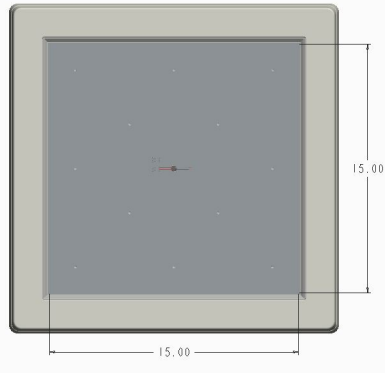


ISOFOOTCANDLE LINES OF HORIZONTAL ILLUMINATION

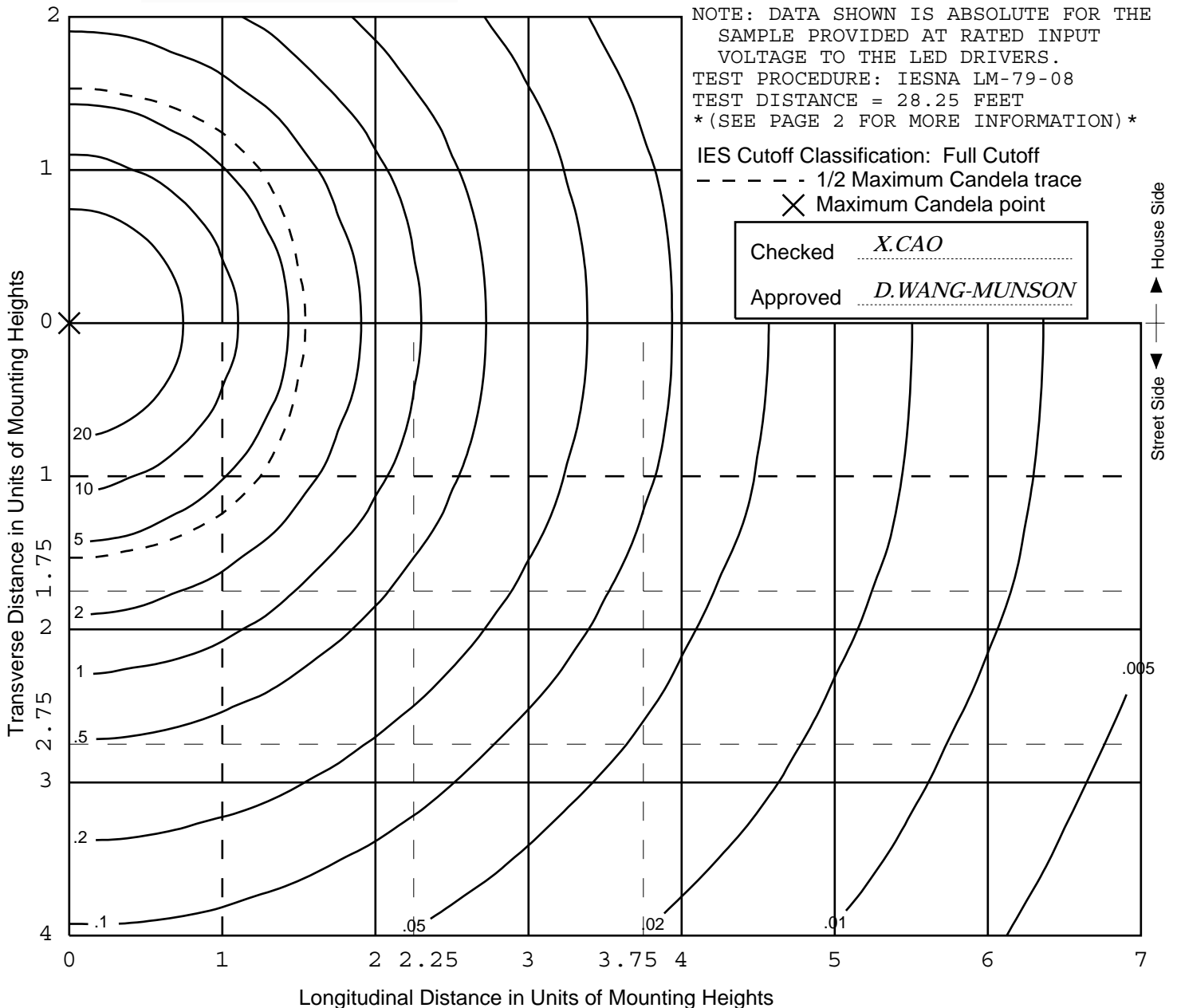
Values based on 14 foot mounting height.



REPORT NUMBER: RAB00894
 ISSUE DATE: 06/03/15 PAGE: 1 OF 9
 PREPARED FOR: RAB LIGHTING INC.
 CATALOG NUMBER: MASI20-200YW/D10
 LUMINAIRE: CAST METAL HOUSING, CAST METAL HEAT SINK, 1 WHITE CIRCUIT BOARD WITH 576 LEDS, CLEAR FLAT GLASS DOOR IN CAST WHITE PAINTED METAL FRAME.
 LAMPS: FIVE HUNDRED AND SEVENTY SIX LIGHT EMITTING DIODES (LEDs), VERTICAL BASE-UP POSITION.
 TOTAL INPUT WATTS = 211.41 AT 120.0 VOLTS
 LED DRIVERS: RDD-200-A0450
 NOTE: DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED AT RATED INPUT VOLTAGE TO THE LED DRIVERS.
 TEST PROCEDURE: IESNA LM-79-08
 TEST DISTANCE = 28.25 FEET
 *(SEE PAGE 2 FOR MORE INFORMATION) *

IES Cutoff Classification: Full Cutoff

--- 1/2 Maximum Candela trace
 X Maximum Candela point



REPORT NUMBER: RAB00894
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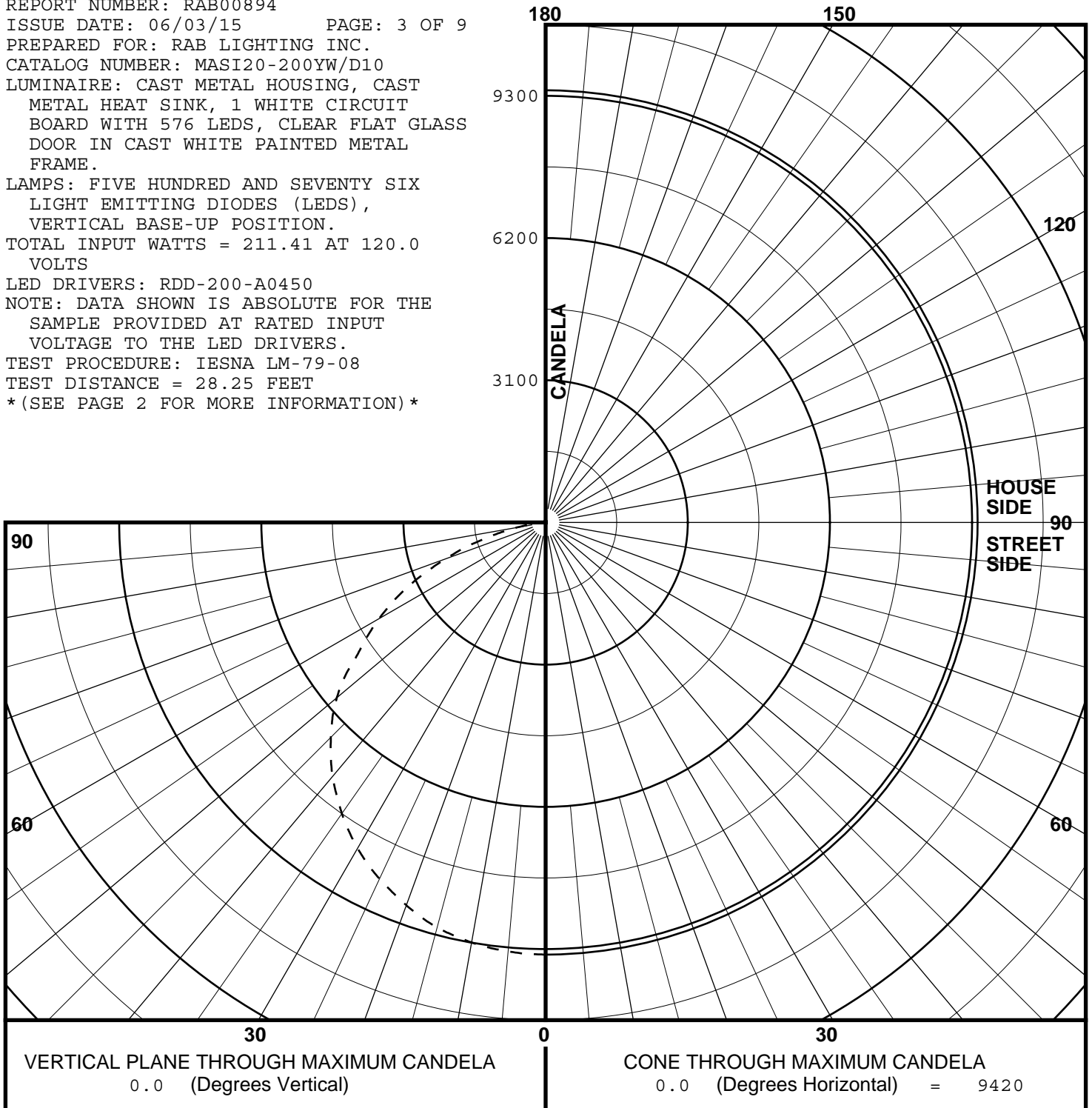
PAGE: 2 OF 9

ADDITIONAL INFORMATION

NOTE: DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED.
ACCREDITED LABORATORY CODE 201058-0

MAXIMUM PLANE AND MAXIMUM CONE PLOTS OF CANDELA

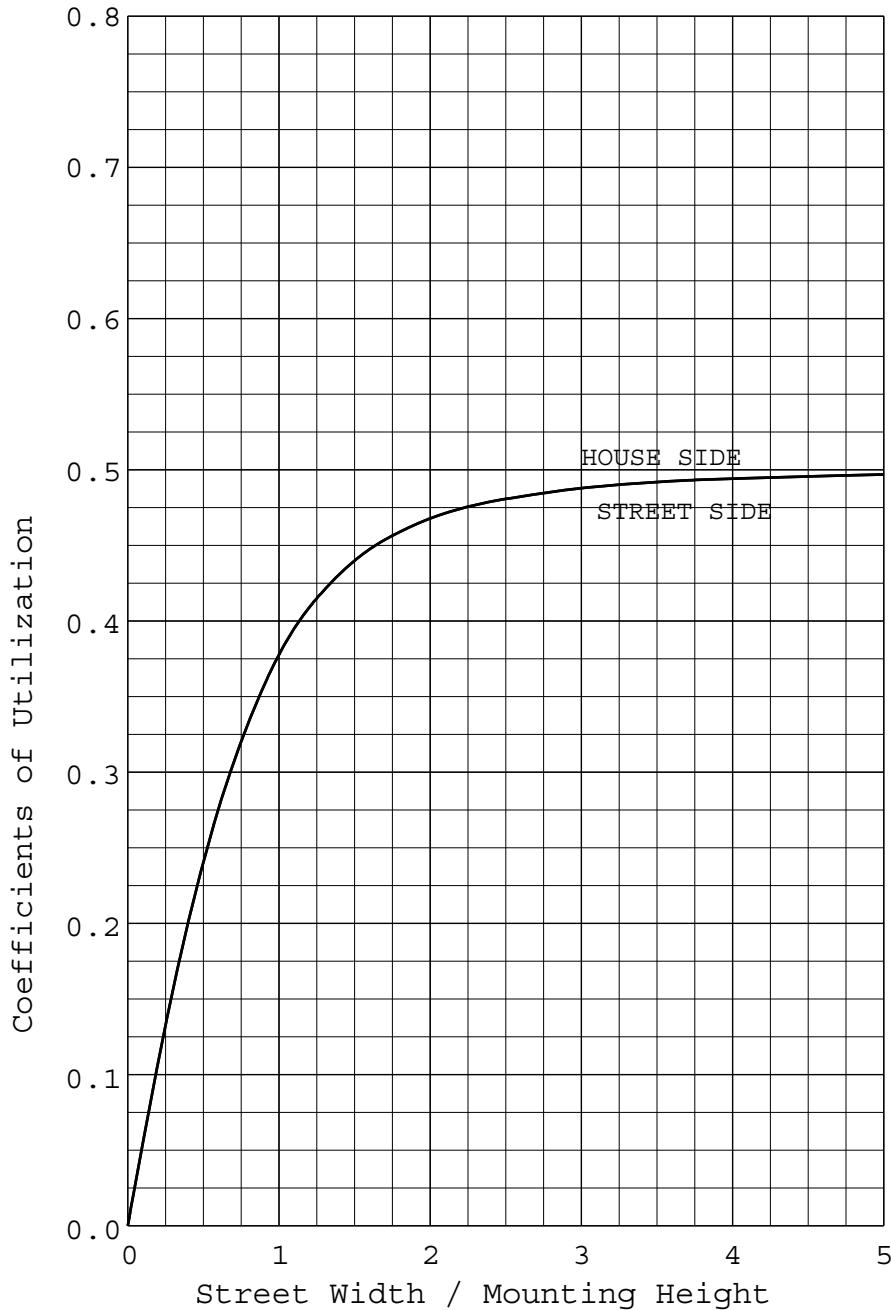
REPORT NUMBER: RAB00894
 ISSUE DATE: 06/03/15 PAGE: 3 OF 9
 PREPARED FOR: RAB LIGHTING INC.
 CATALOG NUMBER: MASI20-200YW/D10
 LUMINAIRE: CAST METAL HOUSING, CAST
 METAL HEAT SINK, 1 WHITE CIRCUIT
 BOARD WITH 576 LEDS, CLEAR FLAT GLASS
 DOOR IN CAST WHITE PAINTED METAL
 FRAME.
 LAMPS: FIVE HUNDRED AND SEVENTY SIX
 LIGHT EMITTING DIODES (LEDS),
 VERTICAL BASE-UP POSITION.
 TOTAL INPUT WATTS = 211.41 AT 120.0
 VOLTS
 LED DRIVERS: RDD-200-A0450
 NOTE: DATA SHOWN IS ABSOLUTE FOR THE
 SAMPLE PROVIDED AT RATED INPUT
 VOLTAGE TO THE LED DRIVERS.
 TEST PROCEDURE: IESNA LM-79-08
 TEST DISTANCE = 28.25 FEET
 *(SEE PAGE 2 FOR MORE INFORMATION) *



REPORT NUMBER: RAB00894
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PREPARED FOR: RAB LIGHTING INC.

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COEFFICIENTS OF UTILIZATION AND FLUX DISTRIBUTION



	LUMENS	PERCENT OF FIXTURE
DOWNWARD STREET SIDE	13514.	50.0
DOWNWARD HOUSE SIDE	13514.	50.0
DOWNWARD TOTAL	27027.	100.0
UPWARD STREET SIDE	0.	0.0
UPWARD HOUSE SIDE	0.	0.0
UPWARD TOTAL	0.	0.0
TOTAL FLUX	27027.	100.0
TOTAL INPUT WATTS = 211.4		
EFFICACY = 127.8 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: RAB00894
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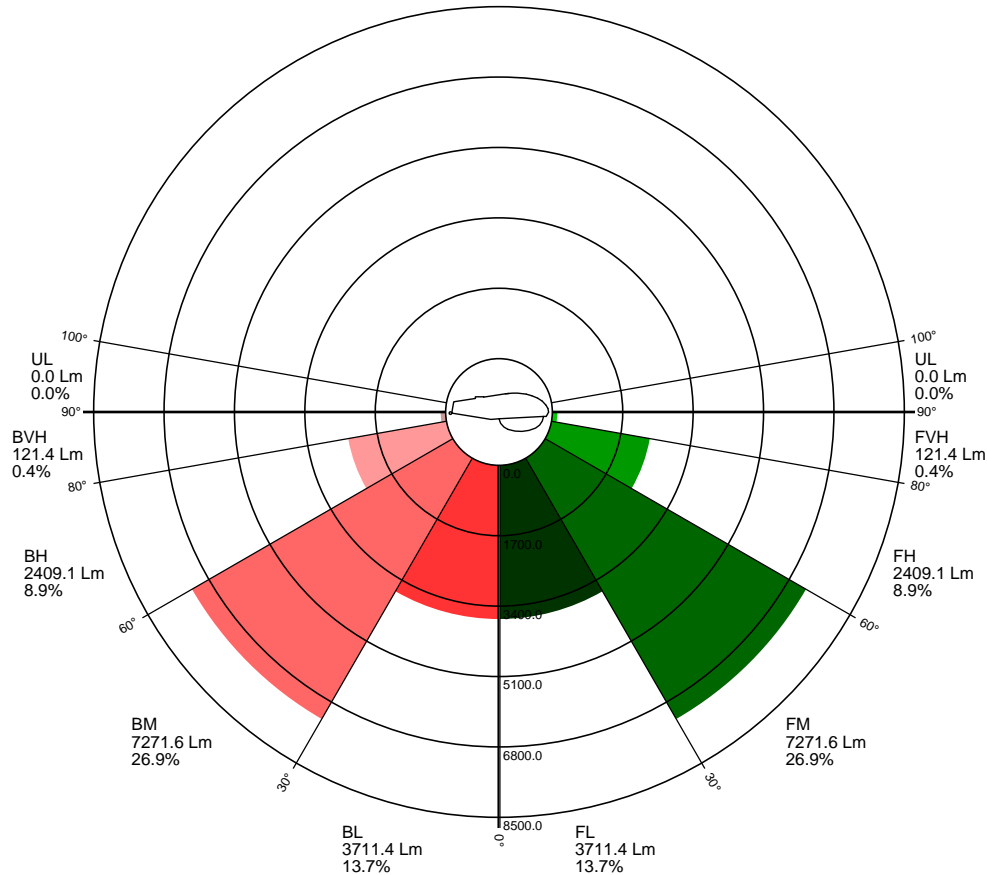
PAGE: 5 OF 9

BUG Rating:				B4	U0	G2
Zonal Summary		Lumens	% of Fixture	Zone Ratings		
				B	U	G
Forward		13514	50.0			
FL	(0° – 30°)	3711.4	13.7			
FM	(30° – 60°)	7271.6	26.9			
FH	(60° – 80°)	2409.1	8.9			G2
FVH	(80° – 90°)	121.4	0.4			G2
Backward		13514	50.0			
BL	(0° – 30°)	3711.4	13.7	B4		
BM	(30° – 60°)	7271.6	26.9	B4		
BH	(60° – 80°)	2409.1	8.9	B3		G2
BVH	(80° – 90°)	121.4	0.4			G2
Upward		0	0.0			
UL	(90° – 100°)	0.0	0.0		U0	
UH	(100° – 180°)	0.0	0.0		U0	
Trapped Light		0	0.0			
Total Flux		27027	100.0			

Zonal Lumen Summary

(Linear scale)

UH
0.0 Lm
0.0%

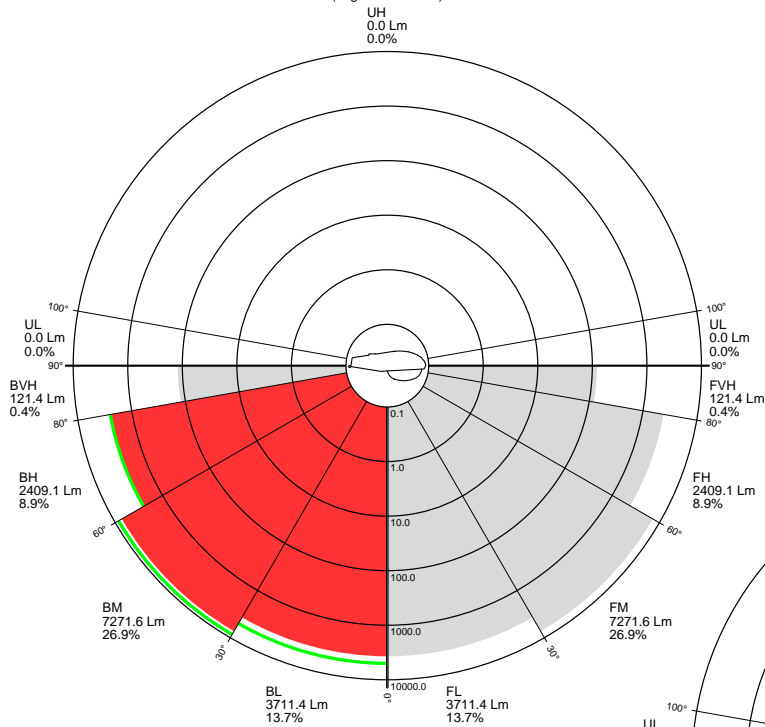


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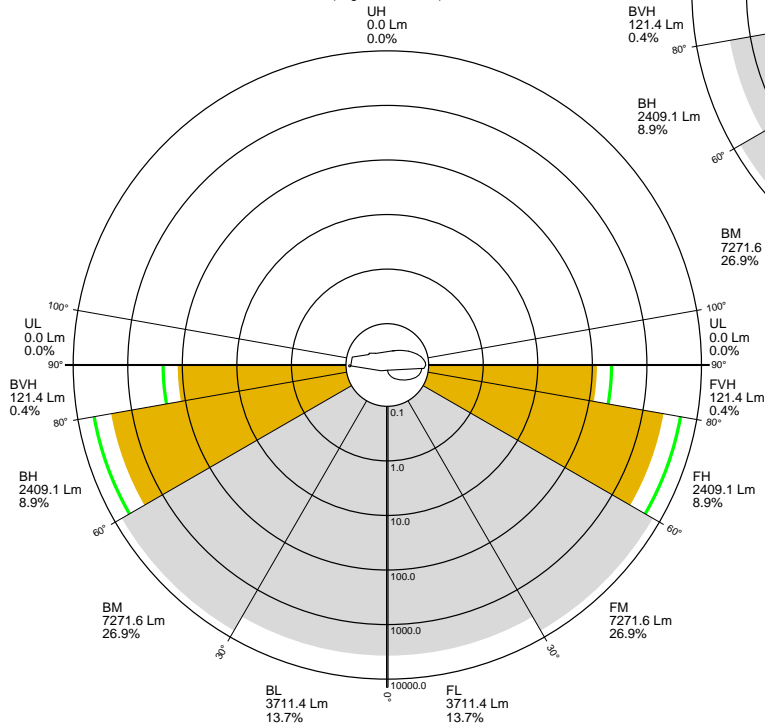
Backlight Rating Details

(Logarithmic scale)



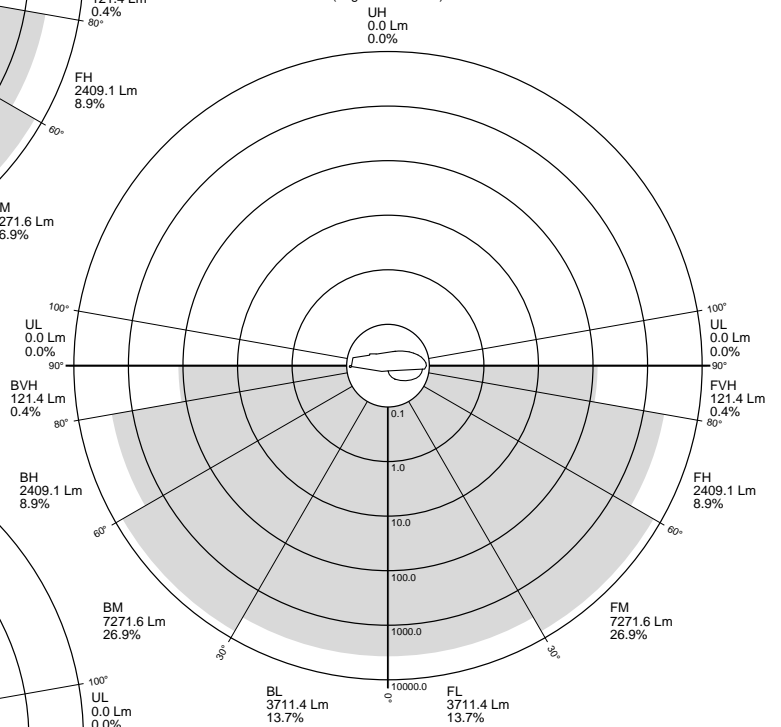
Glare Rating Details

(Logarithmic scale)



Uplight Rating Details

(Logarithmic scale)



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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
	90.0	0.	0.	0.	0.	0.	0.	0.	0.	0.
	87.5	54.	55.	58.	59.	61.	60.	63.	59.	55.
	85.0	150.	154.	154.	154.	156.	155.	162.	160.	165.
	82.5	346.	352.	352.	360.	351.	347.	362.	352.	367.
	80.0	632.	644.	645.	642.	634.	621.	650.	645.	662.
	77.5	1001.	1021.	1026.	993.	999.	990.	1020.	1002.	1046.
	75.0	1400.	1418.	1437.	1429.	1416.	1386.	1424.	1440.	1454.
	72.5	1879.	1897.	1885.	1888.	1838.	1885.	1866.	1897.	1895.
V	70.0	2318.	2339.	2326.	2369.	2350.	2339.	2340.	2392.	2333.
E	67.5	2812.	2834.	2855.	2901.	2880.	2791.	2880.	2901.	2895.
R	65.0	3313.	3340.	3341.	3352.	3347.	3231.	3354.	3353.	3352.
T	62.5	3762.	3782.	3786.	3793.	3797.	3873.	3812.	3789.	3791.
I	60.0	4194.	4205.	4210.	4204.	4251.	4369.	4295.	4204.	4219.
C	57.5	4605.	4608.	4622.	4625.	4789.	4811.	4807.	4665.	4622.
A	55.0	4999.	5005.	5071.	5168.	5205.	5209.	5202.	5194.	5118.
L	52.5	5522.	5535.	5589.	5586.	5602.	5601.	5593.	5587.	5608.
	50.0	5944.	5954.	5969.	5973.	5955.	5962.	5959.	5955.	5974.
A	47.5	6306.	6312.	6324.	6291.	6310.	6295.	6308.	6311.	6314.
N	45.0	6622.	6629.	6640.	6626.	6631.	6621.	6627.	6634.	6636.
G	42.5	6933.	6941.	6956.	6940.	6937.	6929.	6938.	6944.	6942.
L	40.0	7228.	7230.	7231.	7223.	7228.	7221.	7220.	7232.	7225.
E	37.5	7490.	7493.	7502.	7497.	7495.	7493.	7489.	7503.	7494.
	35.0	7747.	7754.	7750.	7754.	7759.	7750.	7747.	7754.	7743.
	30.0	8200.	8202.	8198.	8200.	8204.	8200.	8205.	8195.	8196.
	25.0	8572.	8567.	8568.	8572.	8581.	8575.	8581.	8565.	8567.
	20.0	8881.	8878.	8878.	8881.	8886.	8885.	8878.	8876.	8877.
	15.0	9141.	9132.	9129.	9130.	9127.	9126.	9128.	9128.	9128.
	10.0	9297.	9293.	9293.	9294.	9300.	9298.	9301.	9299.	9297.
	5.0	9386.	9380.	9382.	9382.	9386.	9385.	9388.	9386.	9384.
	0.0<<	9420.	9420.	9420.	9420.	9420.	9420.	9420.	9420.	9420.

||
 PLANE OF MAXIMUM CANDELA
 |
 CONE OF MAXIMUM CANDELA

REPORT NUMBER: RAB00894
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 PREPARED FOR: RAB LIGHTING INC.

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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
90.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
87.5	55.	55.	62.	59.	63.	60.	61.	59.	58.	55.	54.
85.0	156.	156.	165.	160.	162.	155.	156.	154.	154.	154.	150.
82.5	359.	357.	367.	352.	362.	347.	351.	360.	352.	352.	346.
80.0	642.	645.	662.	645.	650.	621.	634.	642.	645.	644.	632.
77.5	1019.	1022.	1046.	1002.	1020.	990.	999.	993.	1026.	1021.	1001.
75.0	1422.	1435.	1454.	1440.	1424.	1386.	1416.	1429.	1437.	1418.	1400.
72.5	1891.	1897.	1895.	1897.	1866.	1885.	1838.	1888.	1885.	1897.	1879.
V 70.0	2335.	2337.	2333.	2392.	2340.	2339.	2350.	2369.	2326.	2339.	2318.
E 67.5	2855.	2863.	2895.	2901.	2880.	2791.	2880.	2901.	2855.	2834.	2812.
R 65.0	3328.	3343.	3352.	3353.	3354.	3231.	3347.	3352.	3341.	3340.	3313.
T 62.5	3784.	3789.	3791.	3789.	3812.	3873.	3797.	3793.	3786.	3782.	3762.
I 60.0	4209.	4203.	4219.	4204.	4295.	4369.	4251.	4204.	4210.	4205.	4194.
C 57.5	4615.	4606.	4622.	4665.	4807.	4811.	4789.	4625.	4622.	4608.	4605.
A 55.0	5044.	5043.	5118.	5194.	5202.	5209.	5205.	5168.	5071.	5005.	4999.
L 52.5	5581.	5570.	5608.	5587.	5593.	5601.	5602.	5586.	5589.	5535.	5522.
50.0	5955.	5949.	5974.	5955.	5959.	5962.	5955.	5973.	5969.	5954.	5944.
A 47.5	6305.	6305.	6314.	6311.	6308.	6295.	6310.	6291.	6324.	6312.	6306.
N 45.0	6640.	6629.	6636.	6634.	6627.	6621.	6631.	6626.	6640.	6629.	6622.
G 42.5	6947.	6928.	6942.	6944.	6938.	6929.	6937.	6940.	6956.	6941.	6933.
L 40.0	7216.	7214.	7225.	7232.	7220.	7221.	7228.	7223.	7231.	7230.	7228.
E 37.5	7490.	7482.	7494.	7503.	7489.	7493.	7495.	7497.	7502.	7493.	7490.
35.0	7748.	7739.	7743.	7754.	7747.	7750.	7759.	7754.	7750.	7754.	7747.
30.0	8193.	8188.	8196.	8195.	8205.	8200.	8204.	8200.	8198.	8202.	8200.
25.0	8575.	8565.	8567.	8565.	8581.	8575.	8581.	8572.	8568.	8567.	8572.
20.0	8865.	8874.	8877.	8876.	8878.	8885.	8886.	8881.	8878.	8878.	8881.
15.0	9117.	9126.	9128.	9128.	9128.	9126.	9127.	9130.	9129.	9132.	9141.
10.0	9291.	9295.	9297.	9299.	9301.	9298.	9300.	9294.	9293.	9293.	9297.
5.0	9372.	9384.	9384.	9386.	9388.	9385.	9386.	9382.	9382.	9380.	9386.
0.0<<	9420.	9420.	9420.	9420.	9420.	9420.	9420.	9420.	9420.	9420.	9420.

CONE OF MAXIMUM CANDELA

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PREPARED FOR: RAB LIGHTING INC.

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5-DEGREE

ZONAL LUMEN SUMMARY

0- 5	225
5- 10	668
10- 15	1093
15- 20	1484
20- 25	1830
25- 30	2123
30- 35	2349
35- 40	2498
40- 45	2566
45- 50	2545
50- 55	2419
55- 60	2165
60- 65	1843
65- 70	1444
70- 75	984
75- 80	547
80- 85	205
85- 90	38

10-DEGREE

ZONAL LUMEN SUMMARY

0- 10	893
0- 20	3470
0- 30	7423
0- 40	12270
0- 50	17382
0- 60	21966
0- 70	25253
0- 80	26784
0- 90	27027

REPORT NUMBER: RAB00927
 DATE: 6/3/2015
 PREPARED FOR: RAB LIGHTING INC.
 CATALOG NUMBER: MASI20-200YW/D10

ADDRESS: 170 LUDLOW AVE, NORTHVALE, NJ 07647

LUMINAIRE: CAST METAL HOUSING, CAST METAL HEAT SINK, 1 WHITE CIRCUIT BOARD WITH 576 LEDS, CLEAR FLAT GLASS DOOR IN CAST WHITE PAINTED METAL FRAME.

LAMP: FIVE HUNDRED AND SEVENTY SIX LIGHT EMITTING DIODES (LEDs), VERTICAL BASE-UP POSITION.

DRIVER: RDD-200-A0450

OBJECT OF TEST: DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED AT THE RATED INPUT VOLTAGES (120.0 AND 277.0 VAC, 60Hz) TO THE TEST SAMPLE.

INSTRUMENTS:	CHROMA PROGRAMMABLE AC POWER SOURCE MODEL 61602	Calibration Due: N/A
	CHROMA PROGRAMMABLE DIGITAL POWER METER MODEL 66202	3/9/16
	OCEAN OPTICS QE65PRO Spectroradiometer	6/2/16
	RAB 2.0 meter Diameter Integrating Sphere, 4PI Geometry	6/2/16

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 (277.0 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: RAB00927
 DATE: 6/3/2015
 PREPARED FOR: RAB LIGHTING INC.
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RESULTS:

PHOTOMETRIC	
Total Integrated Flux (lumens)	27027 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.4335
Chromaticity Ordinate y	0.4000
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2501
Chromaticity Ordinate v'	0.5193
Correlated Color Temp CCT (K)	3024
ANSI C78.377-2008 Duv	-0.001
Total Radiant Flux (milliWatts)	78242 *
ELECTRICAL	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	1.76
Input Power (Watts)	211.4
Input Power Factor (%)	99.8
Input Current THD (%)	4.8
Input Voltage THD (%)	0.2
EFFICACY (Lumens/Watt)	
	127.8
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.792
Input Power (Watts)	207.0
Input Power Factor (%)	94.4
Input Current THD (%)	11.8
Input Voltage THD (%)	0.2
Off-State Power (Watts)	0.0

COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	71
R1 Light greyish red	68
R2 Dark greyish yellow	80
R3 Strong yellowish green	90
R4 Moderate yellowish green	68
R5 Light bluish green	67
R6 Light blue	72
R7 Light violet	79
R8 Light reddish purple	47
R9 Strong red	-27
R10 Strong yellow	53
R11 Strong green	61
R12 Strong blue	44
R13 Light yellowish pink (skin)	70
R14 Moderate olive green (leaf)	94

*NOTE:

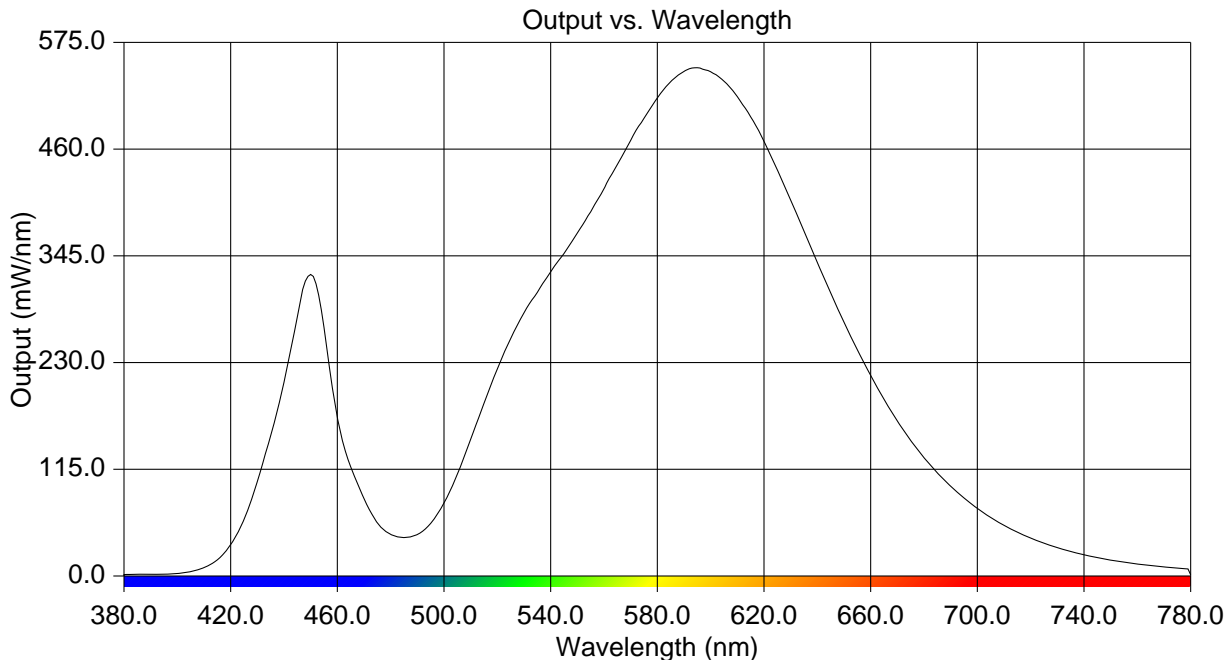
Proper calibration of integrating spheres for measuring total flux output of non-directional samples will produce reliable, repeatable results within the calibration tolerances of the equipment used. However, measurement of test samples with significant self absorption and/or directional output, even 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: RAB00927
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RESULTS:

Wavelength	mW per nm	Wavelength	mW per nm	Wavelength	mW per nm
380	1.463	515	186.023	650	273.884
385	1.550	520	223.316	655	243.952
390	1.707	525	256.182	660	216.244
395	2.042	530	283.727	665	190.693
400	2.922	535	305.757	670	167.356
405	4.608	540	327.969	675	146.064
410	8.804	545	347.669	680	127.591
415	17.388	550	369.848	685	111.326
420	33.670	555	392.550	690	96.869
425	60.844	560	417.594	695	84.138
430	101.682	565	443.630	700	72.927
435	151.970	570	469.609	705	63.099
440	207.802	575	493.470	710	54.602
445	280.506	580	515.229	715	47.287
450	325.075	585	533.308	720	40.889
455	268.024	590	544.352	725	35.371
460	170.991	595	547.982	730	30.539
465	117.789	600	543.631	735	26.360
470	83.517	605	533.494	740	22.819
475	57.532	610	516.843	745	19.868
480	44.750	615	494.998	750	17.237
485	41.470	620	468.443	755	14.875
490	44.681	625	438.331	760	12.993
495	56.683	630	405.545	765	11.157
500	78.709	635	371.472	770	9.798
505	109.762	640	338.085	775	8.529
510	147.233	645	305.241	780	1.290



REPORT NUMBER: RAB00927
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CIE Chromaticity Diagram

