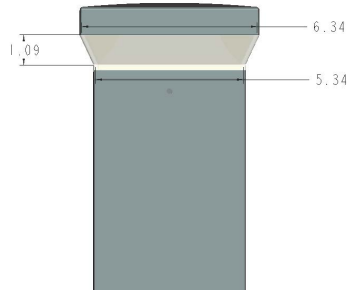


## ISOFOOTCANDLE LINES OF HORIZONTAL ILLUMINATION

Values based on 3.5 foot mounting height.



REPORT NUMBER: RAB03644  
 ISSUE DATE: 07/21/17 PAGE: 1 OF 9  
 DATE SAMPLE TESTED: 07/21/17  
 PREPARED FOR: RAB LIGHTING INC. RC LIGHTING  
 CATALOG NUMBER: BLED24Y, BLED24Y/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.

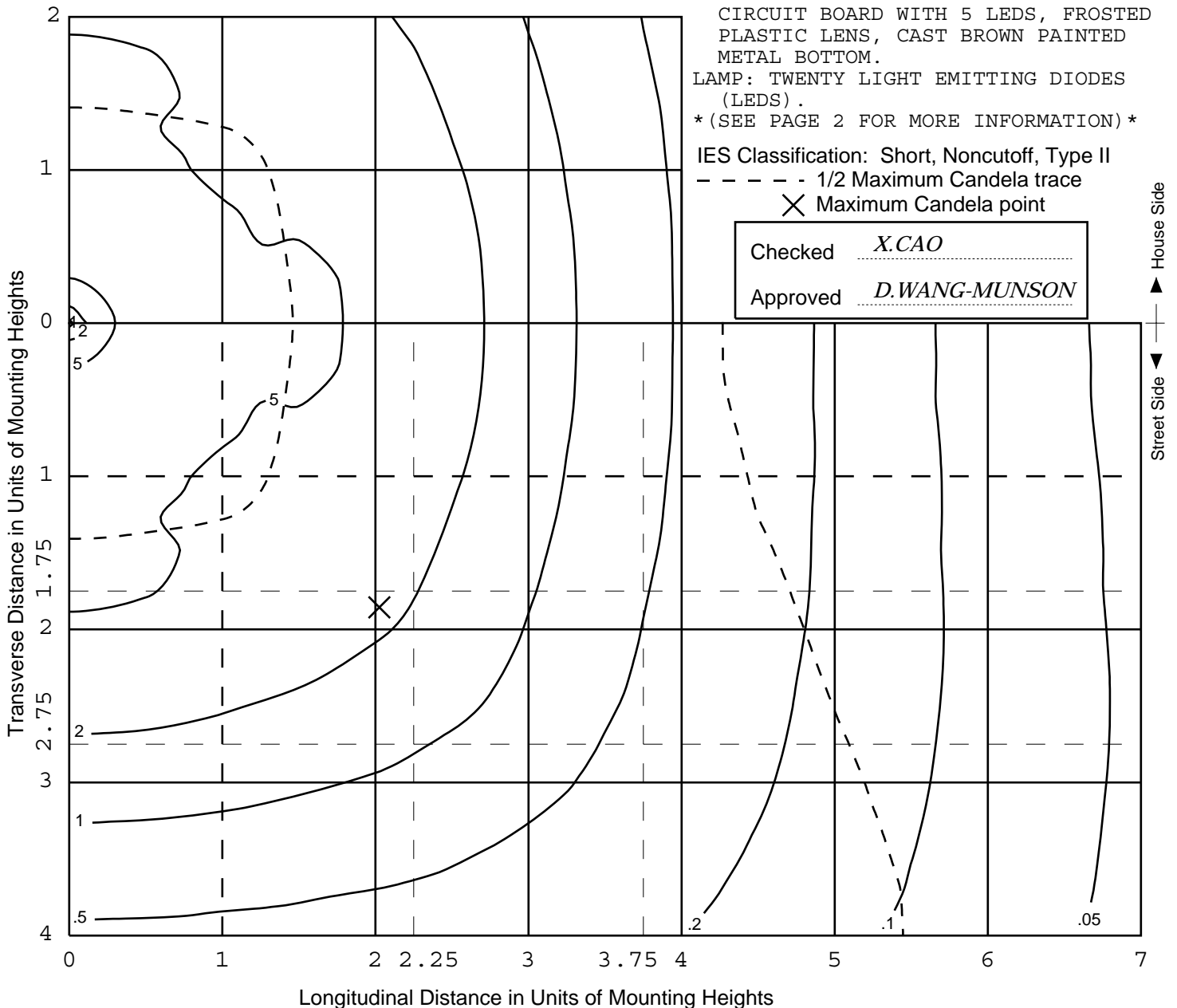
LAMP: TWENTY LIGHT EMITTING DIODES (LEDs).

\*(SEE PAGE 2 FOR MORE INFORMATION)\*

IES Classification: Short, Noncutoff, Type II

--- 1/2 Maximum Candela trace

X Maximum Candela point



REPORT NUMBER: RAB03644

PAGE: 2 OF 9

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DATE SAMPLE TESTED: 07/21/17

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 = 22.538 W AT 277.0 VAC.

LED DRIVER: RDF25U7-39

TEST PROCEDURE: IESNA LM-79-08

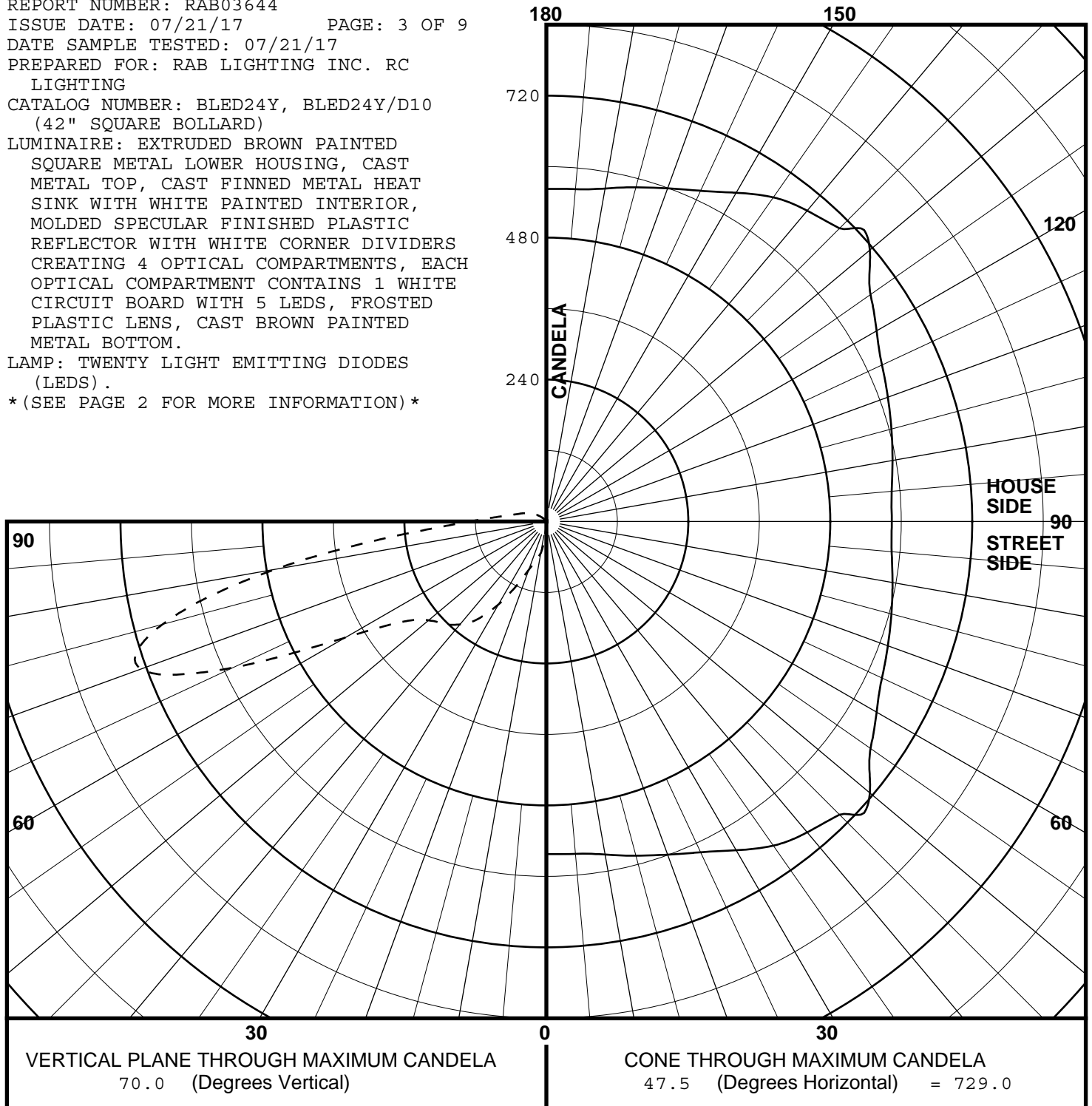
LM-80 DATA AVAILABLE FROM MANUFACTURER FOR SOLID STATE SOURCE

AMBIENT: 24.4

ACCREDITED LABORATORY CODE 201058-0

## MAXIMUM PLANE AND MAXIMUM CONE PLOTS OF CANDELA

REPORT NUMBER: RAB03644  
 ISSUE DATE: 07/21/17 PAGE: 3 OF 9  
 DATE SAMPLE TESTED: 07/21/17  
 PREPARED FOR: RAB LIGHTING INC. RC  
 LIGHTING  
 CATALOG NUMBER: BLED24Y, BLED24Y/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: RAB03644

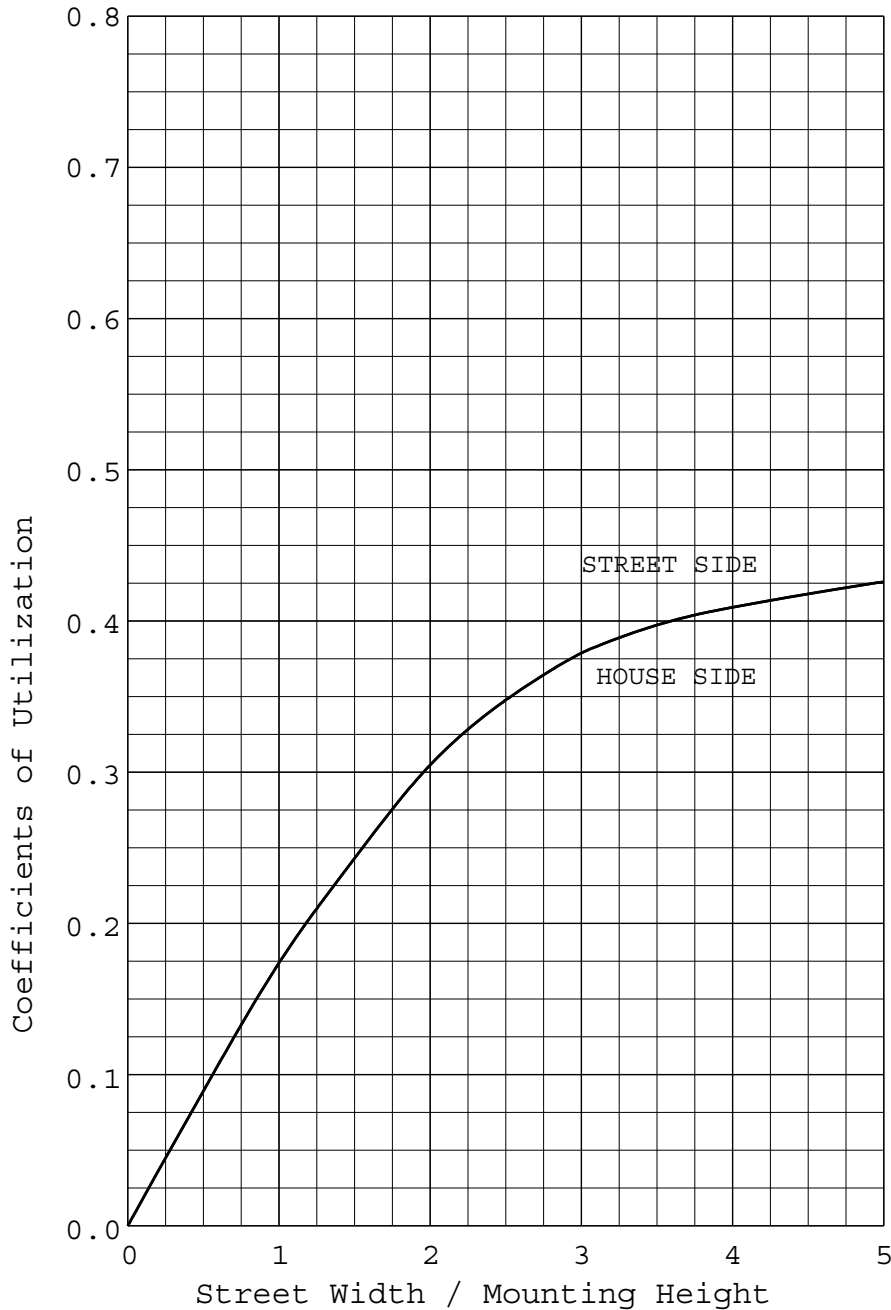
PAGE: 4 OF 9

ISSUE DATE: 07/21/17

DATE SAMPLE TESTED: 07/21/17

PREPARED FOR: RAB LIGHTING INC. RC LIGHTING

# COEFFICIENTS OF UTILIZATION AND FLUX DISTRIBUTION



	LUMENS	PERCENT OF FIXTURE
DOWNWARD STREET SIDE	993.	45.9
DOWNWARD HOUSE SIDE	993.	45.9
DOWNWARD TOTAL	1986.	91.8
UPWARD STREET SIDE	88.	4.1
UPWARD HOUSE SIDE	88.	4.1
UPWARD TOTAL	177.	8.2
TOTAL FLUX	2163.	100.0

TOTAL INPUT WATTS = 22.5  
EFFICACY = 96.1 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: RAB03644

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PREPARED FOR: RAB LIGHTING INC. RC LIGHTING

PAGE: 5 OF 9

DATE SAMPLE TESTED: 07/21/17

BUG Rating:

Zonal Summary

Lumens

% of Fixture

B2 U3 G2

Zone Ratings

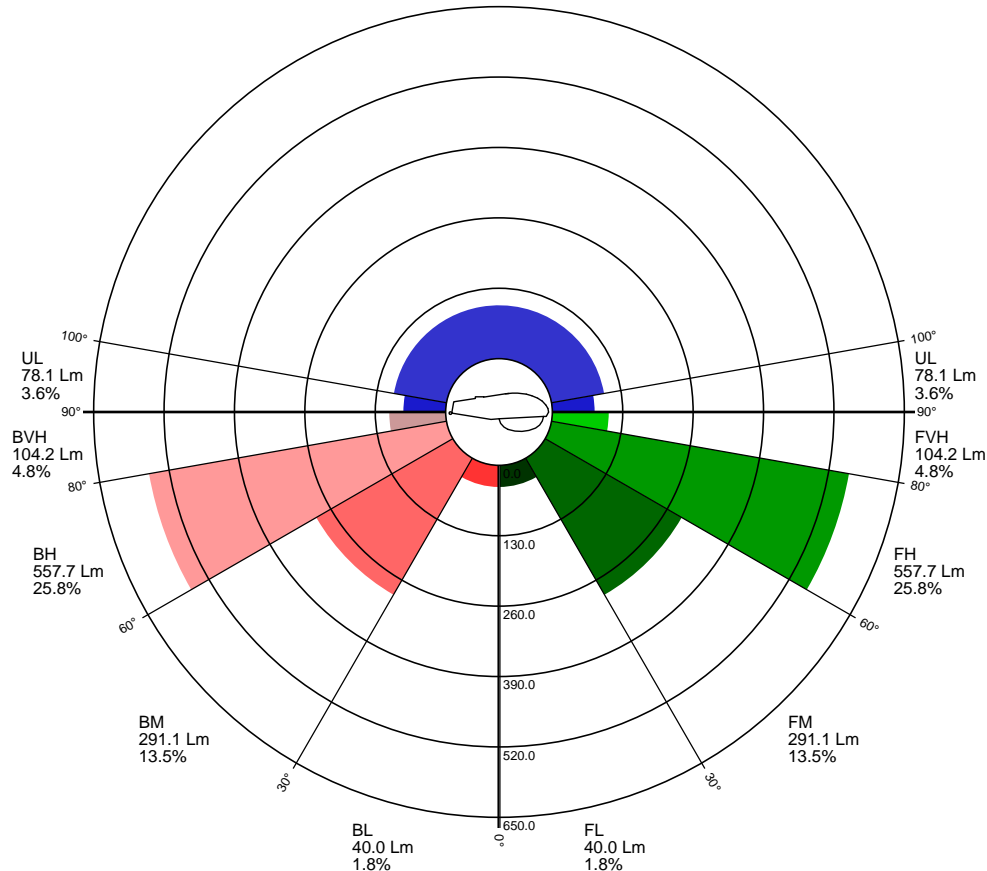
B U G

Forward		993	45.9			
FL	(0° - 30°)	40.0	1.8			
FM	(30° - 60°)	291.1	13.5			
FH	(60° - 80°)	557.7	25.8			G0
FVH	(80° - 90°)	104.2	4.8			G2
Backward		993	45.9			
BL	(0° - 30°)	40.0	1.8	B0		
BM	(30° - 60°)	291.1	13.5	B1		
BH	(60° - 80°)	557.7	25.8	B2		G0
BVH	(80° - 90°)	104.2	4.8			G2
Upward		177	8.2			
UL	(90° - 100°)	78.1	3.6		U3	
UH	(100° - 180°)	98.5	4.6		U3	
Trapped Light		0	0.0			
Total Flux		2163	100.0			

### Zonal Lumen Summary

(Linear scale)

UH  
98.5 Lm  
4.6%



REPORT NUMBER: RAB03644

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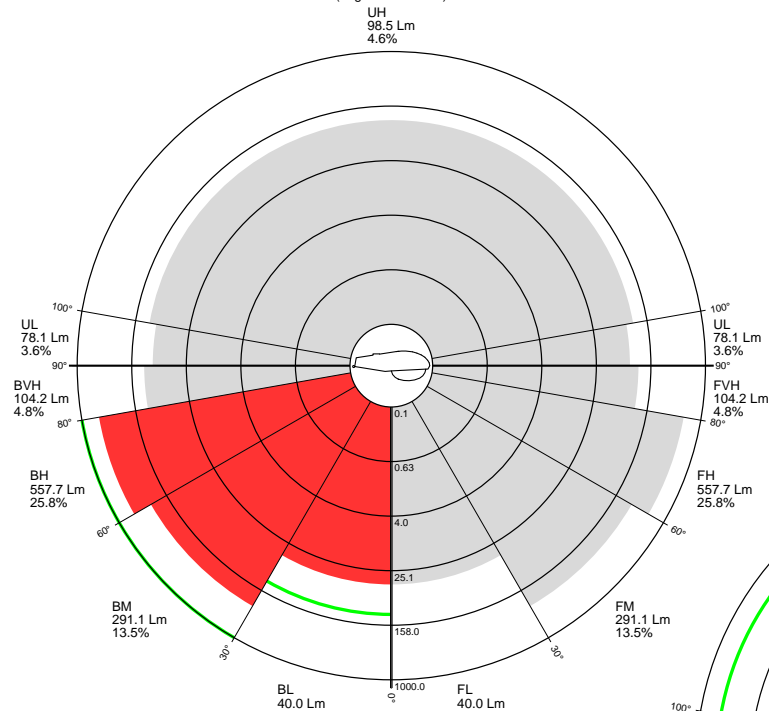
PREPARED FOR: RAB LIGHTING INC. RC LIGHTING

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DATE SAMPLE TESTED: 07/21/17

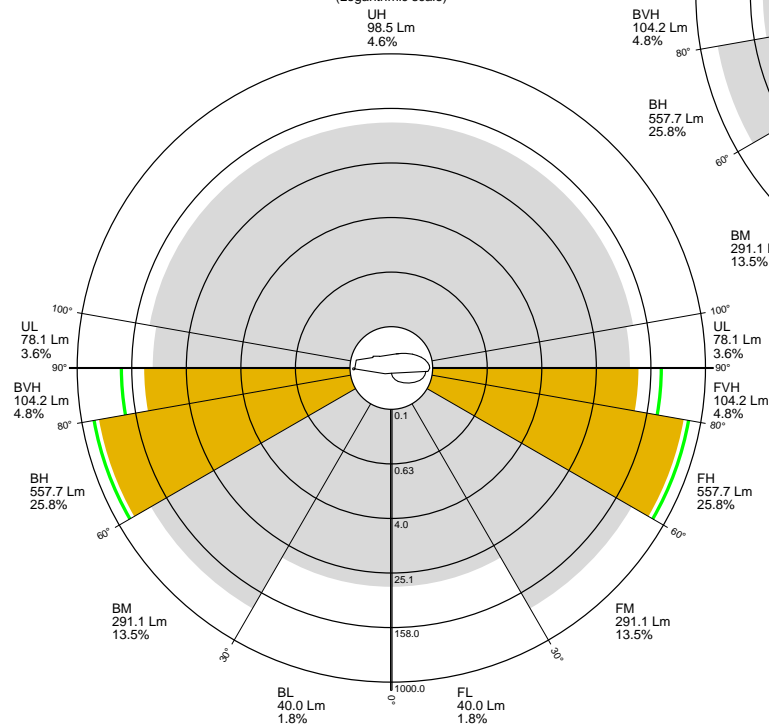
### Backlight Rating Details

(Logarithmic scale)



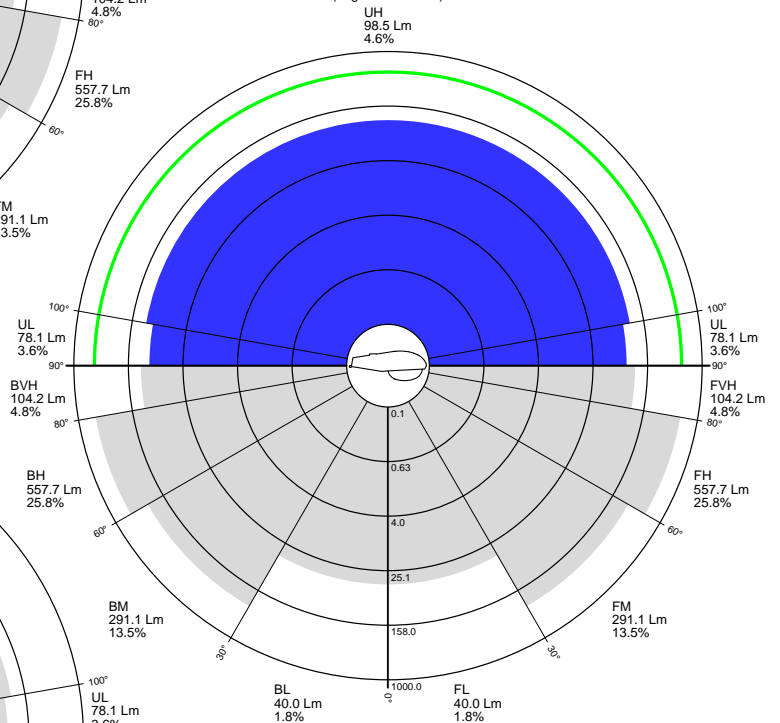
### Glare Rating Details

(Logarithmic scale)



### Uplight Rating Details

(Logarithmic scale)



REPORT NUMBER: RAB03644

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DATE SAMPLE TESTED: 07/21/17

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	47.5	55.0	65.0	75.0	85.0
	180.0	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
	175.0	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
	165.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	1.
	155.0	1.	1.	1.	1.	0.	0.	0.	0.	1.	1.	1.
	145.0	4.	4.	4.	3.	2.	2.	2.	2.	3.	4.	4.
	135.0	10.	10.	9.	8.	8.	8.	8.	8.	8.	9.	10.
	125.0	18.	18.	17.	17.	18.	18.	19.	18.	17.	17.	18.
	115.0	26.	26.	26.	28.	31.	32.	33.	31.	29.	26.	26.
	105.0	34.	34.	37.	43.	47.	48.	49.	47.	43.	37.	34.
	95.0	49.	49.	61.	73.	82.	85.	85.	82.	73.	61.	51.
	90.0	64.	68.	85.	108.	125.	130.	129.	126.	112.	90.	71.
	87.5	81.	84.	107.	139.	166.	173.	170.	166.	143.	113.	90.
	85.0	107.	109.	136.	183.	226.	245.	239.	228.	187.	144.	116.
V	82.5	151.	154.	184.	248.	315.	351.	343.	321.	256.	196.	161.
E	80.0	222.	224.	258.	334.	421.	471.	466.	427.	344.	273.	234.
R	77.5	321.	321.	355.	430.	525.	582.	582.	540.	450.	377.	336.
T	75.0	420.	420.	451.	514.	607.	666.	672.	623.	536.	480.	446.
I	72.5	504.	504.	530.	576.	656.	708.	725.	667.	597.	556.	531.
C	70.0<<	562.	564.	585.	617.	669.	701.	729.	669.	626.	604.	586.
A	67.5	606.	608.	623.	635.	647.	647.	677.	632.	626.	626.	617.
L	65.0	626.	628.	634.	620.	588.	555.	585.	561.	592.	614.	617.
	62.5	611.	610.	604.	567.	505.	456.	480.	475.	530.	566.	576.
A	60.0	554.	551.	536.	488.	419.	374.	393.	398.	453.	494.	510.
N	57.5	468.	465.	446.	403.	348.	318.	333.	337.	379.	413.	427.
G	55.0	373.	371.	355.	326.	297.	284.	295.	294.	315.	336.	344.
L	52.5	291.	291.	284.	275.	266.	263.	273.	266.	272.	276.	279.
E	50.0	234.	235.	237.	244.	249.	252.	260.	250.	243.	235.	230.
	47.5	202.	203.	211.	226.	239.	244.	251.	240.	226.	210.	201.
	45.0	186.	188.	197.	215.	231.	238.	245.	233.	215.	196.	186.
	42.5	177.	179.	188.	206.	224.	231.	237.	224.	205.	186.	177.
	40.0	172.	174.	181.	197.	215.	222.	227.	215.	196.	179.	171.
	37.5	168.	169.	176.	189.	205.	211.	216.	204.	187.	173.	166.
	35.0	164.	165.	170.	180.	193.	198.	201.	190.	177.	167.	161.
	30.0	151.	153.	155.	157.	160.	160.	162.	157.	153.	150.	147.
	25.0	126.	127.	127.	124.	120.	118.	120.	118.	121.	124.	123.
	20.0	92.	92.	93.	90.	87.	85.	87.	86.	89.	91.	90.
	15.0	63.	65.	69.	67.	66.	66.	68.	66.	67.	68.	63.
	10.0	42.	43.	47.	50.	52.	53.	54.	52.	50.	47.	43.
	5.0	25.	25.	21.	18.	18.	19.	18.	19.	20.	23.	26.
	0.0	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.

||  
PLANE OF MAXIMUM CANDELA

CONE OF MAXIMUM CANDELA

REPORT NUMBER: RAB03644

PAGE: 8 OF 9

ISSUE DATE: 07/21/17

DATE SAMPLE TESTED: 07/21/17

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
	180.0	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
	175.0	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
	165.0	1.	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.
	155.0	1.	1.	1.	1.	0.	0.	0.	1.	1.	1.	1.
	145.0	4.	4.	4.	3.	2.	2.	2.	3.	4.	4.	4.
	135.0	10.	10.	9.	8.	8.	8.	8.	8.	9.	10.	10.
	125.0	18.	18.	17.	17.	18.	18.	18.	17.	17.	18.	18.
	115.0	26.	26.	26.	29.	31.	32.	31.	28.	26.	26.	26.
	105.0	34.	34.	37.	43.	47.	48.	47.	43.	37.	34.	34.
	95.0	50.	51.	61.	73.	82.	85.	82.	73.	61.	49.	49.
	90.0	68.	71.	90.	112.	126.	130.	125.	108.	85.	68.	64.
	87.5	86.	90.	113.	143.	166.	173.	166.	139.	107.	84.	81.
	85.0	111.	116.	144.	187.	228.	245.	226.	183.	136.	109.	107.
V	82.5	156.	161.	196.	256.	321.	351.	315.	248.	184.	154.	151.
E	80.0	230.	234.	273.	344.	427.	471.	421.	334.	258.	224.	222.
R	77.5	335.	336.	377.	450.	540.	582.	525.	430.	355.	321.	321.
T	75.0	442.	446.	480.	536.	623.	666.	607.	514.	451.	420.	420.
I	72.5	528.	531.	556.	597.	667.	708.	656.	576.	530.	504.	504.
C	70.0<<	584.	586.	604.	626.	669.	701.	669.	617.	585.	564.	562.
A	67.5	614.	617.	626.	626.	632.	647.	647.	635.	623.	608.	606.
L	65.0	614.	617.	614.	592.	561.	555.	588.	620.	634.	628.	626.
	62.5	576.	576.	566.	530.	475.	456.	505.	567.	604.	610.	611.
A	60.0	507.	510.	494.	453.	398.	374.	419.	488.	536.	551.	554.
N	57.5	424.	427.	413.	379.	337.	318.	348.	403.	446.	465.	468.
G	55.0	343.	344.	336.	315.	294.	284.	297.	326.	355.	371.	373.
L	52.5	276.	279.	276.	272.	266.	263.	266.	275.	284.	291.	291.
E	50.0	227.	230.	235.	243.	250.	252.	249.	244.	237.	235.	234.
	47.5	198.	201.	210.	226.	240.	244.	239.	226.	211.	203.	202.
	45.0	183.	186.	196.	215.	233.	238.	231.	215.	197.	188.	186.
	42.5	175.	177.	186.	205.	224.	231.	224.	206.	188.	179.	177.
	40.0	169.	171.	179.	196.	215.	222.	215.	197.	181.	174.	172.
	37.5	165.	166.	173.	187.	204.	211.	205.	189.	176.	169.	168.
	35.0	160.	161.	167.	177.	190.	198.	193.	180.	170.	165.	164.
	30.0	146.	147.	150.	153.	157.	160.	160.	157.	155.	153.	151.
	25.0	122.	123.	124.	121.	118.	118.	120.	124.	127.	127.	126.
	20.0	90.	90.	91.	89.	86.	85.	87.	90.	93.	92.	92.
	15.0	62.	63.	68.	67.	66.	66.	66.	67.	69.	65.	63.
	10.0	42.	43.	47.	50.	52.	53.	52.	50.	47.	43.	42.
	5.0	26.	26.	23.	20.	19.	19.	18.	18.	21.	25.	25.
	0.0	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.

CONE OF MAXIMUM CANDELA



REPORT NUMBER: RAB03644

PAGE: 9 OF 9

ISSUE DATE: 07/21/17

DATE SAMPLE TESTED: 07/21/17

PREPARED FOR: RAB LIGHTING INC. RC LIGHTING

### 5-DEGREE

#### ZONAL LUMEN SUMMARY

0- 5	0
5- 10	3
10- 15	7
15- 20	13
20- 25	22
25- 30	35
30- 35	49
35- 40	62
40- 45	75
45- 50	91
50- 55	122
55- 60	183
60- 65	263
65- 70	315
70- 75	306
75- 80	231
80- 85	135
85- 90	74
90- 95	46
95-100	32
100-105	25
105-110	20
110-115	16
115-120	13
120-125	9
125-130	7
130-135	4
135-140	3
140-145	1
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	23
0- 30	80
0- 40	192
0- 50	358
0- 60	662
0- 70	1240
0- 80	1778
0- 90	1986
0-100	2064
0-110	2109
0-120	2137
0-130	2153
0-140	2160
0-150	2162
0-160	2162
0-170	2163
0-180	2163

REPORT NUMBER: RAB03652  
 DATE: 7/24/2017  
 PREPARED FOR: RAB LIGHTING INC. RC LIGHTING  
 CATALOG NUMBER: BLED24Y, BLED24Y/D10 (42" SQUARE BOLLARD)

Page 1 of 4

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	<u>X.CAO</u>
Approved	<u>D.WANG-MUNSON</u> Lighting Engineer

REPORT NUMBER: RAB03652  
 DATE: 7/24/2017  
 PREPARED FOR: RAB LIGHTING INC. RC LIGHTING  
 CATALOG NUMBER: BLED24Y, BLED24Y/D10 (42" SQUARE BOLLARD)

Page 2 of 4

### RESULTS:

PHOTOMETRIC	
Total Integrated Flux (lumens)	2163 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.4389
Chromaticity Ordinate y	0.4075
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2503
Chromaticity Ordinate v'	0.5230
Correlated Color Temp CCT (K)	2995
ANSI C78.377-2008 Duv	0.001
Total Radiant Flux (milliWatts)	6608 *
ELECTRICAL	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.089
Input Power (Watts)	22.5
Input Power Factor (%)	91.5
Input Current THD (%)	11.5
Input Voltage THD (%)	0.2
EFFICACY (Lumens/Watt)	
	96.1
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.184
Input Power (Watts)	21.9
Input Power Factor (%)	98.9
Input Current THD (%)	11.1
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	93
R3 Strong yellowish green	95
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	12
R10 Strong yellow	84
R11 Strong green	81
R12 Strong blue	74
R13 Light yellowish pink (skin)	85
R14 Moderate olive green (leaf)	98

### \*NOTE:

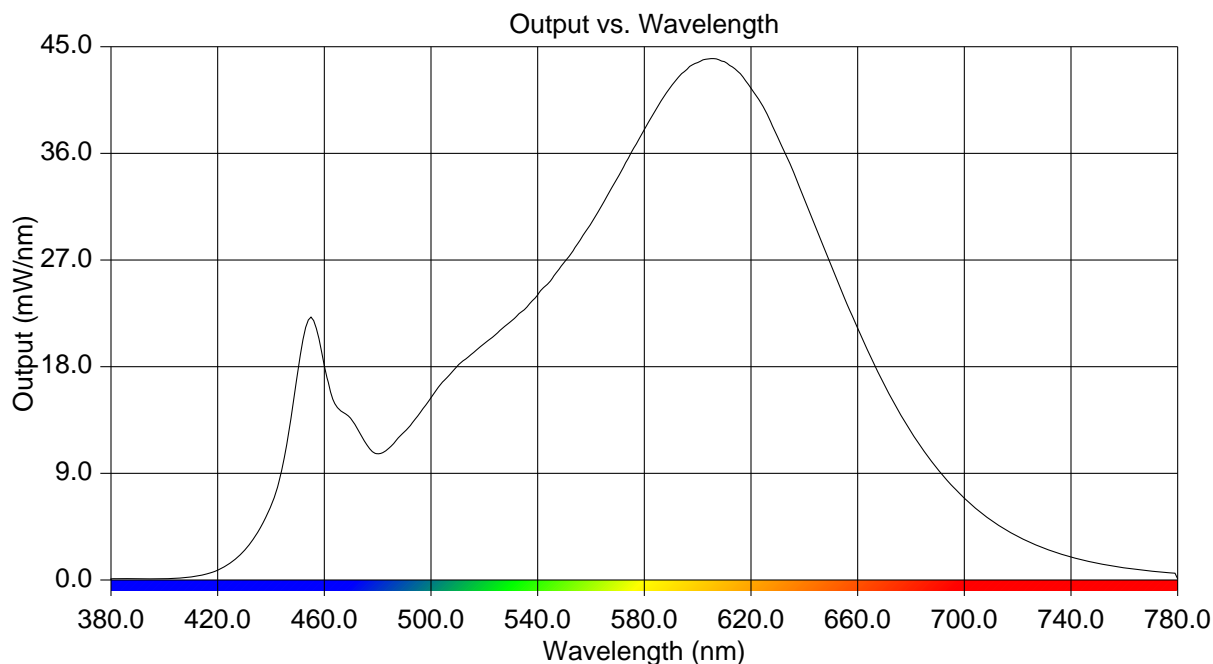
Proper calibration of integrating spheres for measuring total flux output of non-directional samples will produce reliable, repeatable results within the calibration tolerances of the equipment used. However, measurement of test samples with significant self absorption and/or directional output, even 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: RAB03652  
 DATE: 7/24/2017  
 PREPARED FOR: RAB LIGHTING INC. RC LIGHTING  
 CATALOG NUMBER: BLED24Y, BLED24Y/D10 (42" SQUARE BOLLARD)

Page 3 of 4

### RESULTS:

Wavelength	mW per nm	Wavelength	mW per nm	Wavelength	mW per nm
380	0.098	515	19.019	650	26.542
385	0.101	520	19.962	655	23.817
390	0.098	525	20.860	660	21.273
395	0.100	530	21.819	665	18.729
400	0.120	535	22.804	670	16.492
405	0.151	540	24.049	675	14.404
410	0.254	545	25.308	680	12.521
415	0.457	550	26.831	685	10.835
420	0.827	555	28.371	690	9.331
425	1.486	560	30.063	695	8.040
430	2.491	565	31.972	700	6.899
435	4.016	570	33.941	705	5.894
440	6.246	575	36.029	710	5.044
445	10.336	580	38.011	715	4.323
450	17.519	585	39.952	720	3.680
455	22.183	590	41.680	725	3.129
460	18.069	595	42.893	730	2.667
465	14.517	600	43.656	735	2.278
470	13.612	605	43.993	740	1.935
475	11.733	610	43.739	745	1.650
480	10.654	615	42.920	750	1.411
485	11.281	620	41.494	755	1.202
490	12.483	625	39.761	760	1.032
495	13.830	630	37.372	765	0.877
500	15.393	635	34.924	770	0.754
505	16.849	640	32.163	775	0.647
510	18.090	645	29.400	780	0.097



REPORT NUMBER: RAB03652  
DATE: 7/24/2017  
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CATALOG NUMBER: BLED24Y, BLED24Y/D10 (42" SQUARE BOLLARD)

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## CIE Chromaticity Diagram

