SQUARE BOLLARD)

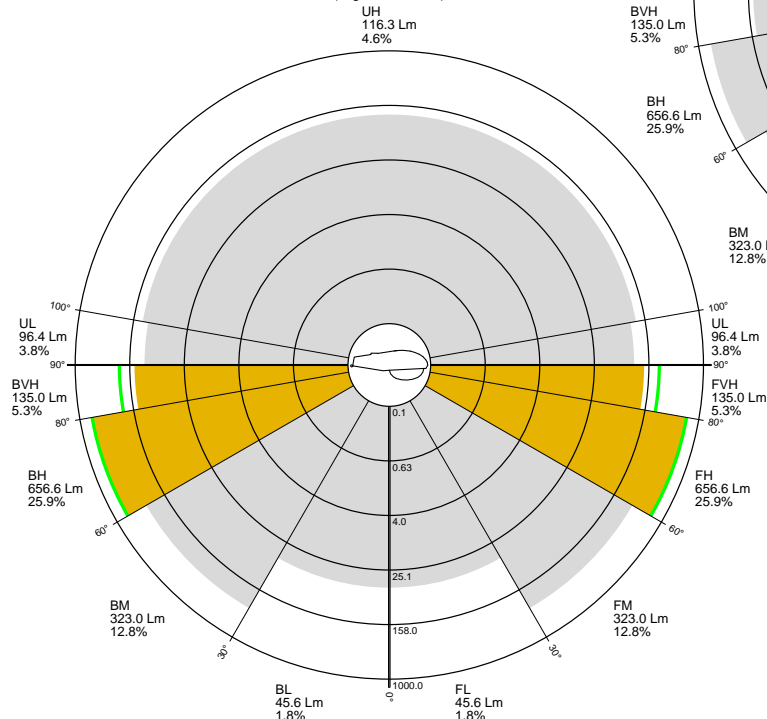
Backlight Rating Details

(Logarithmic scale)



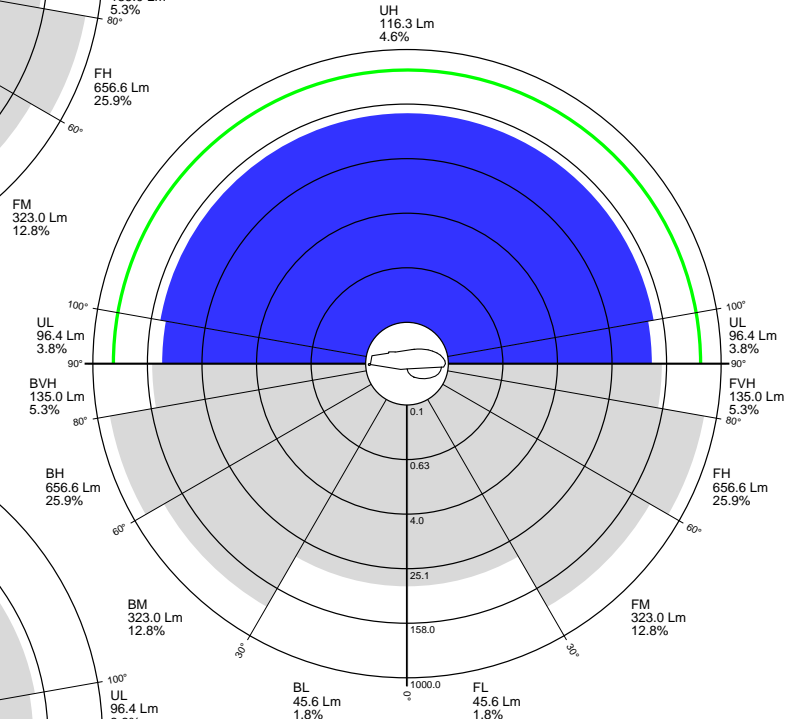
Glare Rating Details

(Logarithmic scale)



Uplight Rating Details

(Logarithmic scale)



REPORT NUMBER: RAB03688

PAGE: 7 OF 9

ISSUE DATE: 08/11/17

DATE SAMPLE TESTED: 08/11/17

CATALOG NUMBER: BLED24, BLED24/D10 (42" SQUARE BOLLARD)

CANDELA TABULATION

	STREET SIDE	LATERAL ANGLE										
		0.0	5.0	15.0	25.0	35.0	45.0	47.5	55.0	65.0	75.0	85.0
	180.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	175.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	165.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	155.0	1.	1.	1.	0.	0.	0.	0.	0.	1.	1.	1.
	145.0	5.	5.	5.	4.	3.	2.	2.	2.	3.	4.	5.
	135.0	12.	12.	12.	11.	10.	9.	9.	9.	10.	11.	11.
	125.0	22.	22.	21.	21.	22.	22.	22.	21.	20.	20.	20.
	115.0	31.	31.	32.	35.	37.	38.	37.	36.	33.	29.	29.
	105.0	42.	42.	46.	53.	57.	58.	57.	56.	50.	43.	38.
	95.0	64.	65.	78.	93.	103.	105.	101.	100.	87.	71.	57.
	90.0	90.	94.	116.	144.	164.	168.	158.	157.	133.	105.	82.
	87.5	114.	119.	147.	187.	219.	228.	213.	210.	171.	133.	104.
	85.0	152.	158.	192.	248.	304.	321.	305.	293.	229.	174.	139.
V	82.5	216.	222.	261.	334.	415.	449.	440.	405.	316.	244.	201.
E	80.0	310.	317.	358.	440.	548.	595.	585.	541.	428.	348.	300.
R	77.5	427.	434.	475.	556.	669.	725.	722.	666.	552.	470.	426.
T	75.0	547.	552.	585.	647.	749.	810.	820.	753.	652.	586.	551.
I	72.5<<	637.	642.	664.	701.	776.	836.	864.	793.	720.	673.	647.
C	70.0	691.	693.	705.	720.	753.	798.	843.	787.	757.	731.	712.
A	67.5	708.	709.	713.	701.	690.	707.	763.	734.	755.	757.	749.
L	65.0	686.	687.	681.	650.	603.	593.	645.	643.	704.	737.	743.
	62.5	627.	626.	614.	571.	511.	483.	523.	534.	615.	667.	685.
A	60.0	542.	545.	531.	487.	434.	402.	427.	436.	507.	566.	587.
N	57.5	447.	451.	439.	412.	372.	353.	365.	365.	408.	453.	470.
G	55.0	364.	366.	362.	350.	334.	322.	329.	322.	337.	355.	368.
L	52.5	297.	303.	304.	308.	308.	303.	307.	298.	294.	290.	291.
E	50.0	255.	258.	265.	280.	292.	293.	295.	284.	269.	253.	245.
	47.5	228.	231.	242.	262.	281.	285.	287.	275.	255.	234.	222.
	45.0	213.	215.	227.	249.	272.	279.	280.	268.	246.	223.	211.
	42.5	203.	206.	217.	238.	262.	270.	271.	260.	237.	216.	205.
	40.0	197.	199.	209.	228.	250.	260.	261.	251.	229.	210.	200.
	37.5	193.	194.	202.	217.	237.	246.	247.	239.	220.	205.	197.
	35.0	187.	188.	194.	206.	220.	228.	230.	223.	210.	198.	192.
	30.0	170.	171.	174.	177.	181.	183.	185.	183.	181.	179.	176.
	25.0	141.	141.	141.	139.	136.	135.	136.	138.	142.	145.	144.
	20.0	104.	104.	105.	102.	100.	99.	98.	100.	103.	105.	105.
	15.0	72.	73.	77.	77.	75.	75.	75.	76.	76.	76.	72.
	10.0	47.	48.	51.	55.	57.	58.	57.	57.	54.	50.	46.
	5.0	24.	23.	19.	17.	15.	15.	14.	15.	17.	19.	24.
	0.0	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.

||
PLANE OF MAXIMUM CANDELA

CONE OF MAXIMUM CANDELA

REPORT NUMBER: RAB03688

PAGE: 8 OF 9

ISSUE DATE: 08/11/17

DATE SAMPLE TESTED: 08/11/17

CATALOG NUMBER: BLED24, BLED24/D10 (42" SQUARE BOLLARD)

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	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	175.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	165.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	155.0	1.	1.	1.	1.	0.	0.	0.	0.	1.	1.
	145.0	5.	5.	4.	3.	2.	2.	3.	4.	5.	5.
	135.0	12.	11.	11.	10.	9.	9.	10.	11.	12.	12.
	125.0	20.	20.	20.	20.	21.	22.	22.	21.	21.	22.
	115.0	29.	29.	29.	33.	36.	38.	37.	35.	32.	31.
	105.0	38.	38.	43.	50.	56.	58.	57.	53.	46.	42.
	95.0	56.	57.	71.	87.	100.	105.	103.	93.	78.	65.
	90.0	78.	82.	105.	133.	157.	168.	164.	144.	116.	94.
	87.5	100.	104.	133.	171.	210.	228.	219.	187.	147.	119.
	85.0	134.	139.	174.	229.	293.	321.	304.	248.	192.	158.
V	82.5	196.	201.	244.	316.	405.	449.	415.	334.	261.	222.
E	80.0	294.	300.	348.	428.	541.	595.	548.	440.	358.	317.
R	77.5	419.	426.	470.	552.	666.	725.	669.	556.	475.	434.
T	75.0	543.	551.	586.	652.	753.	810.	749.	647.	585.	552.
I	72.5<<	640.	647.	673.	720.	793.	836.	776.	701.	664.	642.
C	70.0	708.	712.	731.	757.	787.	798.	753.	720.	705.	693.
A	67.5	744.	749.	757.	755.	734.	707.	690.	701.	713.	709.
L	65.0	741.	743.	737.	704.	643.	593.	603.	650.	681.	687.
	62.5	685.	685.	667.	615.	534.	483.	511.	571.	614.	626.
A	60.0	588.	587.	566.	507.	436.	402.	434.	487.	531.	545.
N	57.5	470.	470.	453.	408.	365.	353.	372.	412.	439.	451.
G	55.0	366.	368.	355.	337.	322.	322.	334.	350.	362.	366.
L	52.5	288.	291.	290.	294.	298.	303.	308.	308.	304.	303.
E	50.0	242.	245.	253.	269.	284.	293.	292.	280.	265.	258.
	47.5	220.	222.	234.	255.	275.	285.	281.	262.	242.	231.
	45.0	208.	211.	223.	246.	268.	279.	272.	249.	227.	215.
	42.5	202.	205.	216.	237.	260.	270.	262.	238.	217.	206.
	40.0	198.	200.	210.	229.	251.	260.	250.	228.	209.	199.
	37.5	194.	197.	205.	220.	239.	246.	237.	217.	202.	194.
	35.0	190.	192.	198.	210.	223.	228.	220.	206.	194.	188.
	30.0	174.	176.	179.	181.	183.	183.	181.	177.	174.	171.
	25.0	143.	144.	145.	142.	138.	135.	136.	139.	141.	141.
	20.0	103.	105.	105.	103.	100.	99.	100.	102.	105.	104.
	15.0	70.	72.	76.	76.	76.	75.	75.	77.	77.	73.
	10.0	44.	46.	50.	54.	57.	58.	57.	55.	51.	48.
	5.0	24.	24.	19.	17.	15.	15.	15.	17.	19.	23.
	0.0	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.

CONE OF MAXIMUM CANDELA

REPORT NUMBER: RAB03688

ISSUE DATE: 08/11/17

PREPARED FOR: RAB LIGHTING INC. RC LIGHTING

PAGE: 9 OF 9

DATE SAMPLE TESTED: 08/11/17

5-DEGREE ZONAL LUMEN SUMMARY

0- 5	0
5- 10	3
10- 15	8
15- 20	15
20- 25	25
25- 30	41
30- 35	57
35- 40	72
40- 45	87
45- 50	103
50- 55	132
55- 60	194
60- 65	287
65- 70	363
70- 75	370
75- 80	293
80- 85	175
85- 90	95
90- 95	57
95-100	39
100-105	30
105-110	23
110-115	19
115-120	15
120-125	11
125-130	8
130-135	5
135-140	3
140-145	2
145-150	1
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	3
0- 20	25
0- 30	91
0- 40	221
0- 50	411
0- 60	737
0- 70	1387
0- 80	2050
0- 90	2320
0-100	2417
0-110	2470
0-120	2503
0-130	2522
0-140	2530
0-150	2533
0-160	2533
0-170	2533
0-180	2533

REPORT NUMBER: RAB03656
DATE: 7/25/2017
PREPARED FOR: RAB LIGHTING INC. RC LIGHTING
CATALOG NUMBER: BLED24, BLED24/D10 (42" SQUARE BOLLARD)

ADDRESS: 170 LUDLOW AVE, NORTHVALE, NJ 07647

LUMINAIRE: EXTRUDED BROWN PAINTED SQUARE METAL LOWER HOUSING, CAST METAL TOP, CAST FINNED METAL HEAT SINK WITH WHITE PAINTED INTERIOR, MOLDED SPECULAR FINISHED PLASTIC REFLECTOR WITH WHITE CORNER DIVIDERS CREATING 4 OPTICAL COMPARTMENTS, EACH OPTICAL COMPARTMENT CONTAINS 1 WHITE CIRCUIT BOARD WITH 5 LEDS, FROSTED PLASTIC LENS, CAST BROWN PAINTED METAL BOTTOM.

LAMP: TWENTY LIGHT EMITTING DIODES (LEDs).

DRIVER: RDF25U7-39

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 (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 (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: RAB03656
 DATE: 7/25/2017
 PREPARED FOR: RAB LIGHTING INC. RC LIGHTING
 CATALOG NUMBER: BLED24, BLED24/D10 (42" SQUARE BOLLARD)

Page 2 of 4

RESULTS:

PHOTOMETRIC	
Total Integrated Flux (lumens)	2533 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.3390
Chromaticity Ordinate y	0.3468
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2092
Chromaticity Ordinate v'	0.4814
Correlated Color Temp CCT (K)	5227
ANSI C78.377-2008 Duv	0.000
Total Radiant Flux (milliWatts)	7670 *
ELECTRICAL	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.090
Input Power (Watts)	22.9
Input Power Factor (%)	91.7
Input Current THD (%)	11.4
Input Voltage THD (%)	0.2
EFFICACY (Lumens/Watt)	
	110.6
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.188
Input Power (Watts)	22.2
Input Power Factor (%)	98.7
Input Current THD (%)	12.5
Input Voltage THD (%)	0.2
Off-State Power (Watts)	0.0

COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	74
R1 Light greyish red	72
R2 Dark greyish yellow	79
R3 Strong yellowish green	82
R4 Moderate yellowish green	75
R5 Light bluish green	73
R6 Light blue	71
R7 Light violet	83
R8 Light reddish purple	60
R9 Strong red	-20
R10 Strong yellow	49
R11 Strong green	71
R12 Strong blue	43
R13 Light yellowish pink (skin)	74
R14 Moderate olive green (leaf)	90

*NOTE:

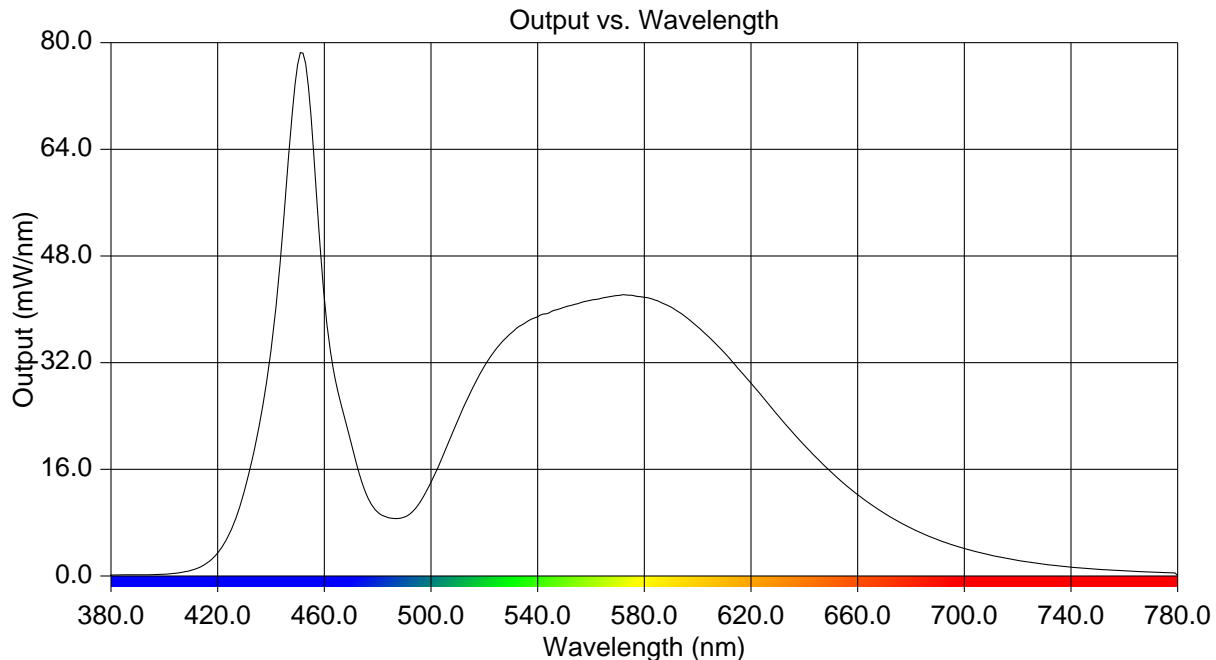
Proper calibration of integrating spheres for measuring total flux output of non-directional samples will produce reliable, repeatable results within the calibration tolerances of the equipment used. However, measurement of test samples with significant self absorption and/or directional output, even 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: RAB03656
 DATE: 7/25/2017
 PREPARED FOR: RAB LIGHTING INC. RC LIGHTING
 CATALOG NUMBER: BLED24, BLED24/D10 (42" SQUARE BOLLARD)

Page 3 of 4

RESULTS:

Wavelength	mW per nm	Wavelength	mW per nm	Wavelength	mW per nm
380	0.141	515	27.679	650	15.612
385	0.154	520	31.459	655	13.821
390	0.165	525	34.369	660	12.212
395	0.198	530	36.378	665	10.711
400	0.282	535	37.877	670	9.417
405	0.443	540	38.882	675	8.221
410	0.821	545	39.639	680	7.186
415	1.688	550	40.314	685	6.249
420	3.449	555	40.839	690	5.454
425	6.883	560	41.374	695	4.735
430	12.770	565	41.780	700	4.118
435	21.179	570	42.082	705	3.579
440	33.928	575	42.123	710	3.109
445	54.726	580	41.826	715	2.699
450	76.757	585	41.282	720	2.343
455	69.058	590	40.329	725	2.033
460	41.613	595	39.012	730	1.769
465	27.813	600	37.359	735	1.532
470	20.031	605	35.544	740	1.333
475	13.006	610	33.532	745	1.163
480	9.564	615	31.196	750	1.012
485	8.677	620	28.891	755	0.878
490	8.836	625	26.592	760	0.762
495	10.555	630	24.116	765	0.669
500	14.030	635	21.828	770	0.584
505	18.475	640	19.618	775	0.516
510	23.327	645	17.563	780	0.078



REPORT NUMBER: RAB03656
DATE: 7/25/2017
PREPARED FOR: RAB LIGHTING INC. RC LIGHTING
CATALOG NUMBER: BLED24, BLED24/D10 (42" SQUARE BOLLARD)

Page 4 of 4

CIE Chromaticity Diagram

