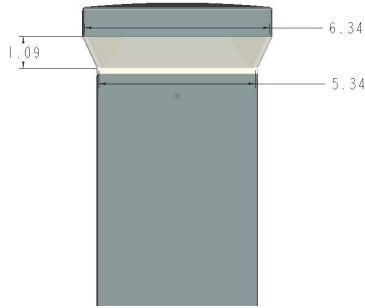


ISOFOOTCANDLE LINES OF HORIZONTAL ILLUMINATION

Values based on 3.5 foot mounting height.



REPORT NUMBER: RAB03687
 ISSUE DATE: 08/11/17 PAGE: 1 OF 9
 DATE SAMPLE TESTED: 08/11/17
 PREPARED FOR: RAB LIGHTING INC. RC LIGHTING
 CATALOG NUMBER: BLED24N, BLED24N/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).

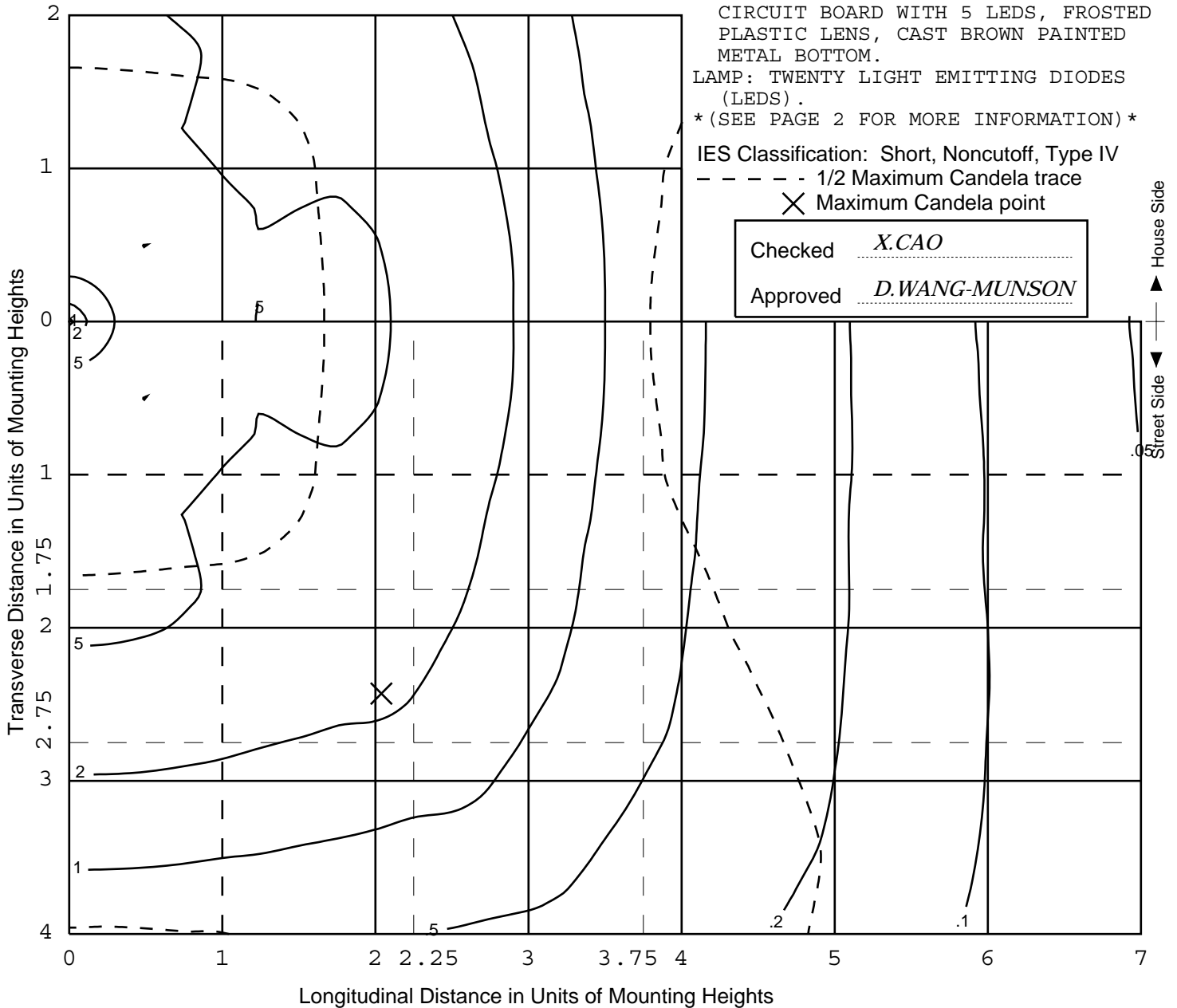
(SEE PAGE 2 FOR MORE INFORMATION)

IES Classification: Short, Noncutoff, Type IV

--- 1/2 Maximum Candela trace

X Maximum Candela point

Checked X.CAO
 Approved D.WANG-MUNSON



REPORT NUMBER: RAB03687

PAGE: 2 OF 9

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DATE SAMPLE TESTED: 08/11/17

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 = 22.995 W AT 277.0 VAC.

LED DRIVER: RDF25U7-39

TEST PROCEDURE: IESNA LM-79-08

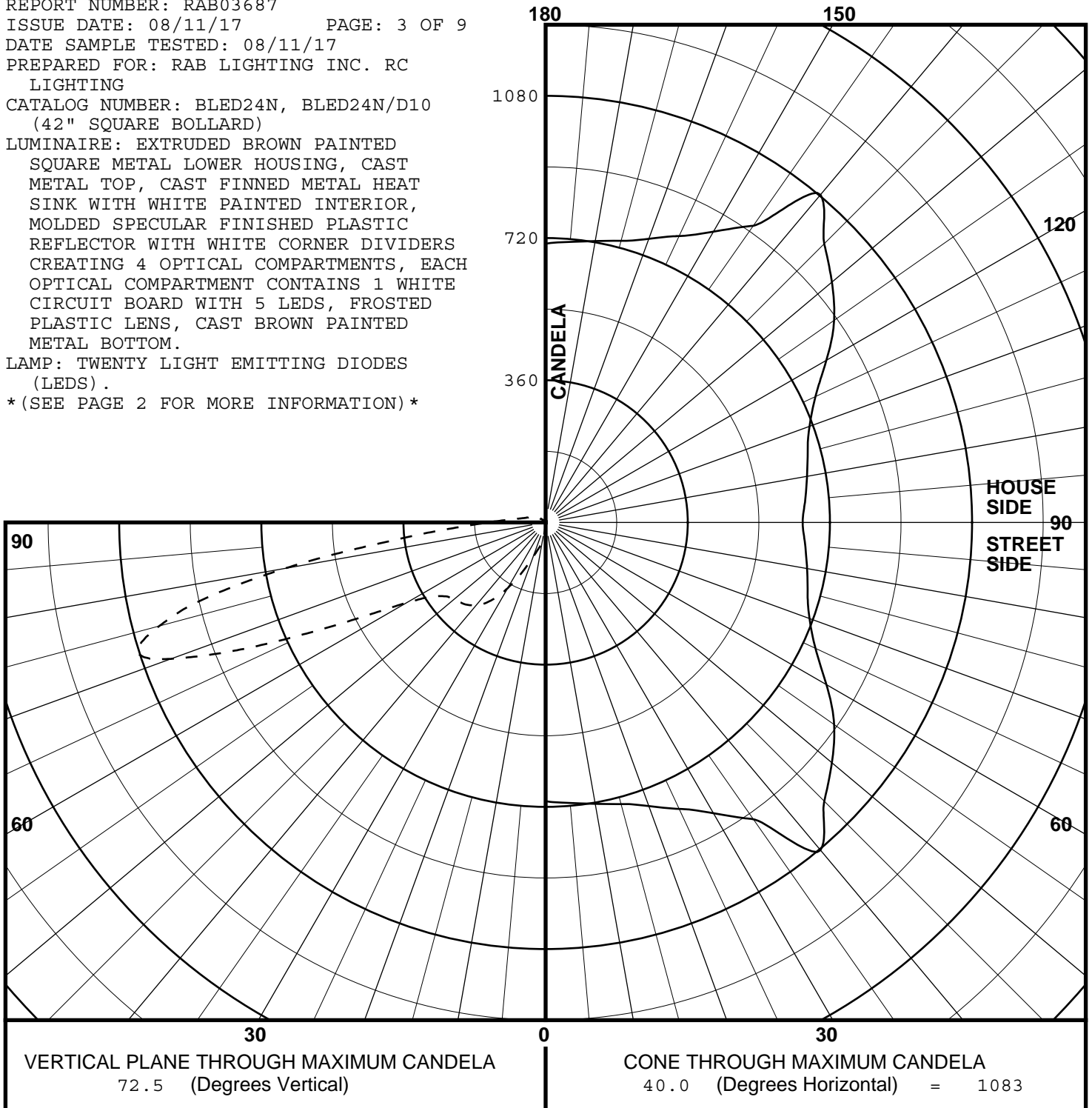
LM-80 DATA AVAILABLE FROM MANUFACTURER FOR SOLID STATE SOURCE

AMBIENT: 24.3

ACCREDITED LABORATORY CODE 201058-0

MAXIMUM PLANE AND MAXIMUM CONE PLOTS OF CANDELA

REPORT NUMBER: RAB03687
 ISSUE DATE: 08/11/17 PAGE: 3 OF 9
 DATE SAMPLE TESTED: 08/11/17
 PREPARED FOR: RAB LIGHTING INC. RC
 LIGHTING
 CATALOG NUMBER: BLED24N, BLED24N/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: RAB03687

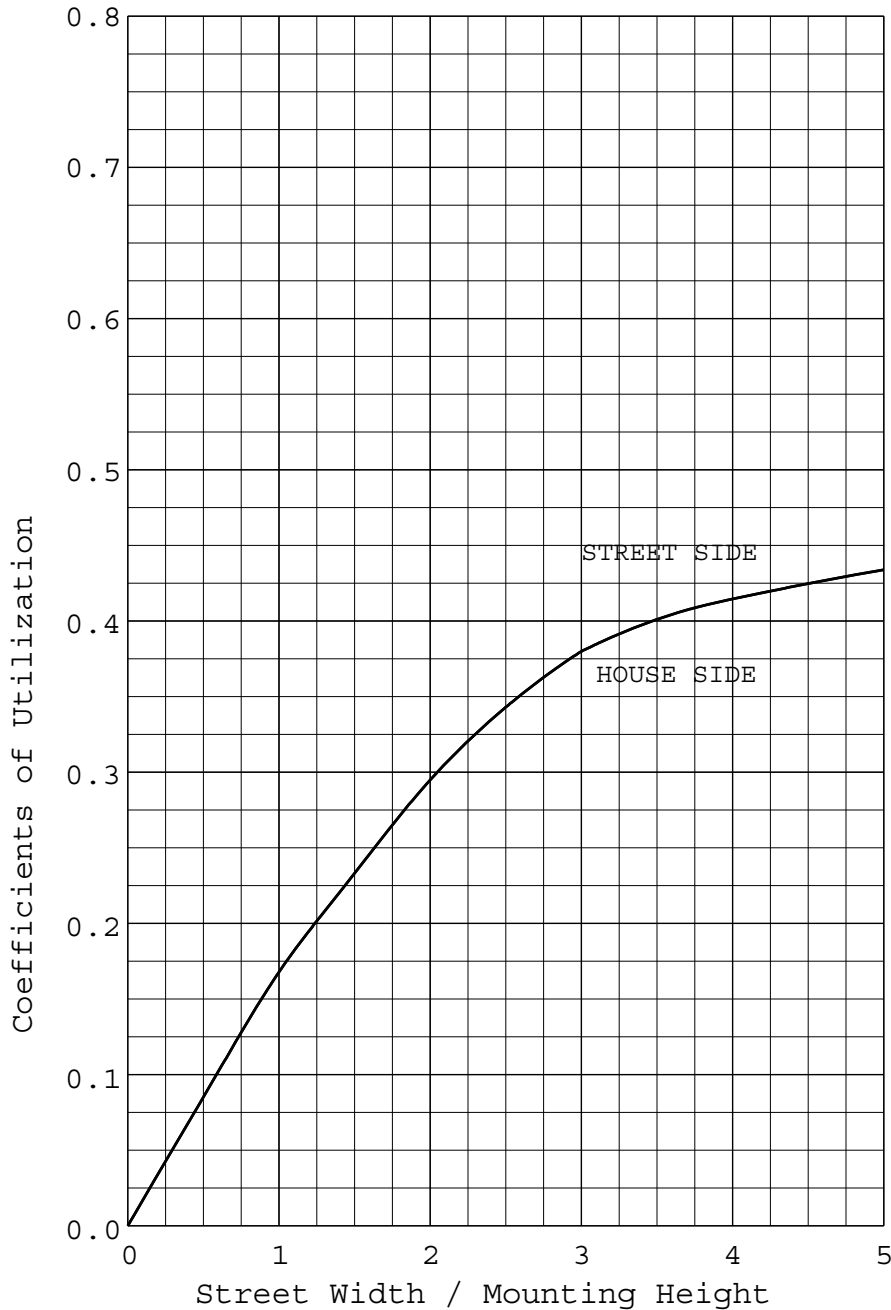
PAGE: 4 OF 9

ISSUE DATE: 08/11/17

DATE SAMPLE TESTED: 08/11/17

PREPARED FOR: RAB LIGHTING INC. RC LIGHTING

COEFFICIENTS OF UTILIZATION AND FLUX DISTRIBUTION



	LUMENS	PERCENT OF FIXTURE
DOWNWARD STREET SIDE	1196.	46.7
DOWNWARD HOUSE SIDE	1196.	46.7
DOWNWARD TOTAL	2392.	93.3
UPWARD STREET SIDE	86.	3.3
UPWARD HOUSE SIDE	86.	3.3
UPWARD TOTAL	171.	6.7
TOTAL FLUX	2564.	100.0
TOTAL INPUT WATTS = 23.0		
EFFICACY = 111.5 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: RAB03687

ISSUE DATE: 08/11/17

PREPARED FOR: RAB LIGHTING INC. RC LIGHTING

PAGE: 5 OF 9

DATE SAMPLE TESTED: 08/11/17

BUG Rating:

Zonal Summary

Lumens

% of Fixture

B2 U3 G2

Zone Ratings

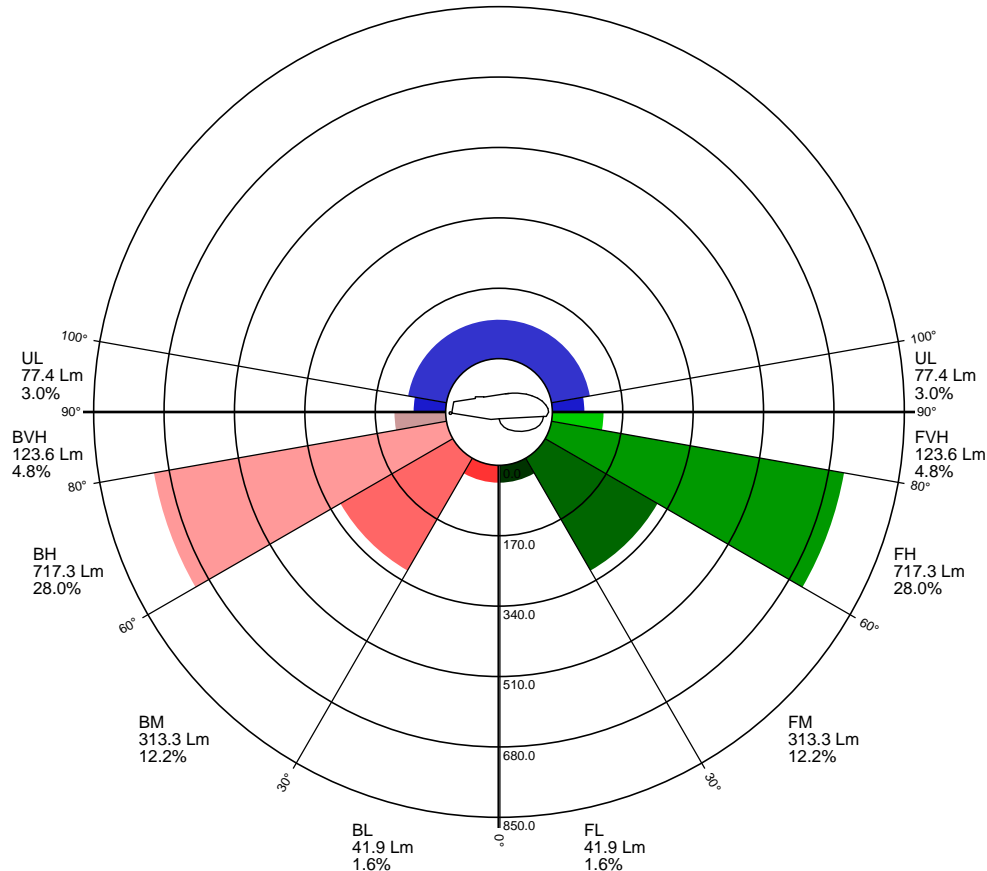
B U G

Forward		1196	46.7			
FL	(0° - 30°)	41.9	1.6			
FM	(30° - 60°)	313.3	12.2			
FH	(60° - 80°)	717.3	28.0			G1
FVH	(80° - 90°)	123.6	4.8			G2
Backward		1196	46.7			
BL	(0° - 30°)	41.9	1.6	B0		
BM	(30° - 60°)	313.3	12.2	B1		
BH	(60° - 80°)	717.3	28.0	B2		G1
BVH	(80° - 90°)	123.6	4.8			G2
Upward		171	6.7			
UL	(90° - 100°)	77.4	3.0		U3	
UH	(100° - 180°)	94.0	3.7		U3	
Trapped Light		0	0.0			
Total Flux		2564	100.0			

Zonal Lumen Summary

(Linear scale)

UH
94.0 Lm
3.7%



REPORT NUMBER: RAB03687

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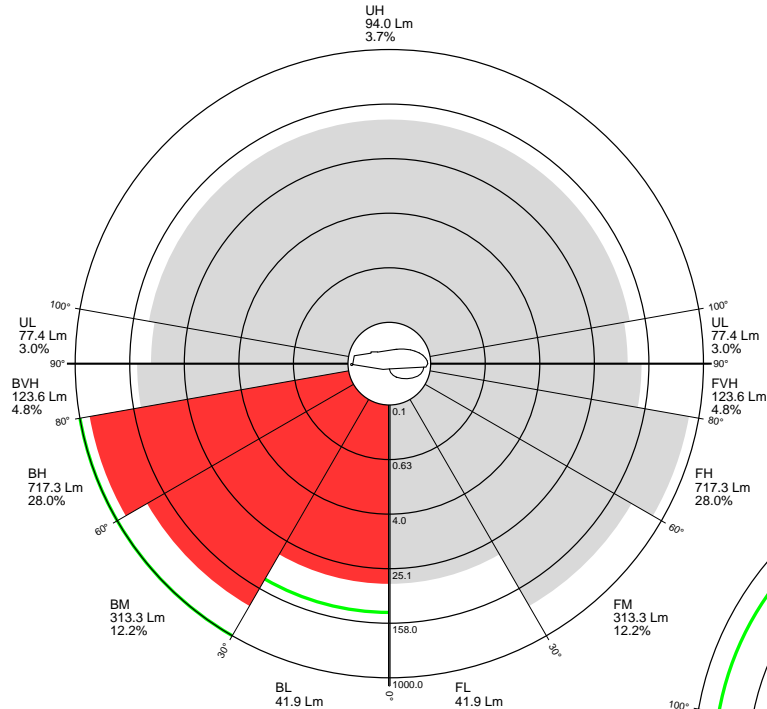
PREPARED FOR: RAB LIGHTING INC. RC LIGHTING

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DATE SAMPLE TESTED: 08/11/17

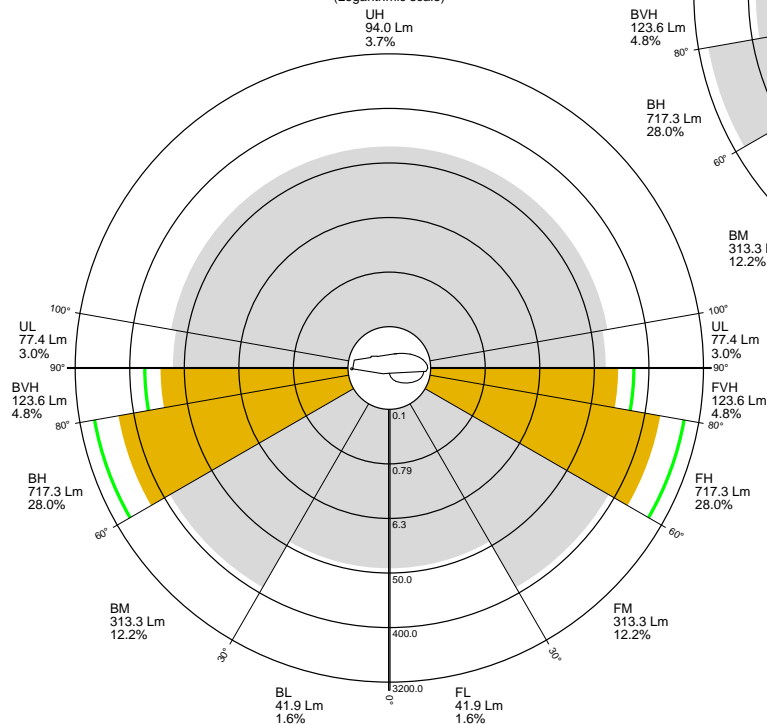
Backlight Rating Details

(Logarithmic scale)



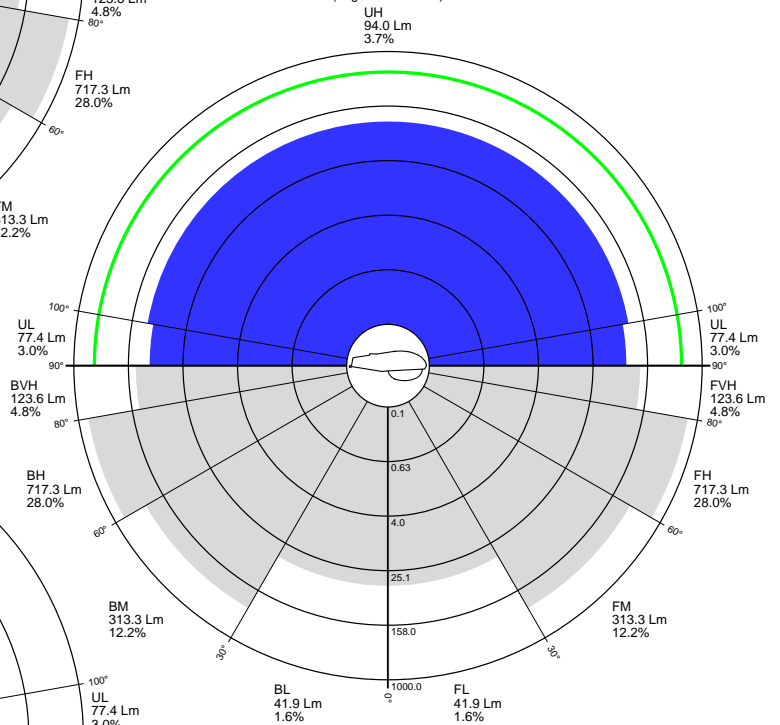
Glare Rating Details

(Logarithmic scale)



Uplight Rating Details

(Logarithmic scale)



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ISSUE DATE: 08/11/17

DATE SAMPLE TESTED: 08/11/17

PREPARED FOR: RAB LIGHTING INC. RC LIGHTING

CANDELA TABULATION

	STREET SIDE	LATERAL ANGLE										
		0.0	5.0	15.0	25.0	35.0	40.0	45.0	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.	0.	1.	1.	1.	1.	1.
	165.0	1.	1.	1.	1.	0.	0.	0.	0.	1.	1.	1.
	155.0	1.	1.	1.	1.	0.	0.	1.	1.	1.	1.	1.
	145.0	4.	4.	3.	3.	2.	2.	2.	2.	3.	4.	4.
	135.0	9.	9.	9.	8.	7.	7.	7.	7.	8.	9.	10.
	125.0	18.	18.	17.	16.	17.	18.	17.	17.	16.	17.	18.
	115.0	24.	24.	25.	27.	30.	32.	30.	30.	28.	25.	25.
	105.0	31.	31.	35.	41.	44.	48.	45.	45.	41.	36.	33.
	95.0	44.	45.	57.	71.	81.	88.	85.	80.	72.	60.	49.
	90.0	64.	67.	89.	116.	134.	146.	137.	132.	117.	92.	70.
	87.5	83.	87.	114.	152.	184.	201.	193.	185.	155.	119.	92.
	85.0	110.	115.	148.	208.	269.	300.	291.	275.	216.	160.	127.
V	82.5	165.	172.	211.	291.	393.	448.	445.	411.	311.	227.	189.
E	80.0	263.	269.	313.	413.	556.	671.	647.	577.	435.	333.	292.
R	77.5	421.	417.	463.	581.	750.	879.	817.	737.	575.	469.	424.
T	75.0	600.	602.	640.	722.	860.	1013.	950.	843.	678.	594.	558.
I	72.5<<	706.	713.	738.	800.	917.	1083.	998.	892.	754.	687.	660.
C	70.0	780.	786.	814.	854.	898.	1010.	924.	877.	809.	765.	738.
A	67.5	828.	833.	849.	843.	801.	845.	780.	791.	811.	810.	796.
L	65.0	807.	810.	802.	762.	671.	661.	616.	661.	740.	782.	794.
	62.5	722.	724.	702.	643.	540.	509.	483.	527.	627.	695.	718.
A	60.0	602.	603.	575.	516.	434.	407.	391.	420.	499.	564.	597.
N	57.5	470.	471.	450.	408.	362.	353.	338.	351.	392.	437.	459.
G	55.0	356.	357.	349.	334.	318.	325.	310.	311.	321.	335.	341.
L	52.5	278.	279.	282.	287.	293.	310.	295.	291.	282.	273.	267.
E	50.0	231.	232.	243.	261.	280.	303.	287.	279.	260.	239.	226.
	47.5	207.	209.	222.	247.	272.	297.	281.	272.	248.	222.	206.
	45.0	195.	197.	211.	237.	265.	292.	276.	266.	239.	212.	197.
	42.5	190.	192.	204.	229.	257.	284.	268.	258.	230.	205.	192.
	40.0	186.	189.	199.	220.	246.	274.	258.	247.	221.	200.	189.
	37.5	184.	186.	195.	212.	233.	260.	244.	234.	211.	195.	186.
	35.0	180.	182.	188.	201.	217.	241.	225.	217.	200.	188.	181.
	30.0	167.	169.	171.	173.	176.	192.	176.	174.	171.	168.	166.
	25.0	137.	138.	137.	132.	127.	136.	124.	125.	130.	134.	134.
	20.0	94.	95.	95.	91.	88.	94.	85.	87.	90.	94.	94.
	15.0	61.	61.	66.	65.	64.	68.	64.	64.	65.	65.	61.
	10.0	38.	39.	43.	46.	48.	51.	49.	48.	45.	43.	39.
	5.0	20.	20.	17.	15.	14.	13.	14.	14.	15.	17.	21.
	0.0	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.

||

PLANE OF MAXIMUM CANDELA

CONE OF MAXIMUM CANDELA

REPORT NUMBER: RAB03687

PAGE: 8 OF 9

ISSUE DATE: 08/11/17

DATE SAMPLE TESTED: 08/11/17

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.	1.	1.	1.	1.	1.	1.	1.
	165.0	1.	1.	1.	1.	0.	0.	0.	1.	1.	1.	1.
	155.0	1.	1.	1.	1.	1.	1.	0.	1.	1.	1.	1.
	145.0	4.	4.	4.	3.	2.	2.	2.	3.	3.	4.	4.
	135.0	10.	10.	9.	8.	7.	7.	7.	8.	9.	9.	9.
	125.0	18.	18.	17.	16.	17.	17.	17.	16.	17.	18.	18.
	115.0	25.	25.	25.	28.	30.	30.	30.	27.	25.	24.	24.
	105.0	33.	33.	36.	41.	45.	45.	44.	41.	35.	31.	31.
	95.0	48.	49.	60.	72.	80.	85.	81.	71.	57.	45.	44.
	90.0	66.	70.	92.	117.	132.	137.	134.	116.	89.	67.	64.
	87.5	87.	92.	119.	155.	185.	193.	184.	152.	114.	87.	83.
	85.0	119.	127.	160.	216.	275.	291.	269.	208.	148.	115.	110.
	82.5	180.	189.	227.	311.	411.	445.	393.	291.	211.	172.	165.
	80.0	281.	292.	333.	435.	577.	647.	556.	413.	313.	269.	263.
	77.5	420.	424.	469.	575.	737.	817.	750.	581.	463.	417.	421.
	75.0	554.	558.	594.	678.	843.	950.	860.	722.	640.	602.	600.
	72.5<<	651.	660.	687.	754.	892.	998.	917.	800.	738.	713.	706.
	70.0	730.	738.	765.	809.	877.	924.	898.	854.	814.	786.	780.
	67.5	794.	796.	810.	811.	791.	780.	801.	843.	849.	833.	828.
	65.0	793.	794.	782.	740.	661.	616.	671.	762.	802.	810.	807.
	62.5	717.	718.	695.	627.	527.	483.	540.	643.	702.	724.	722.
	60.0	599.	597.	564.	499.	420.	391.	434.	516.	575.	603.	602.
	57.5	461.	459.	437.	392.	351.	338.	362.	408.	450.	471.	470.
	55.0	342.	341.	335.	321.	311.	310.	318.	334.	349.	357.	356.
	52.5	266.	267.	273.	282.	291.	295.	293.	287.	282.	279.	278.
	50.0	224.	226.	239.	260.	279.	287.	280.	261.	243.	232.	231.
	47.5	204.	206.	222.	248.	272.	281.	272.	247.	222.	209.	207.
	45.0	195.	197.	212.	239.	266.	276.	265.	237.	211.	197.	195.
	42.5	190.	192.	205.	230.	258.	268.	257.	229.	204.	192.	190.
	40.0	186.	189.	200.	221.	247.	258.	246.	220.	199.	189.	186.
	37.5	184.	186.	195.	211.	234.	244.	233.	212.	195.	186.	184.
35.0	179.	181.	188.	200.	217.	225.	217.	201.	188.	182.	180.	
30.0	165.	166.	168.	171.	174.	176.	176.	173.	171.	169.	167.	
25.0	134.	134.	134.	130.	125.	124.	127.	132.	137.	138.	137.	
20.0	94.	94.	94.	90.	87.	85.	88.	91.	95.	95.	94.	
15.0	61.	61.	65.	65.	64.	64.	64.	65.	66.	61.	61.	
10.0	38.	39.	43.	45.	48.	49.	48.	46.	43.	39.	38.	
5.0	21.	21.	17.	15.	14.	14.	14.	15.	17.	20.	20.	
0.0	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	

CONE OF MAXIMUM CANDELA

REPORT NUMBER: RAB03687

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	2
10- 15	6
15- 20	13
20- 25	23
25- 30	39
30- 35	55
35- 40	70
40- 45	84
45- 50	99
50- 55	126
55- 60	192
60- 65	305
65- 70	406
70- 75	413
75- 80	311
80- 85	166
85- 90	81
90- 95	46
95-100	31
100-105	23
105-110	19
110-115	15
115-120	12
120-125	9
125-130	6
130-135	4
135-140	2
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	2
0- 20	22
0- 30	84
0- 40	210
0- 50	393
0- 60	710
0- 70	1421
0- 80	2145
0- 90	2392
0-100	2470
0-110	2512
0-120	2539
0-130	2554
0-140	2561
0-150	2563
0-160	2563
0-170	2563
0-180	2564

REPORT NUMBER: RAB03655
DATE: 7/25/2017
PREPARED FOR: RAB LIGHTING INC. RC LIGHTING
CATALOG NUMBER: BLED24N, BLED24N/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 (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	<u>X.CAO</u>
Approved	<u>D.WANG-MUNSON</u> Lighting Engineer

REPORT NUMBER: RAB03655
 DATE: 7/25/2017
 PREPARED FOR: RAB LIGHTING INC. RC LIGHTING
 CATALOG NUMBER: BLED24N, BLED24N/D10 (42" SQUARE BOLLARD)

Page 2 of 4

RESULTS:

PHOTOMETRIC	
Total Integrated Flux (lumens)	2564 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.3804
Chromaticity Ordinate y	0.3757
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2255
Chromaticity Ordinate v'	0.5011
Correlated Color Temp CCT (K)	3992
ANSI C78.377-2008 Duv	0.000
Total Radiant Flux (milliWatts)	7434 *
ELECTRICAL	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.091
Input Power (Watts)	23.0
Input Power Factor (%)	91.3
Input Current THD (%)	11.6
Input Voltage THD (%)	0.2
EFFICACY (Lumens/Watt)	
	111.5
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.188
Input Power (Watts)	22.3
Input Power Factor (%)	98.8
Input Current THD (%)	11.8
Input Voltage THD (%)	0.2
Off-State Power (Watts)	0.0

COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	72
R1 Light greyish red	69
R2 Dark greyish yellow	79
R3 Strong yellowish green	85
R4 Moderate yellowish green	71
R5 Light bluish green	69
R6 Light blue	70
R7 Light violet	81
R8 Light reddish purple	53
R9 Strong red	-27
R10 Strong yellow	49
R11 Strong green	65
R12 Strong blue	40
R13 Light yellowish pink (skin)	71
R14 Moderate olive green (leaf)	92

*NOTE:

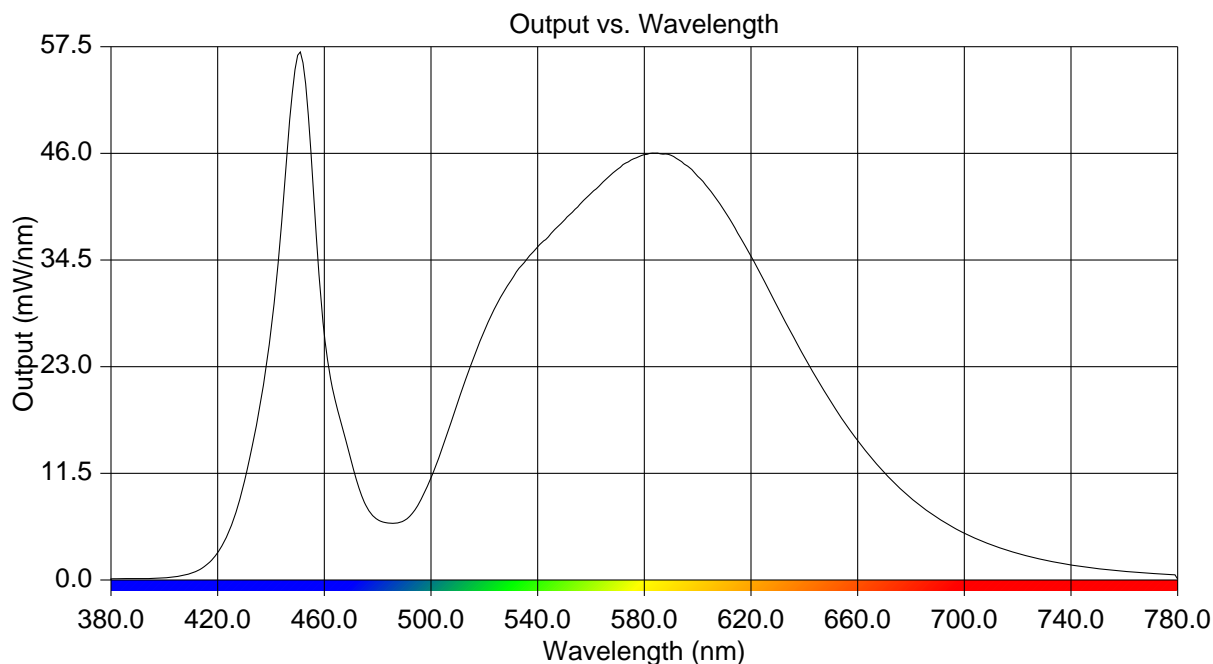
Proper calibration of integrating spheres for measuring total flux output of non-directional samples will produce reliable, repeatable results within the calibration tolerances of the equipment used. However, measurement of test samples with significant self absorption and/or directional output, even 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: RAB03655
 DATE: 7/25/2017
 PREPARED FOR: RAB LIGHTING INC. RC LIGHTING
 CATALOG NUMBER: BLED24N, BLED24N/D10 (42" SQUARE BOLLARD)

Page 3 of 4

RESULTS:

Wavelength	mW per nm	Wavelength	mW per nm	Wavelength	mW per nm
380	0.123	515	23.222	650	19.192
385	0.137	520	26.870	655	17.013
390	0.148	525	29.916	660	15.035
395	0.167	530	32.283	665	13.205
400	0.240	535	34.232	670	11.587
405	0.376	540	35.885	675	10.118
410	0.720	545	37.354	680	8.843
415	1.450	550	38.805	685	7.677
420	2.946	555	40.209	690	6.703
425	5.793	560	41.683	695	5.818
430	10.586	565	43.055	700	5.051
435	17.313	570	44.293	705	4.389
440	26.872	575	45.277	710	3.802
445	42.308	580	45.862	715	3.308
450	56.573	585	46.025	720	2.872
455	46.055	590	45.790	725	2.487
460	26.451	595	44.835	730	2.152
465	18.304	600	43.527	735	1.867
470	12.940	605	41.877	740	1.623
475	8.377	610	39.820	745	1.412
480	6.504	615	37.402	750	1.231
485	6.122	620	34.856	755	1.069
490	6.416	625	32.261	760	0.934
495	8.010	630	29.411	765	0.810
500	11.011	635	26.704	770	0.707
505	14.821	640	24.043	775	0.623
510	19.145	645	21.558	780	0.094



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CIE Chromaticity Diagram

