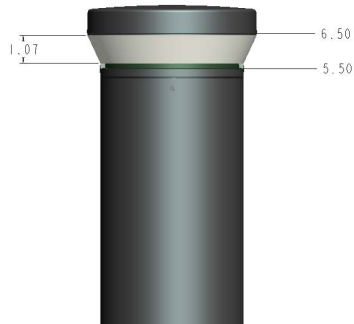


## ISOFOOTCANDLE LINES OF HORIZONTAL ILLUMINATION

Values based on 3.5 foot mounting height.



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DATE SAMPLE TESTED: 07/21/17

PREPARED FOR: RAB LIGHTING INC. RC LIGHTING

CATALOG NUMBER: BLEDR24Y, BLEDR24Y/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, 4 WHITE CIRCUIT BOARDS EACH WITH 3 LEDS, 4 WHITE CIRCUIT BOARDS EACH WITH 2 LEDS, FROSTED PLASTIC LENS, CAST BROWN PAINTED METAL BOTTOM.

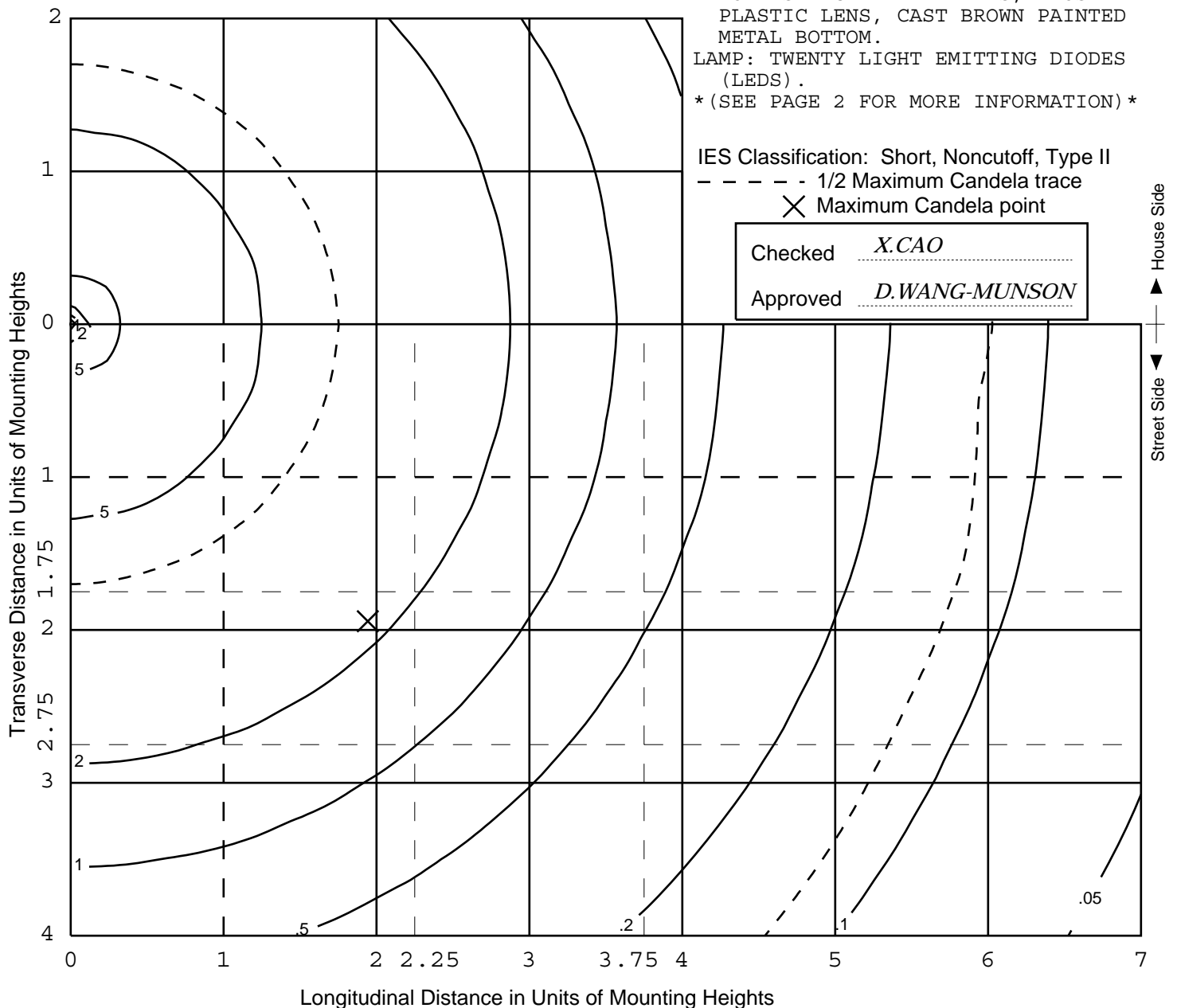
LAMP: TWENTY LIGHT EMITTING DIODES (LEDS).

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

IES Classification: Short, Noncutoff, Type II

--- 1/2 Maximum Candela trace

X Maximum Candela point



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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 = 22.77 W AT 277.0 VAC.

LED DRIVER: RDF25U7-39

TEST PROCEDURE: IESNA LM-79-08

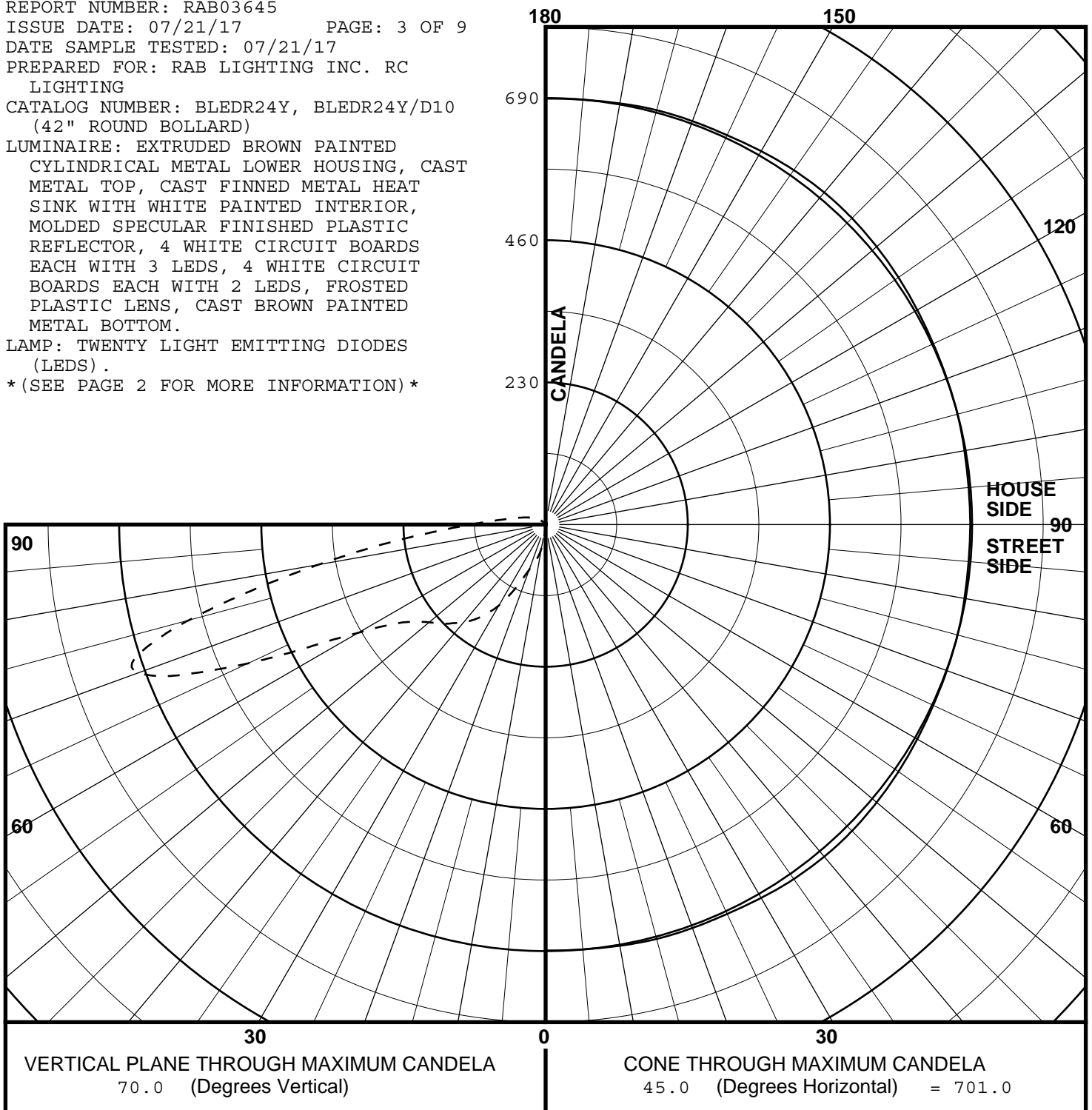
LM-80 DATA AVAILABLE FROM MANUFACTURER FOR SOLID STATE SOURCE

AMBIENT: 25.1

ACCREDITED LABORATORY CODE 201058-0

## MAXIMUM PLANE AND MAXIMUM CONE PLOTS OF CANDELA

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 PREPARED FOR: RAB LIGHTING INC. RC  
 LIGHTING  
 CATALOG NUMBER: BLEDR24Y, BLEDR24Y/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, 4 WHITE CIRCUIT BOARDS  
 EACH WITH 3 LEDS, 4 WHITE CIRCUIT  
 BOARDS EACH WITH 2 LEDS, FROSTED  
 PLASTIC LENS, CAST BROWN PAINTED  
 METAL BOTTOM.  
 LAMP: TWENTY LIGHT EMITTING DIODES  
 (LEDS).  
 \*(SEE PAGE 2 FOR MORE INFORMATION)\*



REPORT NUMBER: RAB03645

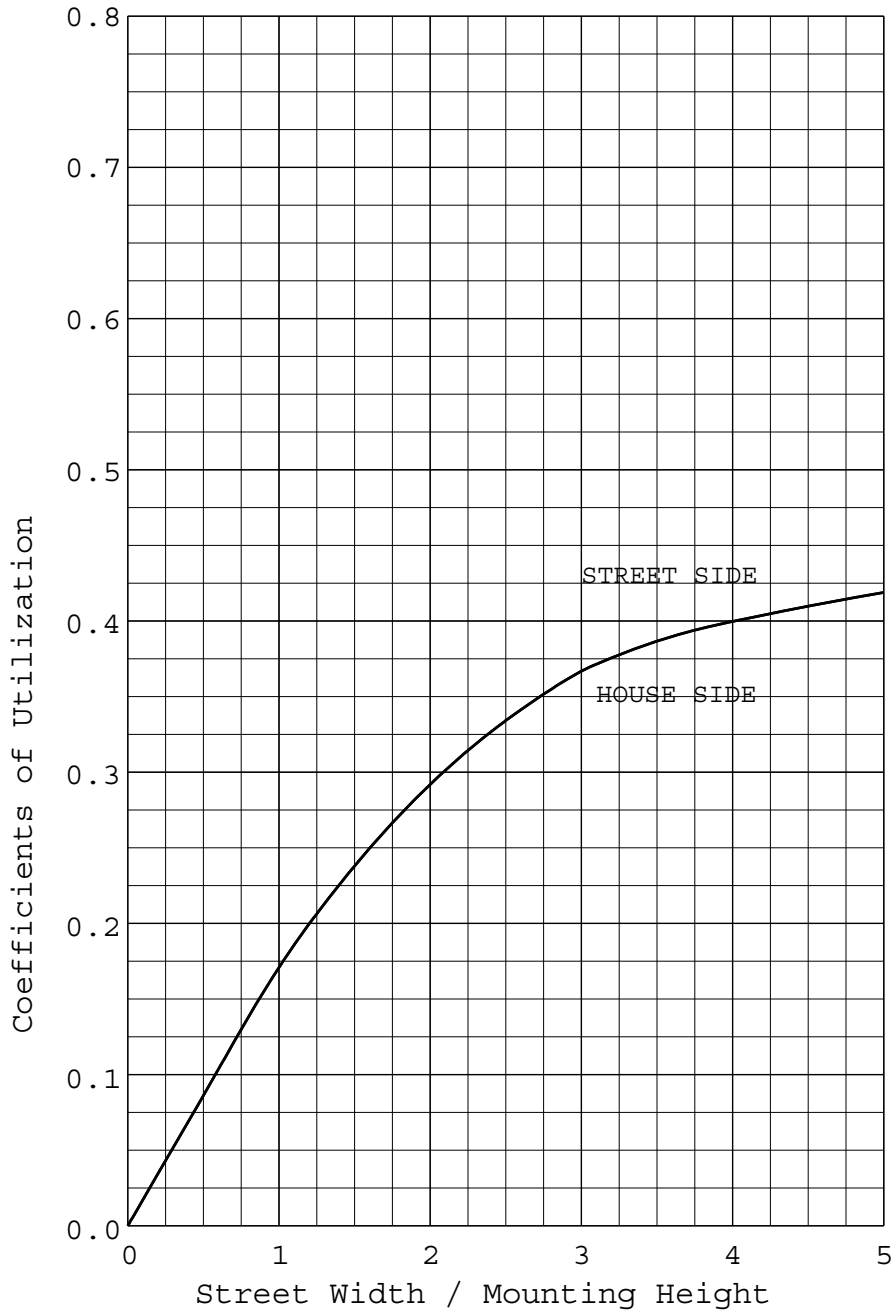
PAGE: 4 OF 9

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PREPARED FOR: RAB LIGHTING INC. RC LIGHTING

## COEFFICIENTS OF UTILIZATION AND FLUX DISTRIBUTION



	LUMENS	PERCENT OF FIXTURE
DOWNWARD STREET SIDE	994.	45.7
DOWNWARD HOUSE SIDE	994.	45.7
DOWNWARD TOTAL	1989.	91.5
UPWARD STREET SIDE	93.	4.3
UPWARD HOUSE SIDE	93.	4.3
UPWARD TOTAL	185.	8.5
TOTAL FLUX	2174.	100.0
TOTAL INPUT WATTS = 22.8		
EFFICACY = 95.4 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.

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PREPARED FOR: RAB LIGHTING INC. RC LIGHTING

BUG Rating:

Zonal Summary

Lumens

% of Fixture

B2 U3 G2

Zone Ratings

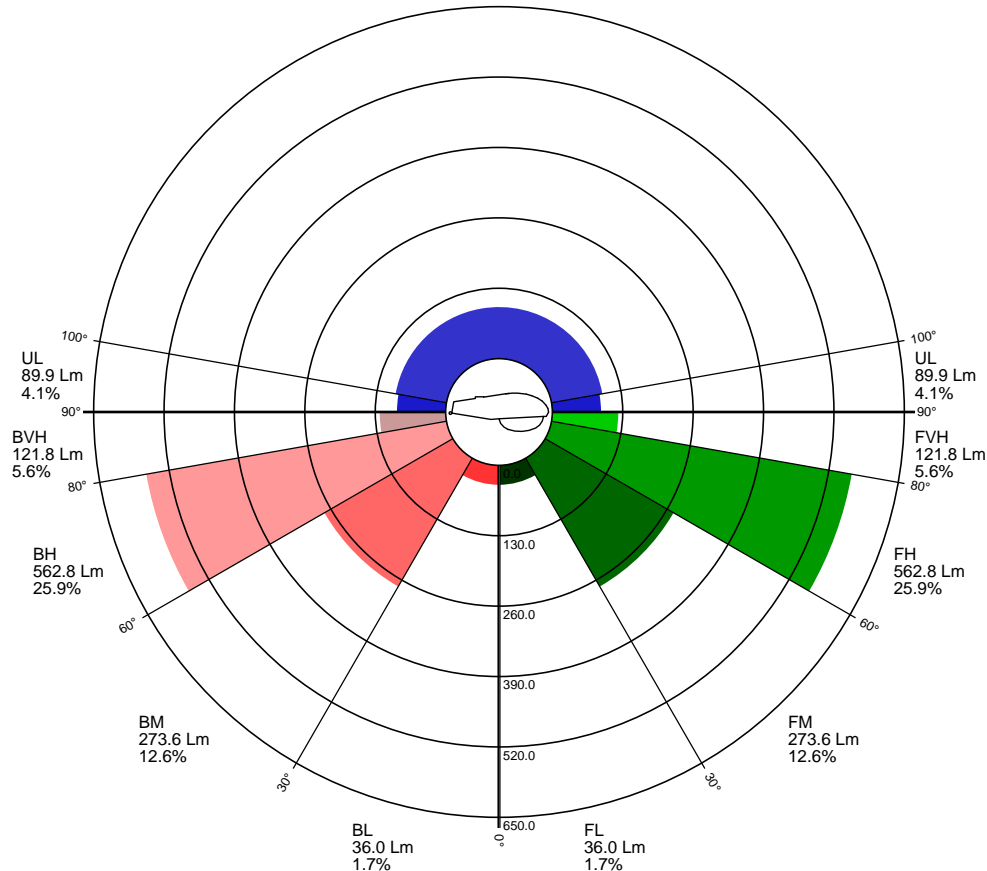
B U G

Forward		994	45.7			
FL	(0° - 30°)	36.0	1.7			
FM	(30° - 60°)	273.6	12.6			
FH	(60° - 80°)	562.8	25.9			G0
FVH	(80° - 90°)	121.8	5.6			G2
Backward		994	45.7			
BL	(0° - 30°)	36.0	1.7	B0		
BM	(30° - 60°)	273.6	12.6	B1		
BH	(60° - 80°)	562.8	25.9	B2		G0
BVH	(80° - 90°)	121.8	5.6			G2
Upward		185	8.5			
UL	(90° - 100°)	89.9	4.1		U3	
UH	(100° - 180°)	95.3	4.4		U3	
Trapped Light		0	0.0			
Total Flux		2174	100.0			

### Zonal Lumen Summary

(Linear scale)

UH  
95.3 Lm  
4.4%



REPORT NUMBER: RAB03645

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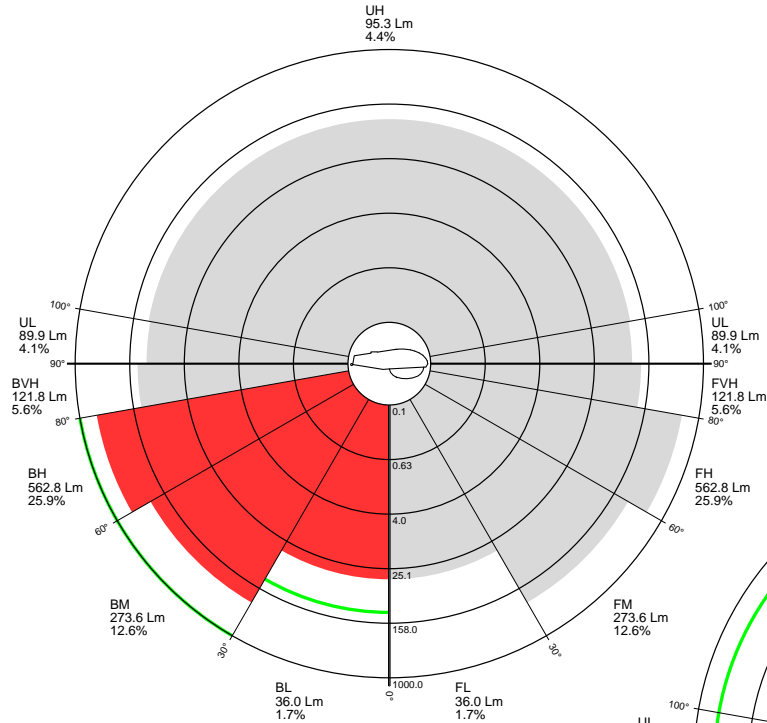
PREPARED FOR: RAB LIGHTING INC. RC LIGHTING

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DATE SAMPLE TESTED: 07/21/17

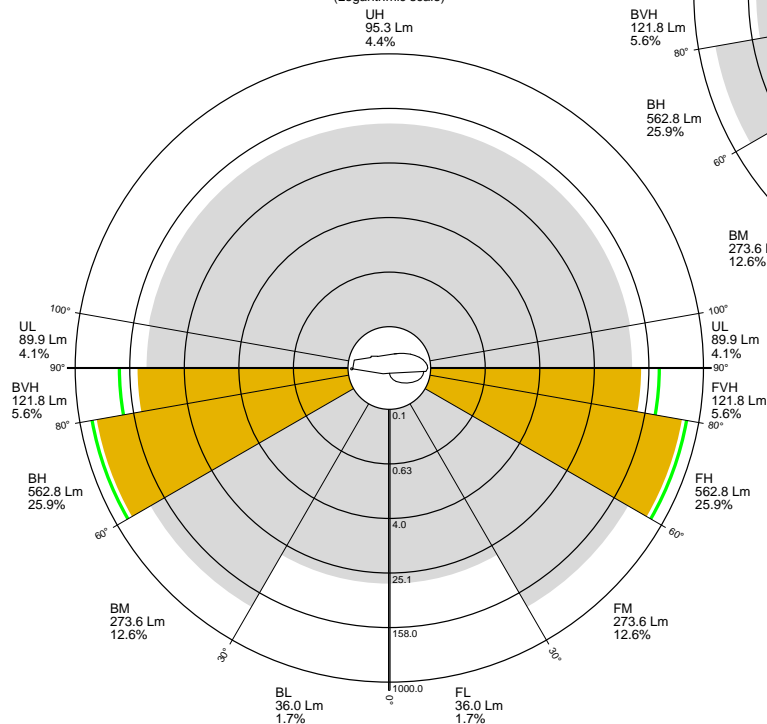
## Backlight Rating Details

(Logarithmic scale)



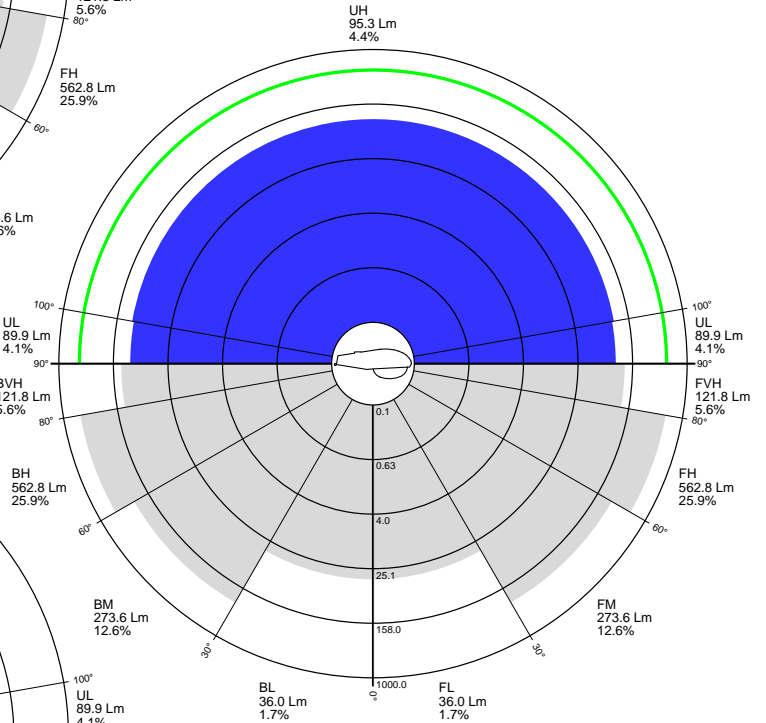
## Glare Rating Details

(Logarithmic scale)



## Uplight Rating Details

(Logarithmic scale)



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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	2.	2.	2.	2.	2.	2.	2.	2.	2.
	175.0	2.	2.	2.	2.	2.	2.	2.	2.	2.
	165.0	1.	1.	1.	1.	1.	1.	1.	1.	1.
	155.0	1.	1.	1.	1.	1.	1.	1.	1.	1.
	145.0	3.	3.	3.	3.	3.	3.	3.	3.	3.
	135.0	7.	7.	7.	7.	7.	7.	7.	7.	7.
	125.0	15.	15.	15.	15.	15.	15.	15.	15.	15.
	115.0	26.	26.	26.	26.	26.	26.	26.	26.	26.
	105.0	43.	43.	43.	43.	43.	43.	43.	43.	43.
	95.0	79.	79.	79.	79.	79.	79.	78.	78.	78.
	90.0	121.	120.	121.	121.	121.	121.	122.	121.	120.
	87.5	156.	156.	157.	158.	158.	158.	158.	158.	156.
	85.0	208.	208.	210.	210.	211.	211.	212.	210.	209.
V	82.5	277.	276.	281.	281.	282.	284.	284.	282.	280.
E	80.0	364.	363.	368.	369.	371.	373.	371.	370.	367.
R	77.5	470.	471.	475.	476.	478.	481.	480.	479.	477.
T	75.0	585.	587.	590.	592.	595.	598.	593.	596.	592.
I	72.5	672.	676.	677.	681.	683.	687.	682.	683.	679.
C	70.0<<	689.	690.	694.	695.	700.	701.	697.	692.	690.
A	67.5	627.	631.	633.	633.	637.	635.	634.	625.	617.
L	65.0	526.	530.	534.	534.	531.	531.	526.	520.	511.
	62.5	428.	429.	430.	431.	424.	425.	422.	415.	411.
A	60.0	357.	355.	357.	356.	353.	350.	350.	347.	343.
N	57.5	310.	309.	308.	310.	305.	303.	302.	301.	299.
G	55.0	280.	280.	280.	279.	277.	275.	273.	273.	274.
L	52.5	262.	262.	261.	260.	259.	258.	256.	256.	257.
E	50.0	249.	249.	248.	247.	247.	246.	244.	244.	245.
	47.5	239.	239.	238.	237.	237.	236.	234.	234.	235.
	45.0	230.	230.	229.	228.	228.	227.	225.	225.	226.
	42.5	221.	220.	219.	219.	218.	216.	216.	216.	218.
	40.0	211.	211.	209.	208.	208.	206.	206.	206.	208.
	37.5	200.	199.	198.	197.	196.	195.	195.	196.	197.
	35.0	186.	186.	185.	185.	183.	182.	182.	183.	185.
	30.0	152.	152.	152.	151.	151.	151.	151.	152.	152.
	25.0	110.	110.	110.	110.	111.	111.	111.	110.	109.
	20.0	77.	77.	77.	77.	78.	77.	77.	77.	76.
	15.0	59.	59.	59.	59.	59.	59.	58.	58.	58.
	10.0	41.	41.	41.	40.	40.	40.	40.	40.	41.
	5.0	10.	9.	9.	9.	10.	10.	11.	10.	11.
	0.0	0.	0.	0.	0.	0.	0.	0.	0.	0.

||

PLANE OF MAXIMUM CANDELA

CONE OF MAXIMUM CANDELA

REPORT NUMBER: RAB03645

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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	2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
	175.0	2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
	165.0	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
	155.0	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
	145.0	3.	3.	3.	3.	3.	3.	3.	3.	3.	3.
	135.0	7.	7.	7.	7.	7.	7.	7.	7.	7.	7.
	125.0	15.	15.	15.	15.	15.	15.	15.	15.	15.	15.
	115.0	26.	26.	26.	26.	26.	26.	26.	26.	26.	26.
	105.0	43.	43.	43.	43.	43.	43.	43.	43.	43.	43.
	95.0	78.	78.	78.	78.	79.	79.	79.	79.	79.	79.
	90.0	120.	120.	121.	121.	122.	121.	121.	121.	121.	120.
	87.5	157.	156.	158.	158.	158.	158.	158.	158.	157.	156.
	85.0	210.	209.	212.	210.	212.	211.	211.	210.	210.	208.
V	82.5	280.	280.	284.	282.	284.	284.	282.	281.	281.	276.
E	80.0	372.	367.	372.	370.	371.	373.	371.	369.	368.	363.
R	77.5	483.	477.	482.	479.	480.	481.	478.	476.	475.	471.
T	75.0	600.	592.	599.	596.	593.	598.	595.	592.	590.	587.
I	72.5	680.	679.	683.	683.	682.	687.	683.	681.	677.	676.
C	70.0 <<	687.	687.	690.	692.	697.	701.	700.	695.	694.	690.
A	67.5	612.	616.	617.	625.	634.	635.	637.	633.	633.	631.
L	65.0	503.	508.	511.	520.	526.	531.	531.	534.	534.	530.
	62.5	406.	410.	411.	415.	422.	425.	424.	431.	430.	429.
A	60.0	343.	345.	343.	347.	350.	350.	353.	356.	357.	355.
N	57.5	300.	301.	299.	301.	302.	303.	305.	310.	308.	309.
G	55.0	273.	274.	273.	273.	273.	275.	277.	279.	280.	280.
L	52.5	257.	257.	256.	256.	256.	258.	259.	260.	261.	262.
E	50.0	245.	245.	244.	244.	244.	246.	247.	247.	248.	249.
	47.5	236.	236.	235.	234.	234.	236.	237.	237.	238.	239.
	45.0	228.	227.	226.	225.	225.	227.	228.	228.	229.	230.
	42.5	219.	218.	216.	216.	216.	216.	218.	219.	219.	220.
	40.0	209.	208.	207.	206.	206.	206.	208.	208.	209.	211.
	37.5	197.	197.	197.	196.	195.	195.	196.	197.	198.	199.
	35.0	185.	185.	185.	183.	182.	182.	183.	185.	185.	186.
	30.0	152.	152.	152.	152.	151.	151.	151.	151.	152.	152.
	25.0	109.	110.	109.	110.	111.	111.	111.	110.	110.	110.
	20.0	76.	76.	76.	77.	77.	77.	78.	77.	77.	77.
	15.0	58.	58.	58.	58.	58.	59.	59.	59.	59.	59.
	10.0	41.	41.	40.	40.	40.	40.	40.	40.	41.	41.
	5.0	11.	11.	9.	10.	11.	10.	10.	9.	9.	10.
	0.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

CONE OF MAXIMUM CANDELA



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PREPARED FOR: RAB LIGHTING INC. RC LIGHTING

### 5-DEGREE

#### ZONAL LUMEN SUMMARY

0- 5	0
5- 10	2
10- 15	6
15- 20	11
20- 25	20
25- 30	33
30- 35	50
35- 40	66
40- 45	81
45- 50	96
50- 55	113
55- 60	143
60- 65	209
65- 70	314
70- 75	346
75- 80	257
80- 85	155
85- 90	88
90- 95	54
95-100	36
100-105	26
105-110	20
110-115	15
115-120	11
120-125	8
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	19
0- 30	72
0- 40	187
0- 50	363
0- 60	619
0- 70	1142
0- 80	1745
0- 90	1989
0-100	2078
0-110	2125
0-120	2151
0-130	2165
0-140	2171
0-150	2173
0-160	2173
0-170	2174
0-180	2174

REPORT NUMBER: RAB03653  
 DATE: 7/24/2017  
 PREPARED FOR: RAB LIGHTING INC. RC LIGHTING  
 CATALOG NUMBER: BLEDR24Y, BLEDR24Y/D10 (42" ROUND BOLLARD)

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, 4 WHITE CIRCUIT BOARDS EACH WITH 3 LEDS, 4 WHITE CIRCUIT BOARDS EACH WITH 2 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:
	CHROMA PROGRAMMABLE DIGITAL POWER METER MODEL 66202	N/A
	OCEAN OPTICS QE65PRO Spectroradiometer	3/01/18
	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<sub>a</sub>,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: RAB03653  
 DATE: 7/24/2017  
 PREPARED FOR: RAB LIGHTING INC. RC LIGHTING  
 CATALOG NUMBER: BLEDR24Y, BLEDR24Y/D10 (42" ROUND BOLLARD)

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### RESULTS:

PHOTOMETRIC	
Total Integrated Flux (lumens)	2174 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.4372
Chromaticity Ordinate y	0.4071
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2494
Chromaticity Ordinate v'	0.5226
Correlated Color Temp CCT (K)	3020
ANSI C78.377-2008 Duv	0.001
Total Radiant Flux (milliWatts)	6637 *
ELECTRICAL	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.090
Input Power (Watts)	22.8
Input Power Factor (%)	91.7
Input Current THD (%)	12.3
Input Voltage THD (%)	0.2
EFFICACY (Lumens/Watt)	
	95.4
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.187
Input Power (Watts)	22.1
Input Power Factor (%)	98.7
Input Current THD (%)	12.2
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	11
R10 Strong yellow	84
R11 Strong green	80
R12 Strong blue	74
R13 Light yellowish pink (skin)	85
R14 Moderate olive green (leaf)	98

### \*NOTE:

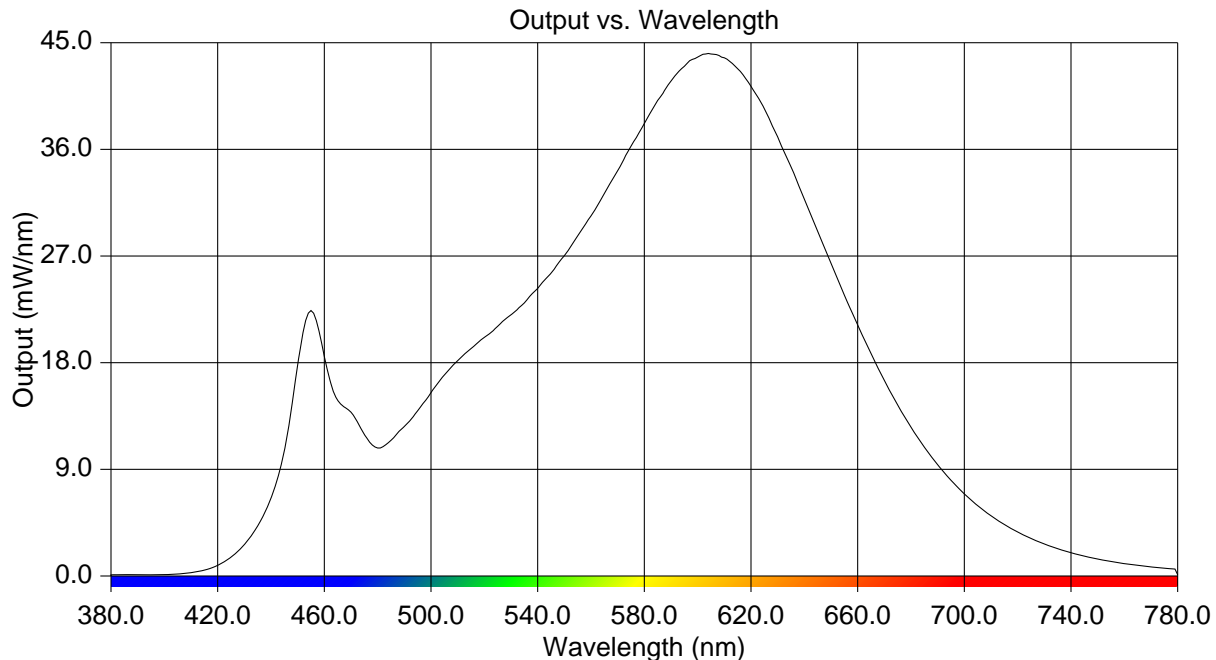
Proper calibration of integrating spheres for measuring total flux output of non-directional samples will produce reliable, repeatable results within the calibration tolerances of the equipment used. However, measurement of test samples with significant self absorption and/or directional output, even 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: RAB03653  
 DATE: 7/24/2017  
 PREPARED FOR: RAB LIGHTING INC. RC LIGHTING  
 CATALOG NUMBER: BLEDR24Y, BLEDR24Y/D10 (42" ROUND BOLLARD)

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### RESULTS:

Wavelength	mW per nm	Wavelength	mW per nm	Wavelength	mW per nm
380	0.096	515	19.187	650	26.376
385	0.111	520	20.140	655	23.703
390	0.100	525	21.068	660	21.194
395	0.105	530	22.051	665	18.726
400	0.125	535	23.039	670	16.510
405	0.167	540	24.264	675	14.444
410	0.277	545	25.542	680	12.544
415	0.493	550	27.026	685	10.859
420	0.905	555	28.697	690	9.379
425	1.594	560	30.389	695	8.075
430	2.658	565	32.270	700	6.936
435	4.221	570	34.197	705	5.933
440	6.537	575	36.265	710	5.075
445	10.625	580	38.195	715	4.353
450	17.725	585	40.125	720	3.705
455	22.398	590	41.757	725	3.157
460	18.516	595	43.004	730	2.700
465	14.824	600	43.783	735	2.295
470	13.822	605	44.043	740	1.962
475	11.957	610	43.723	745	1.676
480	10.799	615	42.800	750	1.435
485	11.447	620	41.313	755	1.218
490	12.608	625	39.438	760	1.042
495	13.942	630	37.053	765	0.900
500	15.474	635	34.533	770	0.770
505	16.937	640	31.820	775	0.659
510	18.199	645	29.105	780	0.099



REPORT NUMBER: RAB03653  
DATE: 7/24/2017  
PREPARED FOR: RAB LIGHTING INC. RC LIGHTING  
CATALOG NUMBER: BLEDR24Y, BLEDR24Y/D10 (42" ROUND BOLLARD)

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## CIE Chromaticity Diagram

