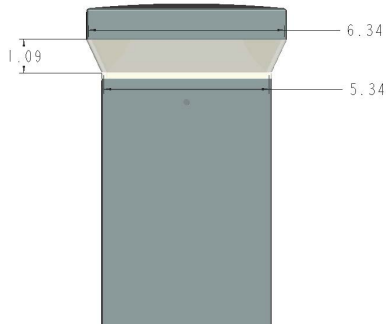


## ISOFOOTCANDLE LINES OF HORIZONTAL ILLUMINATION

Values based on 3.5 foot mounting height.



REPORT NUMBER: RAB03700

ISSUE DATE: 08/17/17

PAGE: 1 OF 9

DATE SAMPLE TESTED: 08/17/17

PREPARED FOR: RAB LIGHTING INC. RC LIGHTING

CATALOG NUMBER: BLED18Y, BLED18Y/D10 (42" SQUARE BOLLARD), WBLED18Y/D10

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, 3 OPTICAL COMPARTMENT CONTAINS 1 WHITE CIRCUIT BOARD WITH 5 LEDS, FROSTED PLASTIC LENS, CAST BROWN PAINTED METAL BOTTOM.

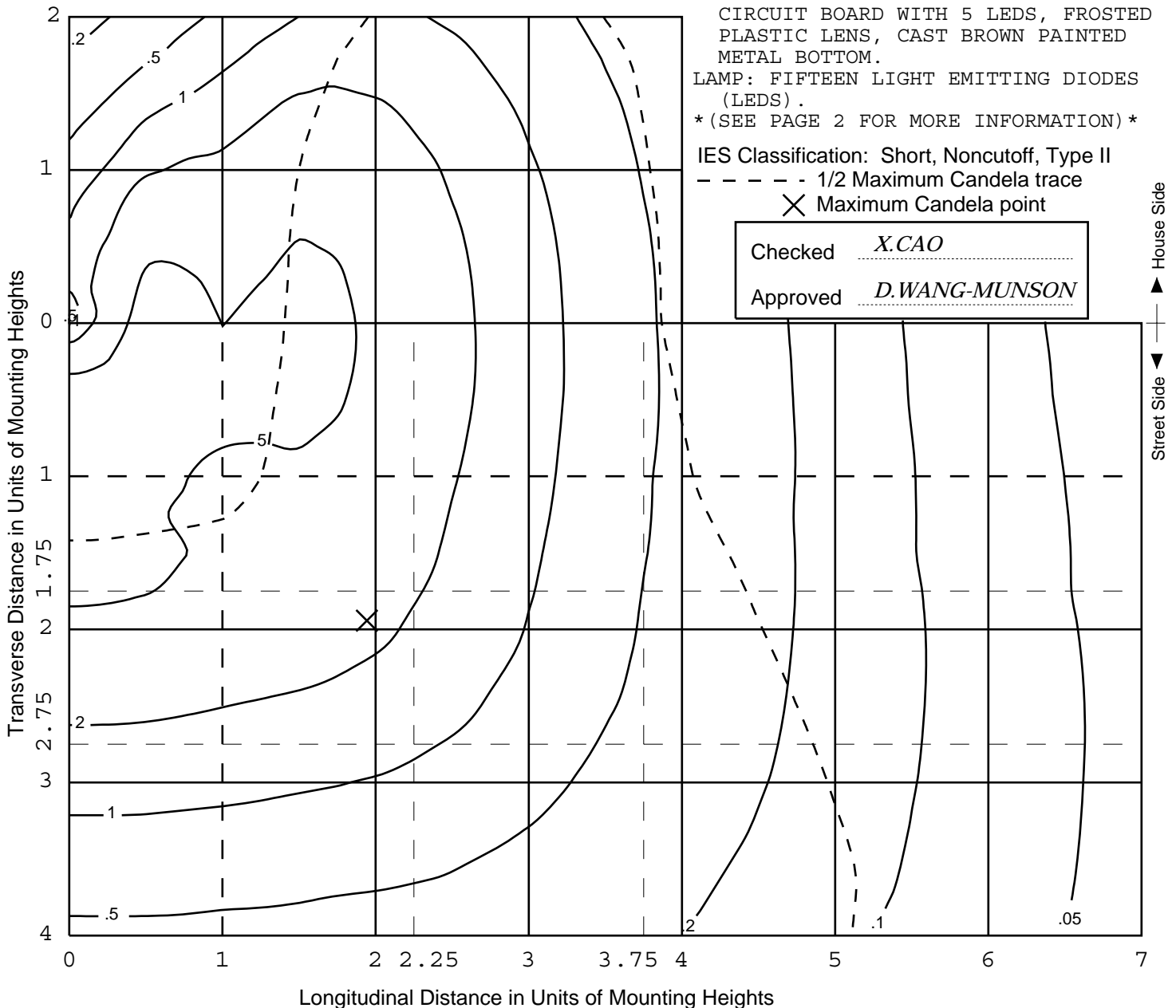
LAMP: FIFTEEN LIGHT EMITTING DIODES (LEDs).

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

IES Classification: Short, Noncutoff, Type II

--- 1/2 Maximum Candela trace

X Maximum Candela point



REPORT NUMBER: RAB03700

PAGE: 2 OF 9

ISSUE DATE: 08/17/17

DATE SAMPLE TESTED: 08/17/17

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 = 16.969 W AT 277.0 VAC.

LED DRIVER: RD-LU018-A035C0SP

TEST PROCEDURE: IESNA LM-79-08

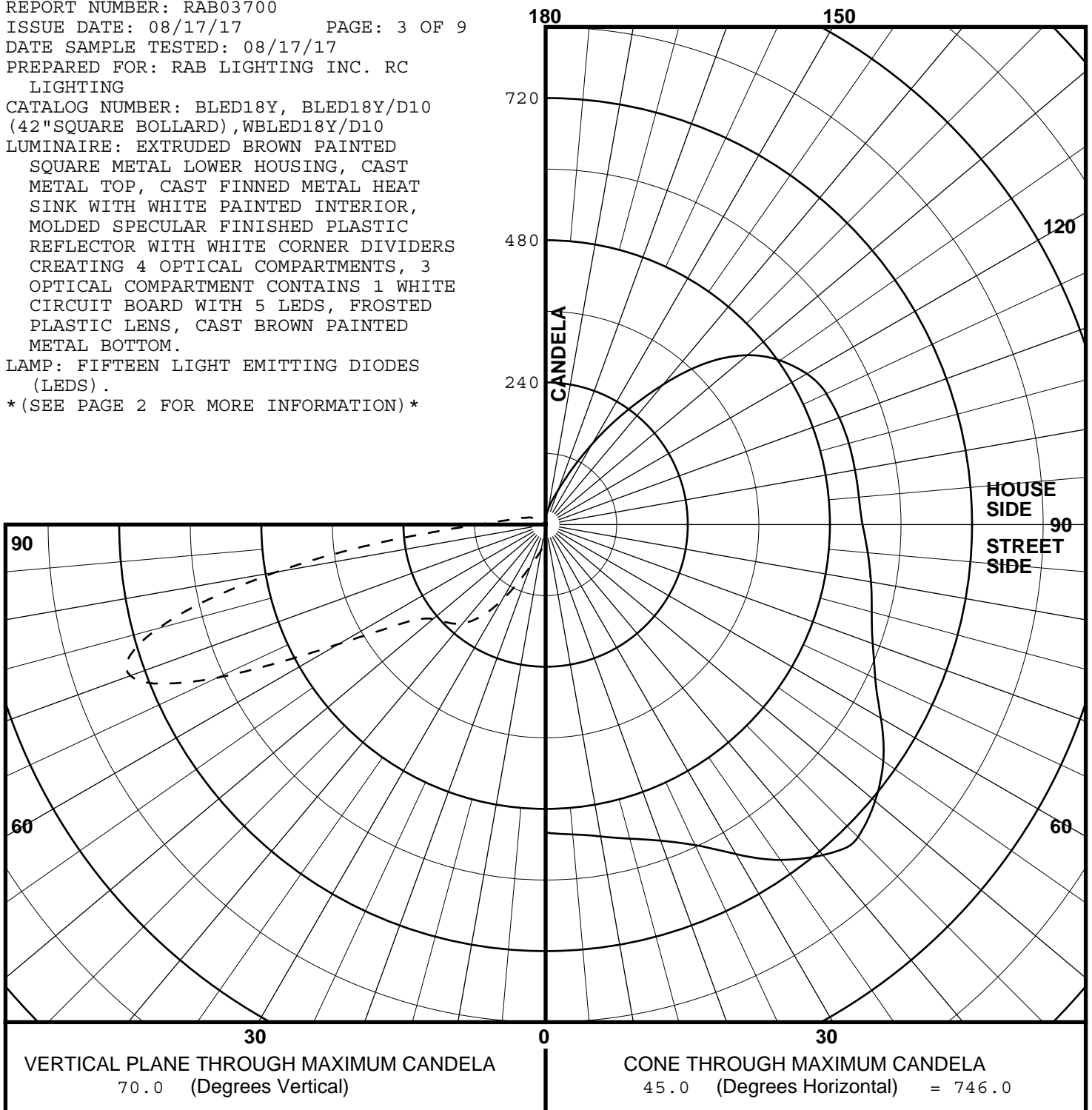
LM-80 DATA AVAILABLE FROM MANUFACTURER FOR SOLID STATE SOURCE

AMBIENT: 24.7

ACCREDITED LABORATORY CODE 201058-0

## MAXIMUM PLANE AND MAXIMUM CONE PLOTS OF CANDELA

REPORT NUMBER: RAB03700  
 ISSUE DATE: 08/17/17 PAGE: 3 OF 9  
 DATE SAMPLE TESTED: 08/17/17  
 PREPARED FOR: RAB LIGHTING INC. RC  
 LIGHTING  
 CATALOG NUMBER: BLED18Y, BLED18Y/D10  
 (42" SQUARE BOLLARD), WBLED18Y/D10  
 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, 3  
 OPTICAL COMPARTMENT CONTAINS 1 WHITE  
 CIRCUIT BOARD WITH 5 LEDS, FROSTED  
 PLASTIC LENS, CAST BROWN PAINTED  
 METAL BOTTOM.  
 LAMP: FIFTEEN LIGHT EMITTING DIODES  
 (LEDS).  
 \*(SEE PAGE 2 FOR MORE INFORMATION)\*



REPORT NUMBER: RAB03700

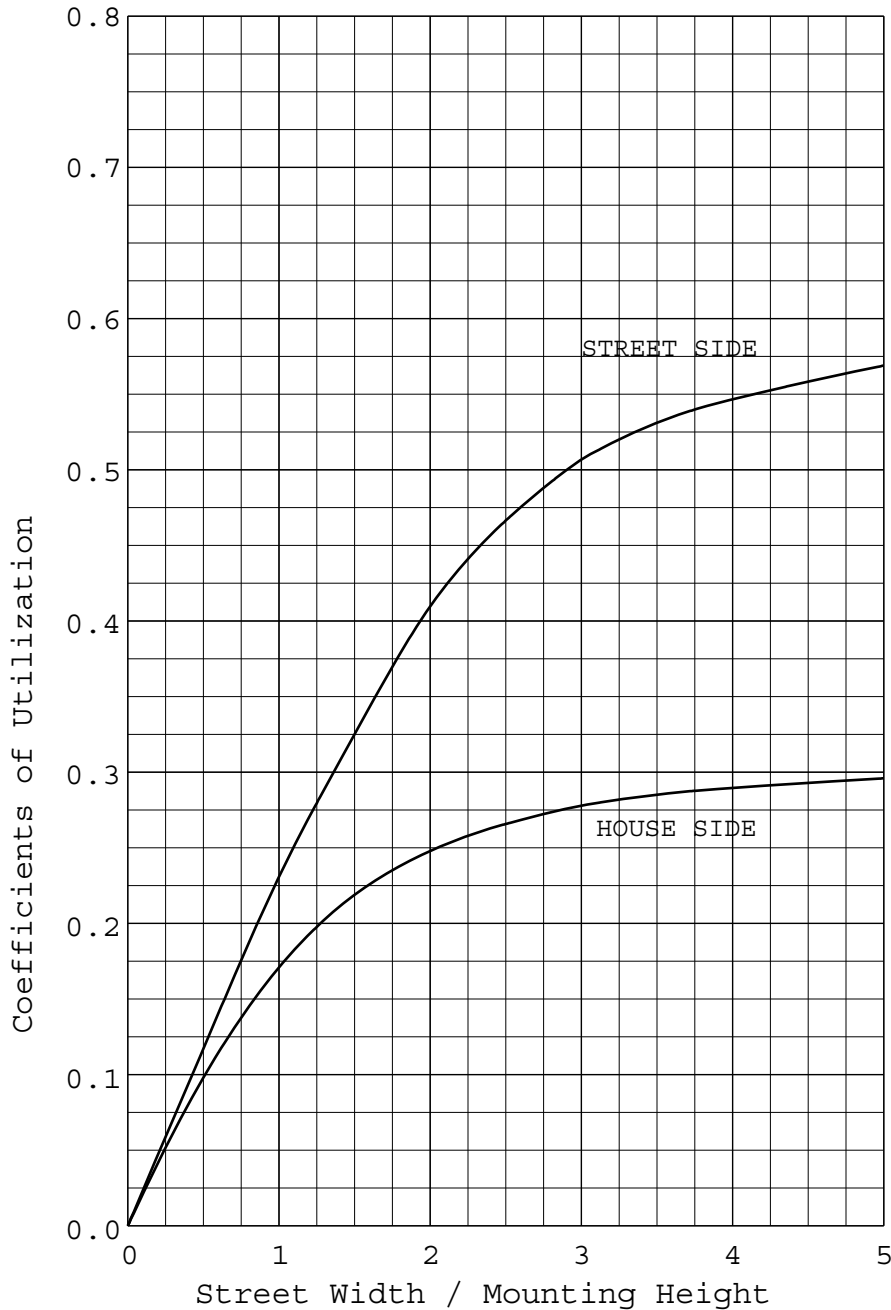
PAGE: 4 OF 9

ISSUE DATE: 08/17/17

DATE SAMPLE TESTED: 08/17/17

PREPARED FOR: RAB LIGHTING INC. RC LIGHTING

# COEFFICIENTS OF UTILIZATION AND FLUX DISTRIBUTION



	LUMENS	PERCENT OF FIXTURE
DOWNWARD STREET SIDE	983.	61.1
DOWNWARD HOUSE SIDE	503.	31.3
DOWNWARD TOTAL	1487.	92.4
UPWARD STREET SIDE	78.	4.9
UPWARD HOUSE SIDE	44.	2.7
UPWARD TOTAL	123.	7.6
TOTAL FLUX	1609.	100.0
TOTAL INPUT WATTS = 17.0		
EFFICACY = 94.6 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: RAB03700

ISSUE DATE: 08/17/17

PAGE: 5 OF 9

DATE SAMPLE TESTED: 08/17/17

PREPARED FOR: RAB LIGHTING INC. RC LIGHTING

BUG Rating:

Zonal Summary

Lumens

% of Fixture

B1 U3 G1

Zone Ratings

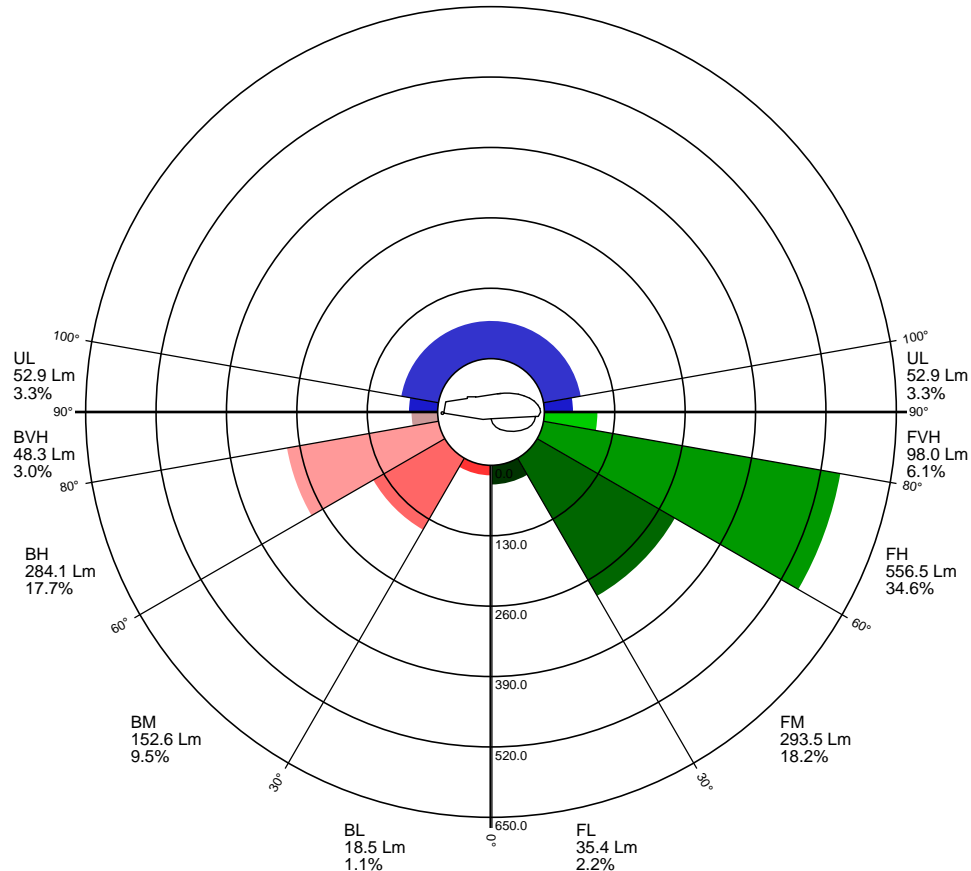
B U G

Forward		983	61.1			
FL	(0° - 30°)	35.4	2.2			
FM	(30° - 60°)	293.5	18.2			
FH	(60° - 80°)	556.5	34.6			G0
FVH	(80° - 90°)	98.0	6.1			G1
Backward		503	31.3			
BL	(0° - 30°)	18.5	1.1	B0		
BM	(30° - 60°)	152.6	9.5	B0		
BH	(60° - 80°)	284.1	17.7	B1		G1
BVH	(80° - 90°)	48.3	3.0			G1
Upward		123	7.6			
UL	(90° - 100°)	52.9	3.3		U3	
UH	(100° - 180°)	69.6	4.3		U3	
Trapped Light		0	0.0			
Total Flux		1609	100.0			

### Zonal Lumen Summary

(Linear scale)

UH  
69.6 Lm  
4.3%



REPORT NUMBER: RAB03700

ISSUE DATE: 08/17/17

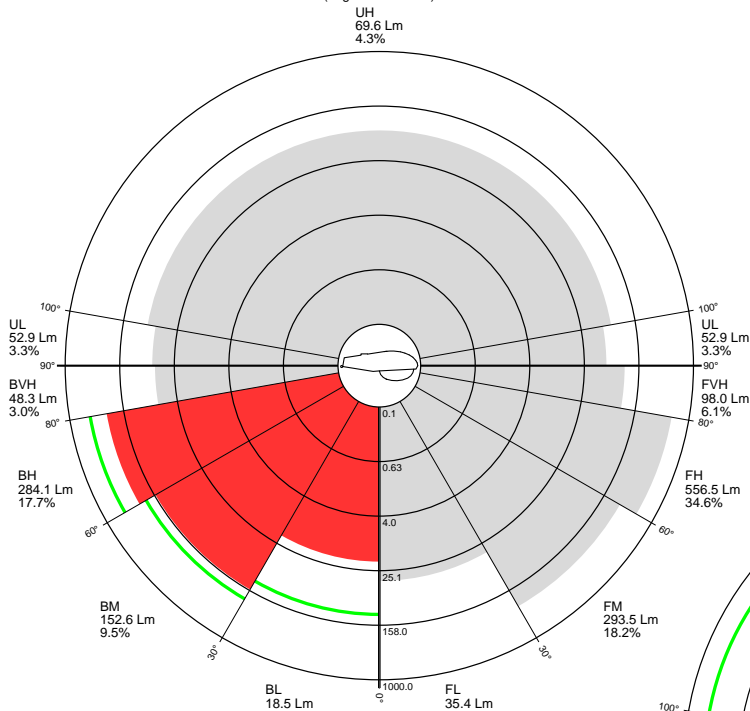
PREPARED FOR: RAB LIGHTING INC. RC LIGHTING

PAGE: 6 OF 9

DATE SAMPLE TESTED: 08/17/17

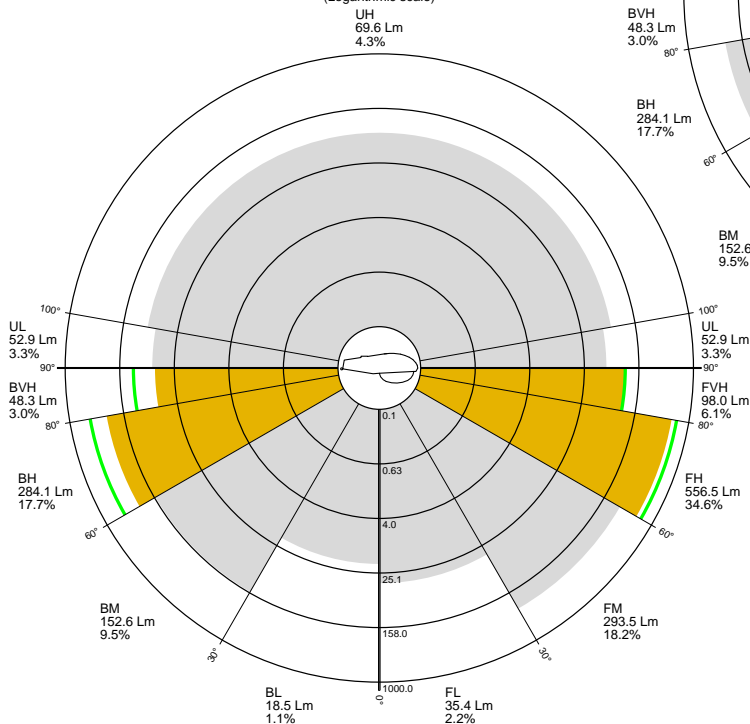
## Backlight Rating Details

(Logarithmic scale)



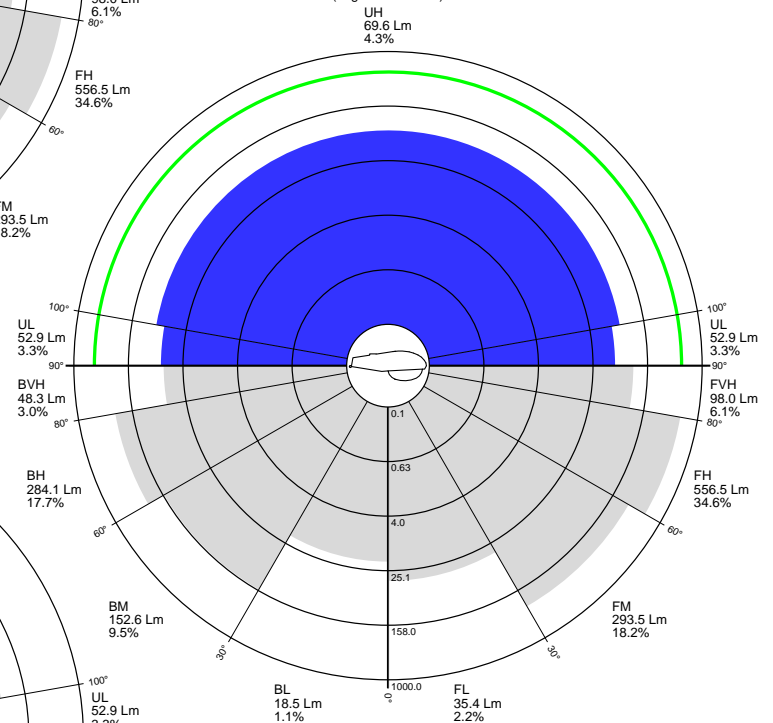
## Glare Rating Details

(Logarithmic scale)



## Uplight Rating Details

(Logarithmic scale)



REPORT NUMBER: RAB03700

PAGE: 7 OF 9

ISSUE DATE: 08/17/17

DATE SAMPLE TESTED: 08/17/17

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	0.	0.	0.	0.	0.	0.	0.	0.	0.
	175.0	0.	0.	0.	0.	0.	0.	0.	0.	0.
	165.0	0.	0.	0.	0.	0.	0.	0.	0.	1.
	155.0	1.	1.	1.	1.	0.	0.	1.	1.	1.
	145.0	4.	4.	3.	3.	2.	1.	2.	2.	3.
	135.0	9.	9.	9.	8.	7.	7.	7.	7.	8.
	125.0	17.	17.	17.	16.	17.	16.	16.	15.	15.
	115.0	24.	24.	24.	26.	28.	28.	27.	25.	23.
	105.0	32.	33.	35.	39.	42.	43.	41.	37.	32.
	95.0	48.	48.	57.	66.	72.	73.	71.	63.	53.
	90.0	61.	64.	80.	98.	113.	113.	109.	96.	76.
	87.5	75.	80.	101.	131.	155.	156.	149.	125.	96.
	85.0	101.	106.	134.	176.	220.	230.	213.	168.	124.
V	82.5	146.	153.	187.	246.	318.	340.	305.	233.	170.
E	80.0	222.	230.	269.	341.	429.	462.	415.	325.	243.
R	77.5	327.	326.	363.	434.	538.	582.	532.	426.	342.
T	75.0	404.	411.	442.	511.	620.	677.	625.	517.	439.
I	72.5	471.	477.	502.	561.	672.	736.	680.	577.	517.
C	70.0<<	520.	525.	549.	597.	691.	746.	696.	614.	570.
A	67.5	565.	569.	591.	621.	672.	702.	671.	633.	612.
L	65.0	595.	598.	612.	615.	612.	612.	611.	623.	628.
	62.5	588.	590.	591.	571.	523.	500.	529.	576.	605.
A	60.0	543.	543.	533.	499.	430.	403.	444.	507.	548.
N	57.5	468.	466.	451.	413.	354.	335.	369.	428.	468.
G	55.0	378.	377.	364.	336.	297.	287.	312.	354.	380.
L	52.5	291.	290.	285.	276.	263.	261.	272.	293.	304.
E	50.0	229.	232.	233.	241.	246.	248.	250.	251.	247.
	47.5	194.	197.	204.	221.	235.	240.	236.	225.	211.
	45.0	177.	179.	188.	208.	227.	234.	227.	209.	191.
	42.5	168.	169.	178.	198.	218.	227.	219.	199.	180.
	40.0	162.	163.	172.	188.	208.	217.	208.	189.	173.
	37.5	158.	159.	166.	179.	196.	205.	196.	180.	167.
	35.0	154.	154.	160.	169.	181.	188.	181.	170.	160.
	30.0	141.	140.	143.	145.	146.	147.	146.	144.	142.
	25.0	115.	113.	113.	111.	107.	105.	107.	110.	113.
	20.0	82.	79.	80.	78.	76.	75.	77.	79.	81.
	15.0	56.	54.	58.	57.	57.	56.	57.	58.	58.
	10.0	36.	35.	39.	41.	43.	44.	43.	41.	38.
	5.0	17.	16.	14.	11.	11.	10.	11.	12.	14.
	0.0	1.	1.	1.	1.	1.	1.	1.	1.	1.

||

PLANE OF MAXIMUM CANDELA

CONE OF MAXIMUM CANDELA

REPORT NUMBER: RAB03700

PAGE: 8 OF 9

ISSUE DATE: 08/17/17

DATE SAMPLE TESTED: 08/17/17

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	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	1.	1.	1.	1.	0.	0.	0.	0.	0.	0.	1.
	155.0	1.	1.	1.	1.	1.	1.	0.	1.	1.	1.	1.
	145.0	3.	3.	3.	2.	2.	1.	1.	1.	1.	1.	1.
	135.0	9.	9.	8.	7.	6.	4.	3.	2.	2.	2.	1.
	125.0	16.	16.	16.	14.	13.	10.	7.	4.	3.	3.	3.
	115.0	23.	23.	23.	22.	20.	17.	13.	8.	5.	3.	3.
	105.0	30.	30.	30.	29.	28.	25.	20.	14.	8.	4.	4.
	95.0	42.	42.	43.	43.	42.	40.	35.	26.	15.	5.	5.
	90.0	56.	56.	59.	61.	61.	59.	53.	41.	23.	7.	4.
	87.5	70.	71.	74.	77.	78.	79.	73.	53.	28.	9.	5.
	85.0	91.	91.	96.	103.	109.	113.	102.	68.	32.	10.	6.
	82.5	127.	126.	135.	150.	162.	165.	138.	83.	37.	12.	7.
	80.0	192.	191.	204.	226.	240.	230.	177.	97.	40.	13.	9.
	77.5	287.	288.	300.	323.	327.	295.	212.	106.	42.	14.	11.
	75.0	394.	394.	401.	413.	400.	347.	235.	110.	42.	16.	12.
	72.5	479.	476.	477.	477.	451.	380.	241.	106.	43.	18.	14.
	70.0<<	535.	531.	530.	523.	483.	387.	228.	99.	42.	19.	16.
	67.5	582.	575.	571.	551.	489.	365.	203.	91.	43.	21.	18.
	65.0	609.	601.	590.	548.	459.	320.	173.	86.	44.	22.	20.
	62.5	598.	588.	567.	505.	402.	264.	146.	82.	44.	23.	21.
	60.0	551.	540.	510.	438.	333.	213.	128.	80.	45.	25.	22.
	57.5	476.	465.	432.	359.	262.	174.	117.	78.	46.	25.	23.
	55.0	388.	377.	345.	282.	206.	149.	111.	77.	45.	26.	23.
	52.5	304.	295.	266.	219.	170.	135.	106.	75.	44.	26.	23.
	50.0	237.	230.	209.	180.	152.	128.	104.	73.	43.	26.	23.
	47.5	194.	188.	175.	158.	141.	123.	100.	70.	41.	26.	23.
	45.0	172.	165.	158.	148.	135.	119.	96.	66.	39.	25.	23.
	42.5	161.	154.	149.	142.	131.	115.	91.	61.	37.	25.	23.
	40.0	154.	148.	143.	137.	127.	110.	85.	56.	35.	24.	22.
	37.5	149.	143.	139.	132.	121.	104.	78.	51.	33.	23.	22.
35.0	145.	139.	134.	126.	115.	96.	70.	46.	31.	23.	22.	
30.0	131.	124.	119.	109.	94.	75.	55.	38.	28.	22.	22.	
25.0	104.	98.	92.	81.	69.	54.	41.	31.	25.	21.	21.	
20.0	71.	66.	60.	55.	47.	39.	32.	27.	23.	21.	20.	
15.0	46.	42.	39.	36.	33.	29.	26.	24.	22.	19.	17.	
10.0	29.	28.	27.	25.	24.	22.	20.	17.	13.	10.	9.	
5.0	17.	16.	14.	11.	8.	6.	5.	3.	3.	2.	2.	
0.0	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	

CONE OF MAXIMUM CANDELA



REPORT NUMBER: RAB03700

ISSUE DATE: 08/17/17

PREPARED FOR: RAB LIGHTING INC. RC LIGHTING

PAGE: 9 OF 9

DATE SAMPLE TESTED: 08/17/17

### 5-DEGREE ZONAL LUMEN SUMMARY

0- 5	0
5- 10	2
10- 15	4
15- 20	8
20- 25	15
25- 30	24
30- 35	35
35- 40	45
40- 45	55
45- 50	68
50- 55	96
55- 60	147
60- 65	207
65- 70	238
70- 75	226
75- 80	170
80- 85	96
85- 90	50
90- 95	31
95-100	22
100-105	17
105-110	14
110-115	11
115-120	9
120-125	7
125-130	5
130-135	3
135-140	2
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	2
0- 20	14
0- 30	54
0- 40	134
0- 50	257
0- 60	500
0- 70	945
0- 80	1341
0- 90	1487
0-100	1540
0-110	1571
0-120	1591
0-130	1602
0-140	1607
0-150	1609
0-160	1609
0-170	1609
0-180	1609

REPORT NUMBER: RAB03657 Page 1 of 4  
 DATE: 7/26/2017  
 PREPARED FOR: RAB LIGHTING INC. RC LIGHTING  
 CATALOG NUMBER: BLED18Y, BLED18Y/D10 (42" SQUARE BOLLARD), WBLED18Y/D10

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, 3 OPTICAL COMPARTMENT CONTAINS 1 WHITE CIRCUIT BOARD WITH 5 LEDS, FROSTED PLASTIC LENS, CAST BROWN PAINTED METAL BOTTOM.

LAMP: FIFTEEN LIGHT EMITTING DIODES (LEDs).

DRIVER: RD-LU018-A035C0SP

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: 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 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: RAB03657  
 DATE: 7/26/2017  
 PREPARED FOR: RAB LIGHTING INC. RC LIGHTING  
 CATALOG NUMBER: BLED18Y, BLED18Y/D10 (42" SQUARE BOLLARD), WBLED18Y/D10

Page 2 of 4

### RESULTS:

PHOTOMETRIC	
Total Integrated Flux (lumens)	1609 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.4401
Chromaticity Ordinate y	0.4091
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2504
Chromaticity Ordinate v'	0.5238
Correlated Color Temp CCT (K)	2987
ANSI C78.377-2008 Duv	0.002
Total Radiant Flux (milliWatts)	4893 *
ELECTRICAL	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.068
Input Power (Watts)	17.0
Input Power Factor (%)	89.9
Input Current THD (%)	10.6
Input Voltage THD (%)	0.2
EFFICACY (Lumens/Watt)	
	94.6
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.137
Input Power (Watts)	16.3
Input Power Factor (%)	99.5
Input Current THD (%)	6.4
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	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:

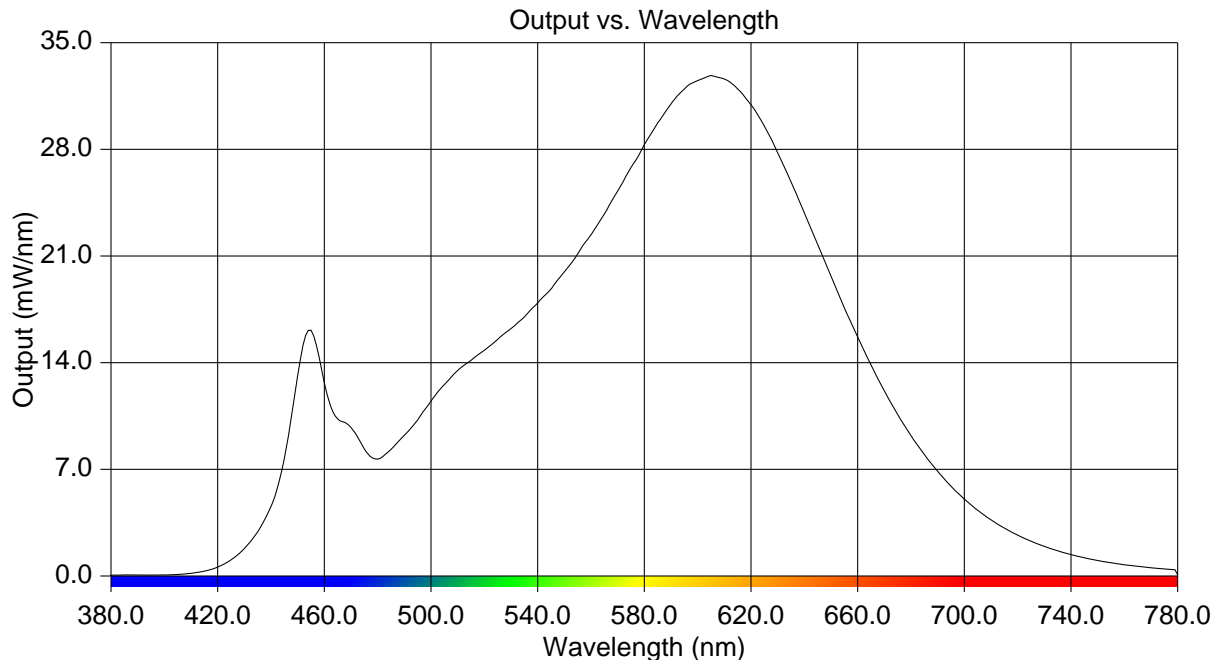
Proper calibration of integrating spheres for measuring total flux output of non-directional samples will produce reliable, repeatable results within the calibration tolerances of the equipment used. However, measurement of test samples with significant self absorption and/or directional output, even 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: RAB03657  
 DATE: 7/26/2017  
 PREPARED FOR: RAB LIGHTING INC. RC LIGHTING  
 CATALOG NUMBER: BLED18Y, BLED18Y/D10 (42" SQUARE BOLLARD), WBLED18Y/D10

Page 3 of 4

### RESULTS:

Wavelength	mW per nm	Wavelength	mW per nm	Wavelength	mW per nm
380	0.055	515	14.149	650	19.657
385	0.063	520	14.812	655	17.593
390	0.057	525	15.529	660	15.711
395	0.064	530	16.241	665	13.834
400	0.073	535	16.995	670	12.158
405	0.102	540	17.913	675	10.591
410	0.171	545	18.836	680	9.211
415	0.312	550	19.958	685	7.971
420	0.584	555	21.141	690	6.860
425	1.061	560	22.380	695	5.891
430	1.796	565	23.757	700	5.044
435	2.896	570	25.263	705	4.307
440	4.555	575	26.808	710	3.687
445	7.708	580	28.309	715	3.147
450	13.150	585	29.729	720	2.681
455	16.131	590	30.974	725	2.283
460	12.671	595	31.956	730	1.941
465	10.314	600	32.503	735	1.645
470	9.735	605	32.846	740	1.397
475	8.335	610	32.624	745	1.197
480	7.670	615	31.956	750	1.014
485	8.308	620	30.921	755	0.867
490	9.231	625	29.534	760	0.737
495	10.246	630	27.785	765	0.629
500	11.480	635	25.892	770	0.538
505	12.553	640	23.849	775	0.462
510	13.490	645	21.786	780	0.069



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Page 4 of 4

## CIE Chromaticity Diagram

