



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

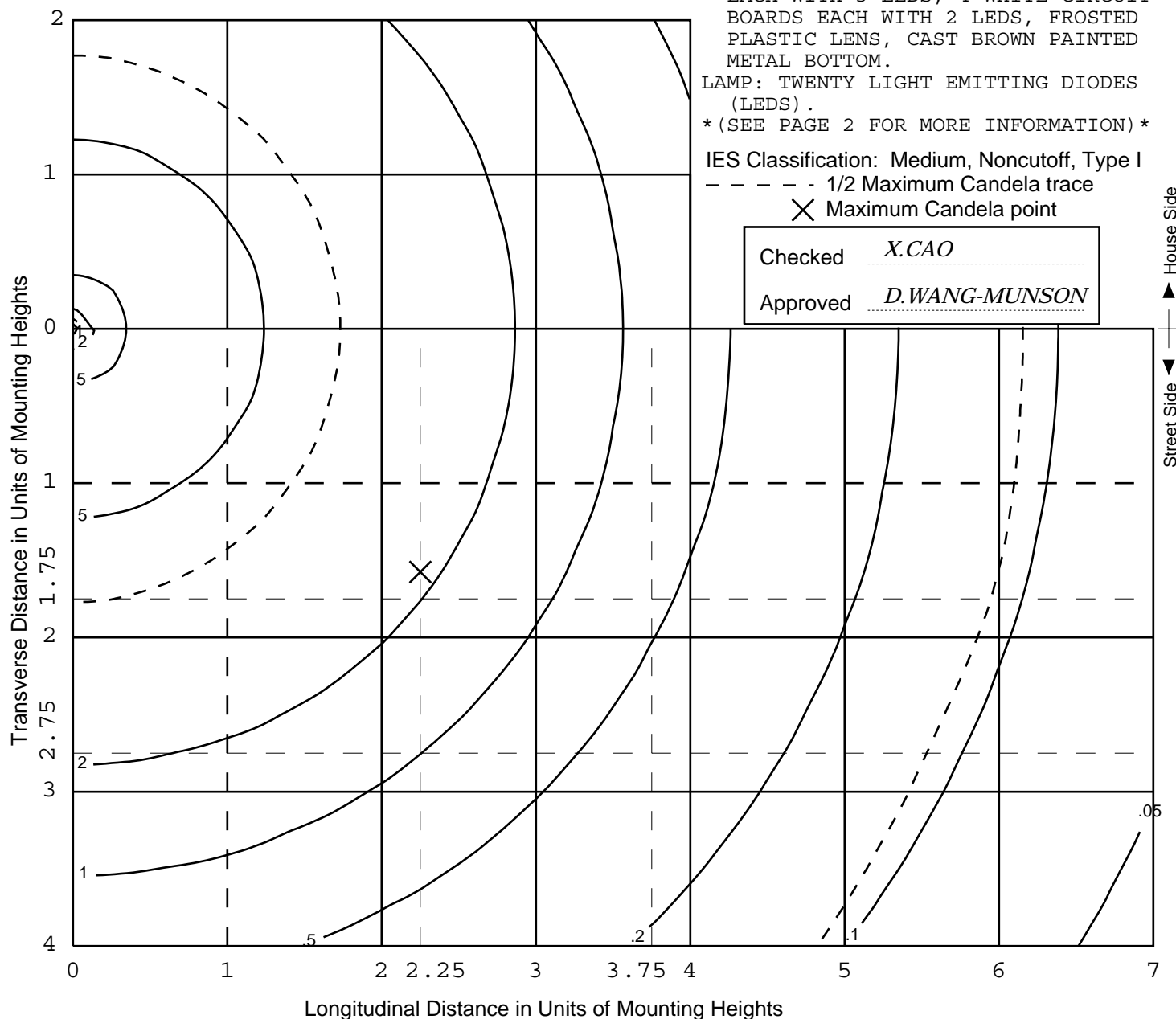
IES Classification: Medium, Noncutoff, Type I

— — — — - 1/2 Maximum Candela trace

✕ Maximum Candela point

Checked X.CAO

Approved D. WANG-MUNSON



REPORT NUMBER: RAB03695

PAGE: 2 OF 9

ISSUE DATE: 08/14/17

DATE SAMPLE TESTED: 08/14/17

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 = 21.731 W AT 347.0 VAC.

LED DRIVER: RDD-LT40-A0700-60PF

TEST PROCEDURE: IESNA LM-79-08

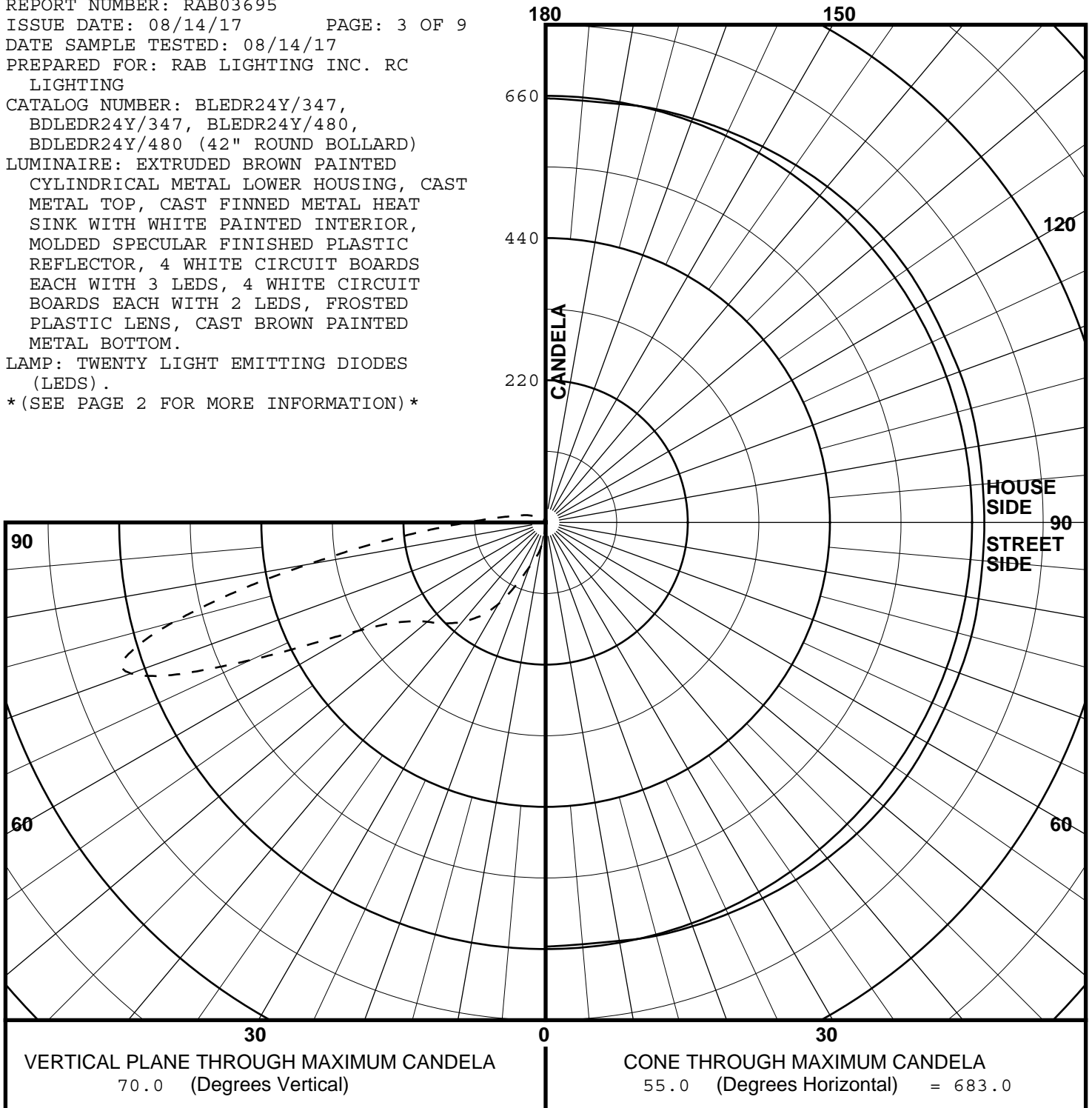
LM-80 DATA AVAILABLE FROM MANUFACTURER FOR SOLID STATE SOURCE

AMBIENT: 24.8

ACCREDITED LABORATORY CODE 201058-0

## MAXIMUM PLANE AND MAXIMUM CONE PLOTS OF CANDELA

REPORT NUMBER: RAB03695  
 ISSUE DATE: 08/14/17 PAGE: 3 OF 9  
 DATE SAMPLE TESTED: 08/14/17  
 PREPARED FOR: RAB LIGHTING INC. RC  
 LIGHTING  
 CATALOG NUMBER: BLEDR24Y/347,  
 BDLEDR24Y/347, BLEDR24Y/480,  
 BDLEDR24Y/480 (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: RAB03695

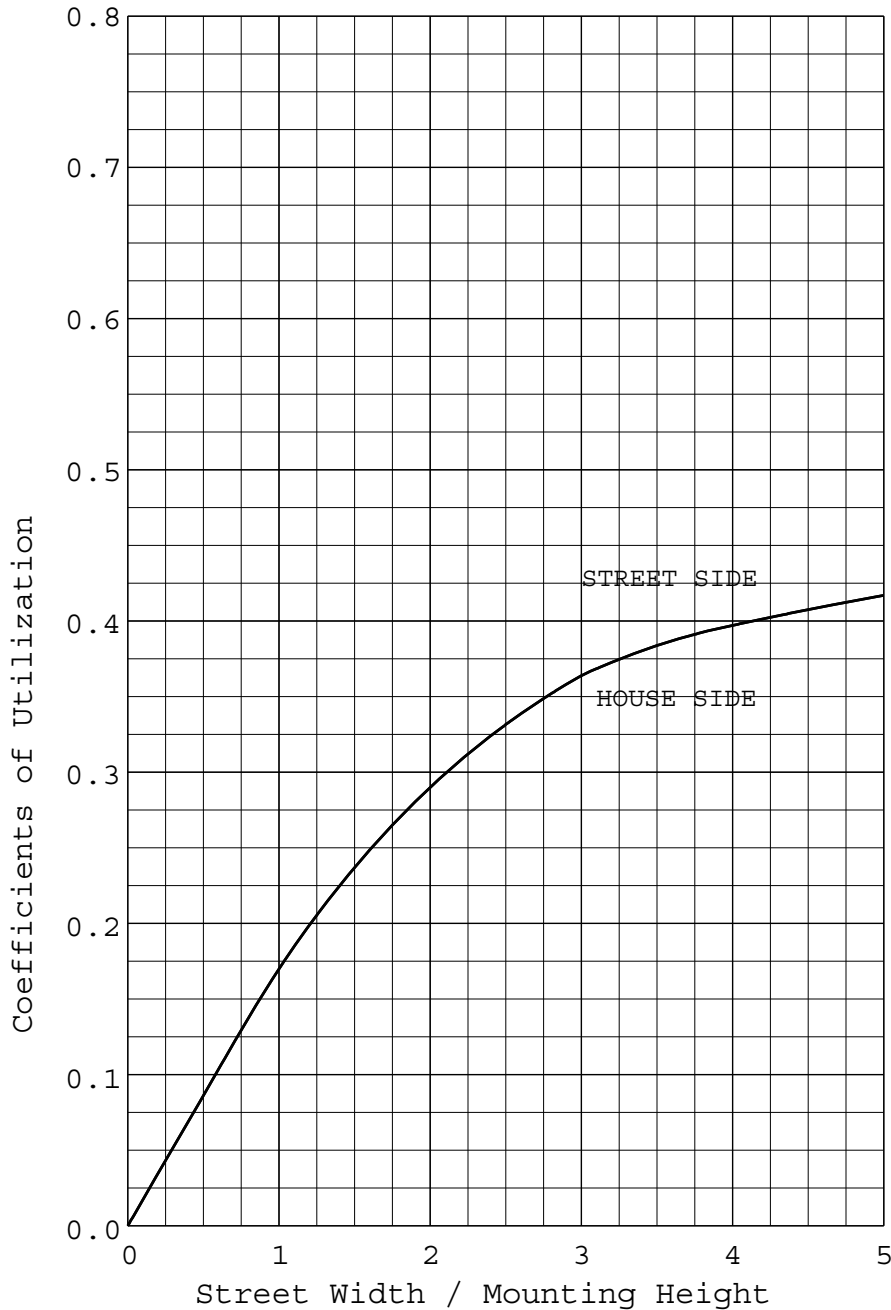
PAGE: 4 OF 9

ISSUE DATE: 08/14/17

DATE SAMPLE TESTED: 08/14/17

PREPARED FOR: RAB LIGHTING INC. RC LIGHTING

# COEFFICIENTS OF UTILIZATION AND FLUX DISTRIBUTION



	LUMENS	PERCENT OF FIXTURE
DOWNWARD STREET SIDE	970.	45.7
DOWNWARD HOUSE SIDE	970.	45.7
DOWNWARD TOTAL	1940.	91.5
UPWARD STREET SIDE	90.	4.3
UPWARD HOUSE SIDE	90.	4.3
UPWARD TOTAL	180.	8.5
TOTAL FLUX	2120.	100.0
TOTAL INPUT WATTS = 21.7		
EFFICACY = 97.7 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: RAB03695

ISSUE DATE: 08/14/17

PREPARED FOR: RAB LIGHTING INC. RC LIGHTING

PAGE: 5 OF 9

DATE SAMPLE TESTED: 08/14/17

BUG Rating:

Zonal Summary

Lumens

% of Fixture

B2 U3 G2

Zone Ratings

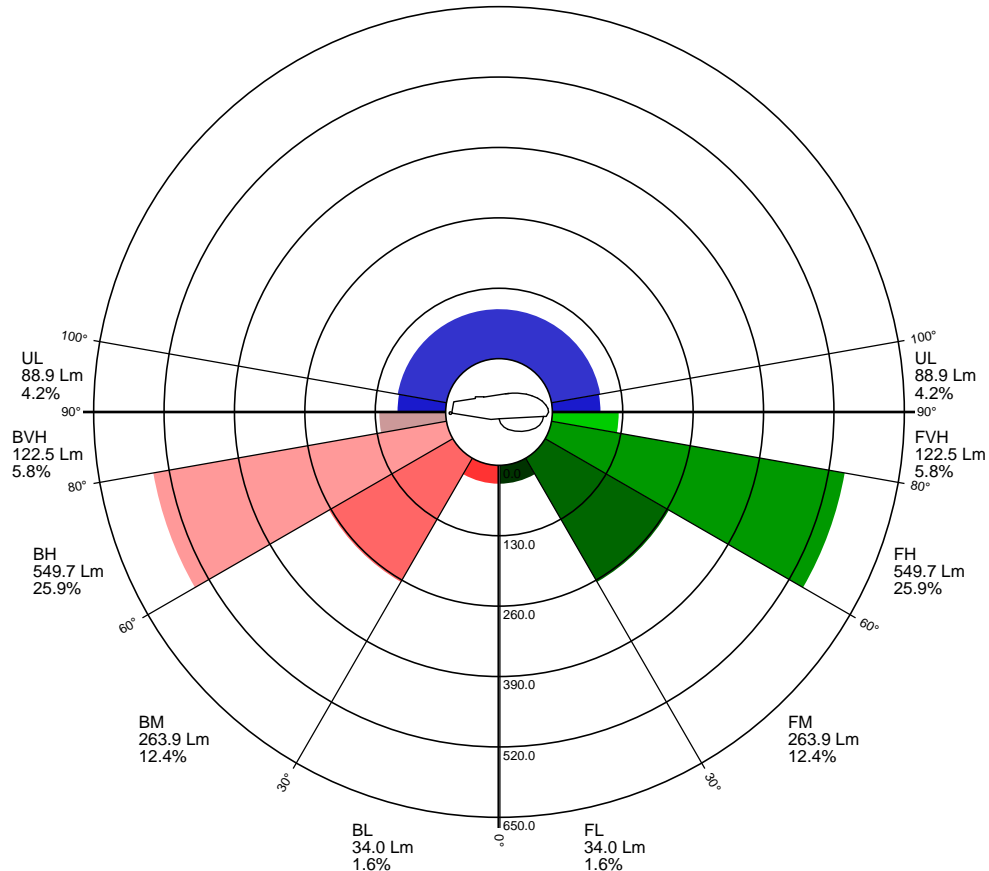
B U G

Forward		970	45.7			
FL	(0° - 30°)	34.0	1.6			
FM	(30° - 60°)	263.9	12.4			
FH	(60° - 80°)	549.7	25.9			G0
FVH	(80° - 90°)	122.5	5.8			G2
Backward		970	45.7			
BL	(0° - 30°)	34.0	1.6	B0		
BM	(30° - 60°)	263.9	12.4	B1		
BH	(60° - 80°)	549.7	25.9	B2		G0
BVH	(80° - 90°)	122.5	5.8			G2
Upward		180	8.5			
UL	(90° - 100°)	88.9	4.2		U3	
UH	(100° - 180°)	91.4	4.3		U3	
Trapped Light		0	0.0			
Total Flux		2120	100.0			

### Zonal Lumen Summary

(Linear scale)

UH  
91.4 Lm  
4.3%



REPORT NUMBER: RAB03695

ISSUE DATE: 08/14/17

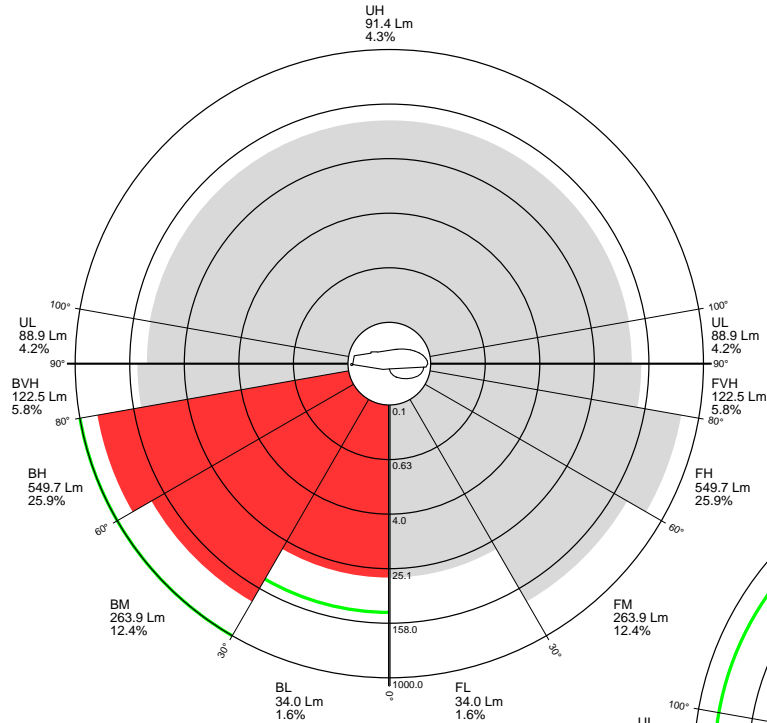
PREPARED FOR: RAB LIGHTING INC. RC LIGHTING

PAGE: 6 OF 9

DATE SAMPLE TESTED: 08/14/17

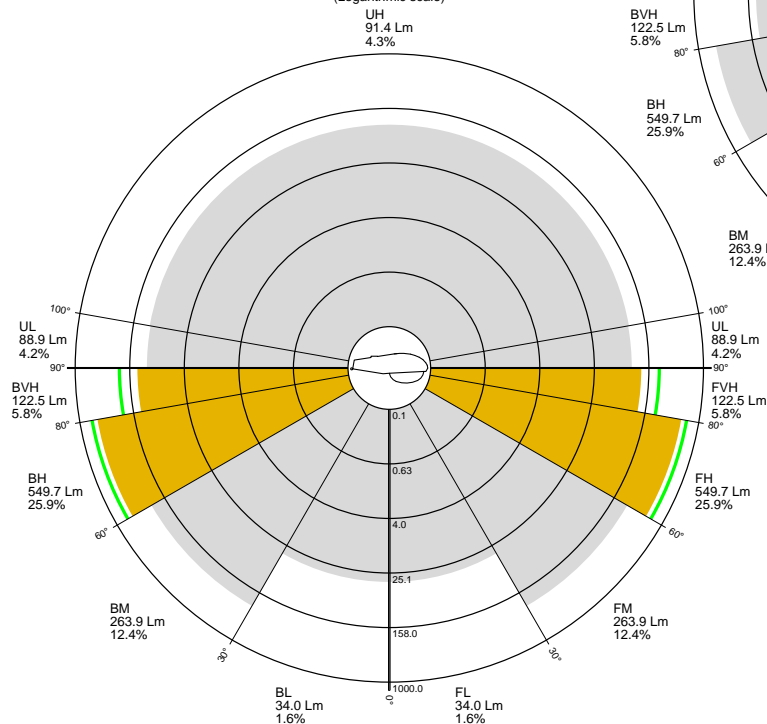
## Backlight Rating Details

(Logarithmic scale)



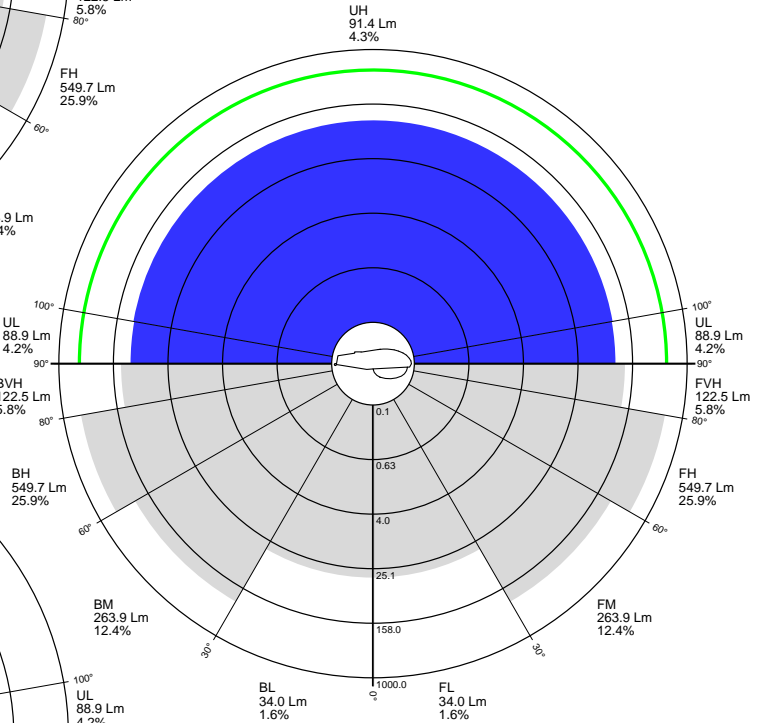
## Glare Rating Details

(Logarithmic scale)



## Uplight Rating Details

(Logarithmic scale)



REPORT NUMBER: RAB03695

PAGE: 7 OF 9

ISSUE DATE: 08/14/17

DATE SAMPLE TESTED: 08/14/17

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	1.	1.	1.	1.	1.	1.	1.	1.	1.
	175.0	0.	0.	0.	0.	0.	0.	0.	0.	0.
	165.0	0.	0.	0.	0.	0.	0.	0.	0.	0.
	155.0	1.	1.	1.	1.	1.	1.	1.	1.	1.
	145.0	2.	2.	2.	2.	2.	2.	2.	2.	2.
	135.0	7.	7.	7.	7.	7.	7.	7.	7.	7.
	125.0	14.	14.	14.	14.	14.	14.	14.	14.	14.
	115.0	26.	26.	26.	26.	25.	26.	25.	25.	25.
	105.0	42.	42.	42.	42.	42.	42.	42.	42.	42.
	95.0	78.	77.	77.	78.	78.	78.	78.	77.	77.
	90.0	122.	122.	120.	121.	122.	123.	121.	121.	119.
	87.5	160.	159.	158.	158.	160.	160.	158.	156.	156.
	85.0	212.	213.	213.	212.	212.	212.	210.	210.	209.
V	82.5	285.	283.	285.	284.	286.	286.	283.	281.	281.
E	80.0	372.	373.	374.	372.	378.	378.	373.	370.	369.
R	77.5	480.	482.	482.	481.	488.	489.	487.	481.	479.
T	75.0	588.	589.	591.	591.	597.	598.	597.	597.	595.
I	72.5	658.	658.	661.	665.	672.	674.	677.	677.	677.
C	70.0<<	656.	655.	662.	668.	675.	681.	683.	681.	682.
A	67.5	583.	583.	590.	597.	606.	613.	613.	609.	608.
L	65.0	485.	483.	486.	496.	498.	505.	504.	501.	501.
	62.5	392.	391.	392.	399.	402.	405.	404.	403.	404.
A	60.0	327.	328.	326.	330.	332.	334.	336.	334.	336.
N	57.5	288.	289.	287.	289.	290.	291.	293.	294.	296.
G	55.0	265.	265.	264.	264.	265.	266.	268.	269.	270.
L	52.5	249.	249.	248.	248.	248.	250.	251.	251.	253.
E	50.0	238.	238.	237.	236.	237.	238.	239.	240.	240.
	47.5	229.	229.	228.	227.	227.	228.	230.	230.	231.
	45.0	221.	220.	219.	218.	218.	219.	221.	221.	222.
	42.5	211.	211.	210.	209.	209.	209.	211.	212.	212.
	40.0	201.	201.	200.	199.	199.	199.	201.	202.	202.
	37.5	190.	190.	189.	188.	188.	188.	189.	191.	191.
	35.0	177.	177.	177.	176.	175.	176.	177.	178.	179.
	30.0	145.	145.	145.	144.	144.	144.	145.	145.	146.
	25.0	103.	104.	104.	104.	104.	104.	105.	104.	105.
	20.0	72.	73.	73.	73.	73.	74.	73.	73.	73.
	15.0	55.	55.	55.	55.	55.	55.	55.	55.	55.
	10.0	37.	36.	36.	36.	36.	36.	36.	37.	37.
	5.0	8.	8.	7.	7.	7.	7.	6.	6.	5.
	0.0	0.	0.	0.	0.	0.	0.	0.	0.	0.

||  
PLANE OF MAXIMUM CANDELA

CONE OF MAXIMUM CANDELA

REPORT NUMBER: RAB03695

PAGE: 8 OF 9

ISSUE DATE: 08/14/17

DATE SAMPLE TESTED: 08/14/17

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	180.0	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
	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.	1.	1.	1.	1.	1.	1.	1.	1.
	145.0	2.	2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
	135.0	7.	7.	7.	7.	7.	7.	7.	7.	7.	7.	7.
	125.0	14.	14.	14.	14.	14.	14.	14.	14.	14.	14.	14.
	115.0	25.	25.	25.	25.	25.	26.	25.	26.	26.	26.	26.
	105.0	42.	42.	42.	42.	42.	42.	42.	42.	42.	42.	42.
	95.0	77.	77.	77.	77.	78.	78.	78.	78.	77.	77.	78.
	90.0	119.	119.	120.	121.	121.	123.	122.	121.	120.	122.	122.
	87.5	155.	156.	157.	156.	158.	160.	160.	158.	158.	159.	160.
	85.0	208.	209.	210.	210.	210.	212.	212.	212.	213.	213.	212.
	82.5	280.	281.	282.	281.	283.	286.	286.	284.	285.	283.	285.
	80.0	369.	369.	372.	370.	373.	378.	378.	372.	374.	373.	372.
	77.5	480.	479.	484.	481.	487.	489.	488.	481.	482.	482.	480.
	75.0	596.	595.	595.	597.	597.	598.	597.	591.	591.	589.	588.
	72.5	676.	677.	678.	677.	677.	674.	672.	665.	661.	658.	658.
	70.0<<	679.	679.	682.	681.	683.	681.	675.	668.	662.	655.	656.
	67.5	607.	605.	608.	609.	613.	613.	606.	597.	590.	583.	583.
	65.0	501.	501.	501.	501.	504.	505.	498.	496.	486.	483.	485.
	62.5	406.	406.	404.	403.	404.	405.	402.	399.	392.	391.	392.
	60.0	339.	338.	336.	334.	336.	334.	332.	330.	326.	328.	327.
	57.5	297.	296.	296.	294.	293.	291.	290.	289.	287.	289.	288.
	55.0	270.	270.	269.	269.	268.	266.	265.	264.	264.	265.	265.
	52.5	253.	252.	253.	251.	251.	250.	248.	248.	248.	249.	249.
	50.0	241.	240.	240.	240.	239.	238.	237.	236.	237.	238.	238.
	47.5	231.	231.	231.	230.	230.	228.	227.	227.	228.	229.	229.
	45.0	223.	222.	222.	221.	221.	219.	218.	218.	219.	220.	221.
	42.5	214.	213.	212.	212.	211.	209.	209.	209.	210.	211.	211.
	40.0	204.	203.	202.	202.	201.	199.	199.	199.	200.	201.	201.
	37.5	193.	192.	191.	191.	189.	188.	188.	188.	189.	190.	190.
35.0	180.	179.	179.	178.	177.	176.	175.	176.	177.	177.	177.	
30.0	146.	146.	146.	145.	145.	144.	144.	144.	145.	145.	145.	
25.0	104.	104.	105.	104.	105.	104.	104.	104.	104.	104.	103.	
20.0	73.	73.	73.	73.	73.	74.	73.	73.	73.	73.	72.	
15.0	55.	55.	55.	55.	55.	55.	55.	55.	55.	55.	55.	
10.0	36.	37.	37.	37.	36.	36.	36.	36.	36.	36.	37.	
5.0	6.	5.	6.	6.	6.	7.	7.	7.	7.	8.	8.	
0.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	

CONE OF MAXIMUM CANDELA



REPORT NUMBER: RAB03695

ISSUE DATE: 08/14/17

PREPARED FOR: RAB LIGHTING INC. RC LIGHTING

PAGE: 9 OF 9

DATE SAMPLE TESTED: 08/14/17

### 5-DEGREE ZONAL LUMEN SUMMARY

0- 5	0
5- 10	2
10- 15	6
15- 20	11
20- 25	18
25- 30	32
30- 35	48
35- 40	63
40- 45	78
45- 50	93
50- 55	109
55- 60	137
60- 65	199
65- 70	301
70- 75	341
75- 80	259
80- 85	156
85- 90	89
90- 95	53
95-100	36
100-105	26
105-110	19
110-115	15
115-120	11
120-125	8
125-130	5
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	18
0- 30	68
0- 40	179
0- 50	350
0- 60	596
0- 70	1095
0- 80	1695
0- 90	1940
0-100	2029
0-110	2074
0-120	2100
0-130	2113
0-140	2119
0-150	2120
0-160	2120
0-170	2120
0-180	2120

REPORT NUMBER: RAB03696  
DATE: 8/09/2017  
PREPARED FOR: RAB LIGHTING INC. RC LIGHTING  
CATALOG NUMBER: BLEDR24Y/347, BDLEDR24Y/347, BLEDR24Y/480, BDLEDR24Y/480 (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: RDD-LT40-A0700-60PF

OBJECT OF TEST: DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED AT THE RATED INPUT VOLTAGES (347.0 AND 480.0 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<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 (480.0 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: RAB03696  
 DATE: 8/09/2017  
 PREPARED FOR: RAB LIGHTING INC. RC LIGHTING  
 CATALOG NUMBER: BLEDR24Y/347, BDLEDR24Y/347, BLEDR24Y/480, BDLEDR24Y/480 (42" ROUND BOLLARD)

Page 2 of 4

### RESULTS:

PHOTOMETRIC	
Total Integrated Flux (lumens)	2120 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.4381
Chromaticity Ordinate y	0.4076
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2498
Chromaticity Ordinate v'	0.5229
Correlated Color Temp CCT (K)	3009
ANSI C78.377-2008 Duv	0.001
Total Radiant Flux (milliWatts)	6467 *
ELECTRICAL	
Input Voltage (Volts AC)	347.0
Input Current (Amps AC)	0.064
Input Power (Watts)	21.7
Input Power Factor (%)	97.9
Input Current THD (%)	8.4
Input Voltage THD (%)	0.2
EFFICACY (Lumens/Watt)	
	97.7
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	480.0
Input Current (Amps AC)	0.055
Input Power (Watts)	22.1
Input Power Factor (%)	83.7
Input Current THD (%)	9.7
Input Voltage THD (%)	0.2
Off-State Power (Watts)	
	0.0

COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	83
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	82
R8 Light reddish purple	60
R9 Strong red	11
R10 Strong yellow	83
R11 Strong green	80
R12 Strong blue	74
R13 Light yellowish pink (skin)	85
R14 Moderate olive green (leaf)	98

### \*NOTE:

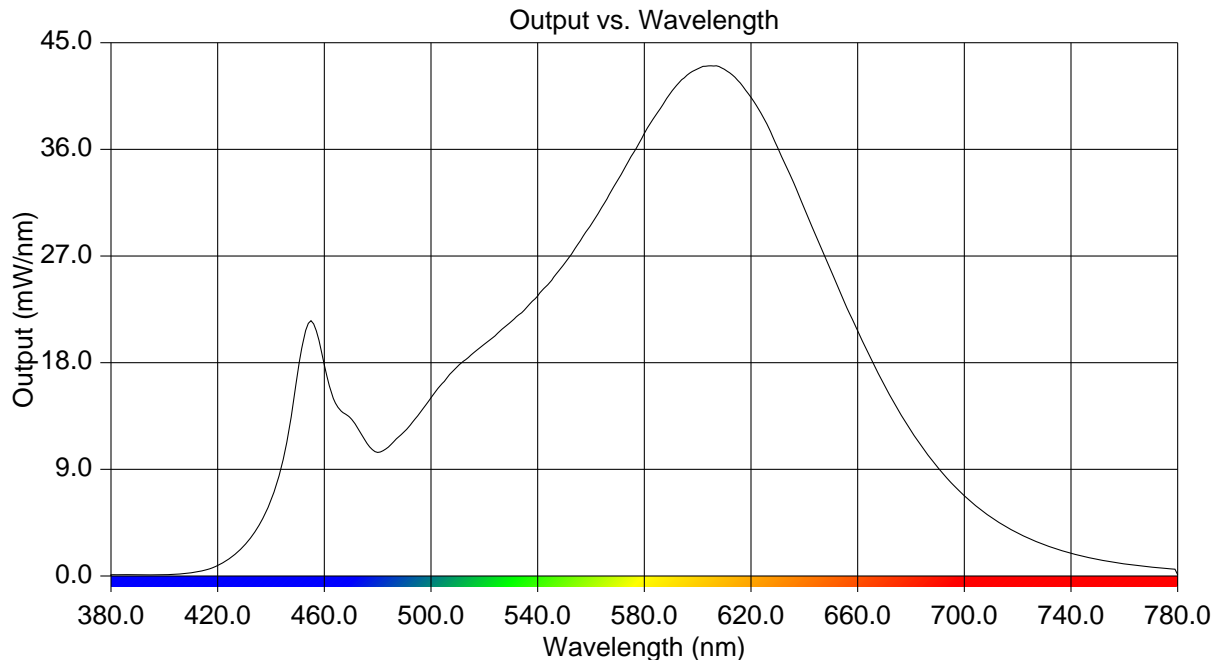
Proper calibration of integrating spheres for measuring total flux output of non-directional samples will produce reliable, repeatable results within the calibration tolerances of the equipment used. However, measurement of test samples with significant self absorption and/or directional output, even 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: RAB03696  
 DATE: 8/09/2017  
 PREPARED FOR: RAB LIGHTING INC. RC LIGHTING  
 CATALOG NUMBER: BLEDR24Y/347, BDLEDR24Y/347, BLEDR24Y/480, BDLEDR24Y/480 (42" ROUND BOLLARD)

Page 3 of 4

### RESULTS:

Wavelength	mW per nm	Wavelength	mW per nm	Wavelength	mW per nm
380	0.102	515	18.647	650	25.736
385	0.104	520	19.558	655	23.121
390	0.097	525	20.485	660	20.716
395	0.101	530	21.446	665	18.296
400	0.117	535	22.434	670	16.093
405	0.158	540	23.624	675	14.102
410	0.261	545	24.890	680	12.251
415	0.484	550	26.337	685	10.628
420	0.873	555	27.963	690	9.155
425	1.549	560	29.613	695	7.880
430	2.594	565	31.447	700	6.766
435	4.103	570	33.389	705	5.799
440	6.374	575	35.385	710	4.958
445	10.285	580	37.316	715	4.257
450	17.114	585	39.119	720	3.619
455	21.543	590	40.822	725	3.090
460	17.798	595	42.035	730	2.637
465	14.279	600	42.790	735	2.243
470	13.288	605	43.047	740	1.920
475	11.553	610	42.756	745	1.638
480	10.425	615	41.825	750	1.397
485	11.094	620	40.387	755	1.195
490	12.166	625	38.568	760	1.025
495	13.508	630	36.143	765	0.878
500	15.040	635	33.687	770	0.756
505	16.418	640	31.020	775	0.650
510	17.692	645	28.353	780	0.097



REPORT NUMBER: RAB03696  
 DATE: 8/09/2017  
 PREPARED FOR: RAB LIGHTING INC. RC LIGHTING  
 CATALOG NUMBER: BLEDR24Y/347, BDLEDR24Y/347, BLEDR24Y/480, BDLEDR24Y/480 (42" ROUND BOLLARD)

Page 4 of 4

## CIE Chromaticity Diagram

