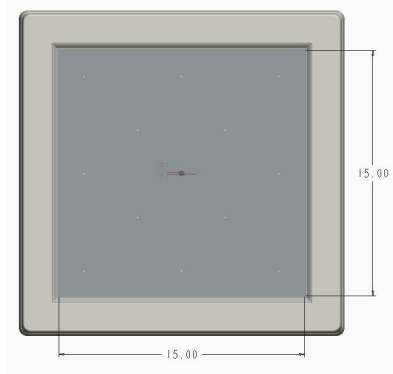


ISOFOOTCANDLE LINES OF HORIZONTAL ILLUMINATION

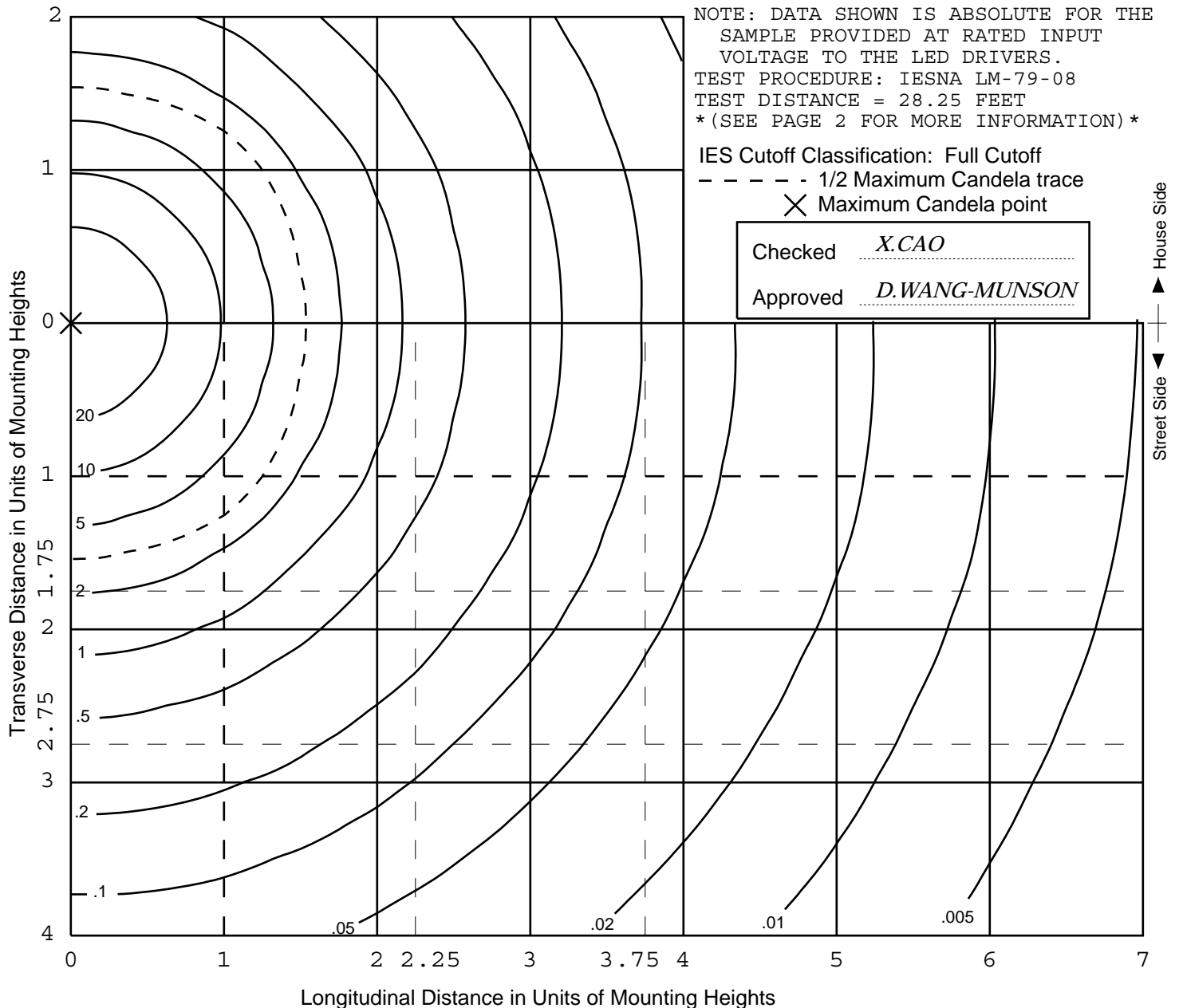
Values based on 14 foot mounting height.



REPORT NUMBER: RAB00897
 ISSUE DATE: 06/02/15 PAGE: 1 OF 9
 PREPARED FOR: RAB LIGHTING INC.
 CATALOG NUMBER: MASI20-160YW/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 WHITE LIGHT EMITTING DIODES (LEDs), VERTICAL BASE-UP POSITION.
 TOTAL INPUT WATTS = 157.37 AT 120.0 VOLTS
 LED DRIVERS: PSDV151101A
 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: RAB00897
ISSUE DATE: 06/02/15
PREPARED FOR: RAB LIGHTING INC.

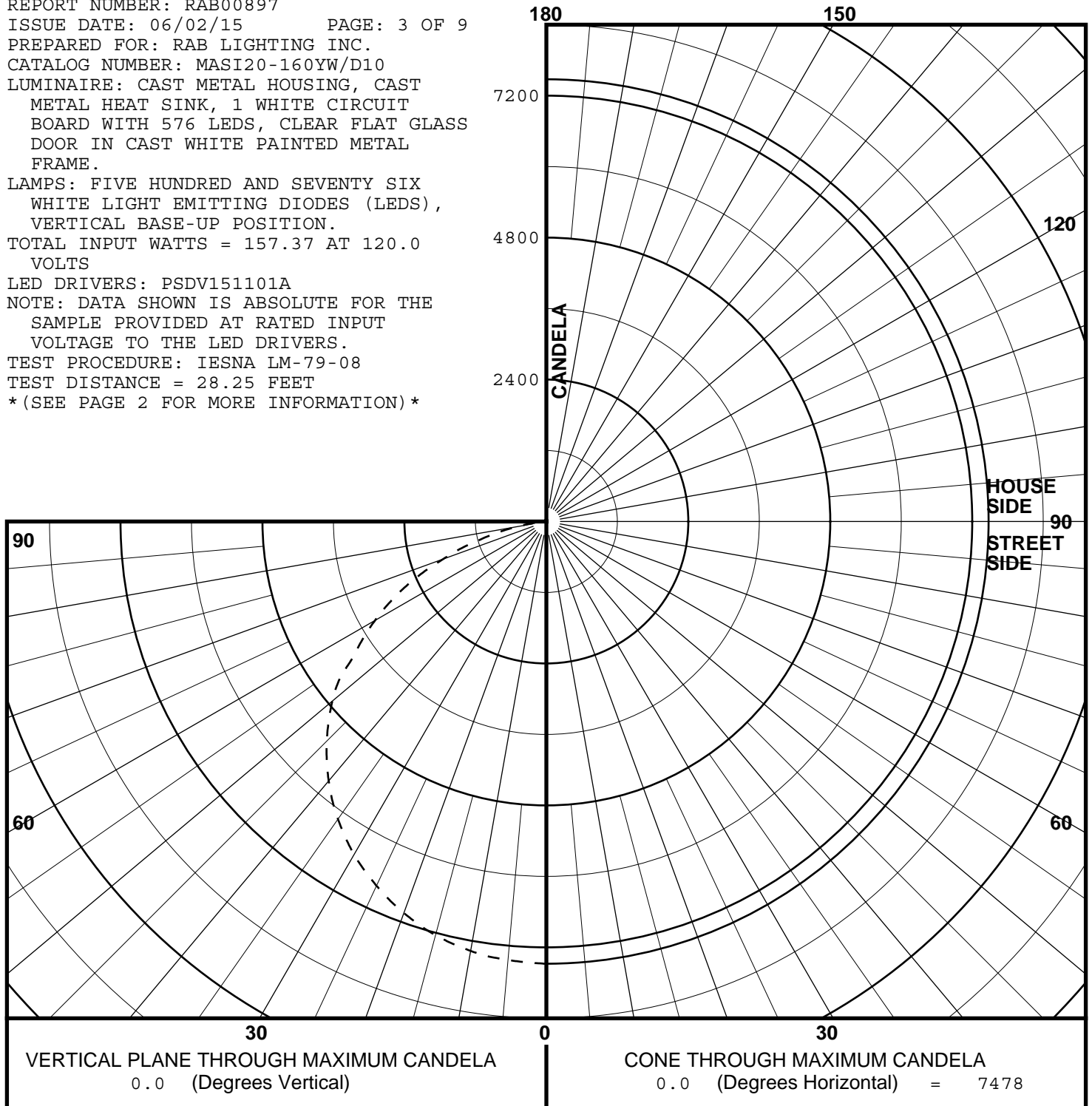
PAGE: 2 OF 9

ADDITIONAL INFORMATION

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

MAXIMUM PLANE AND MAXIMUM CONE PLOTS OF CANDELA

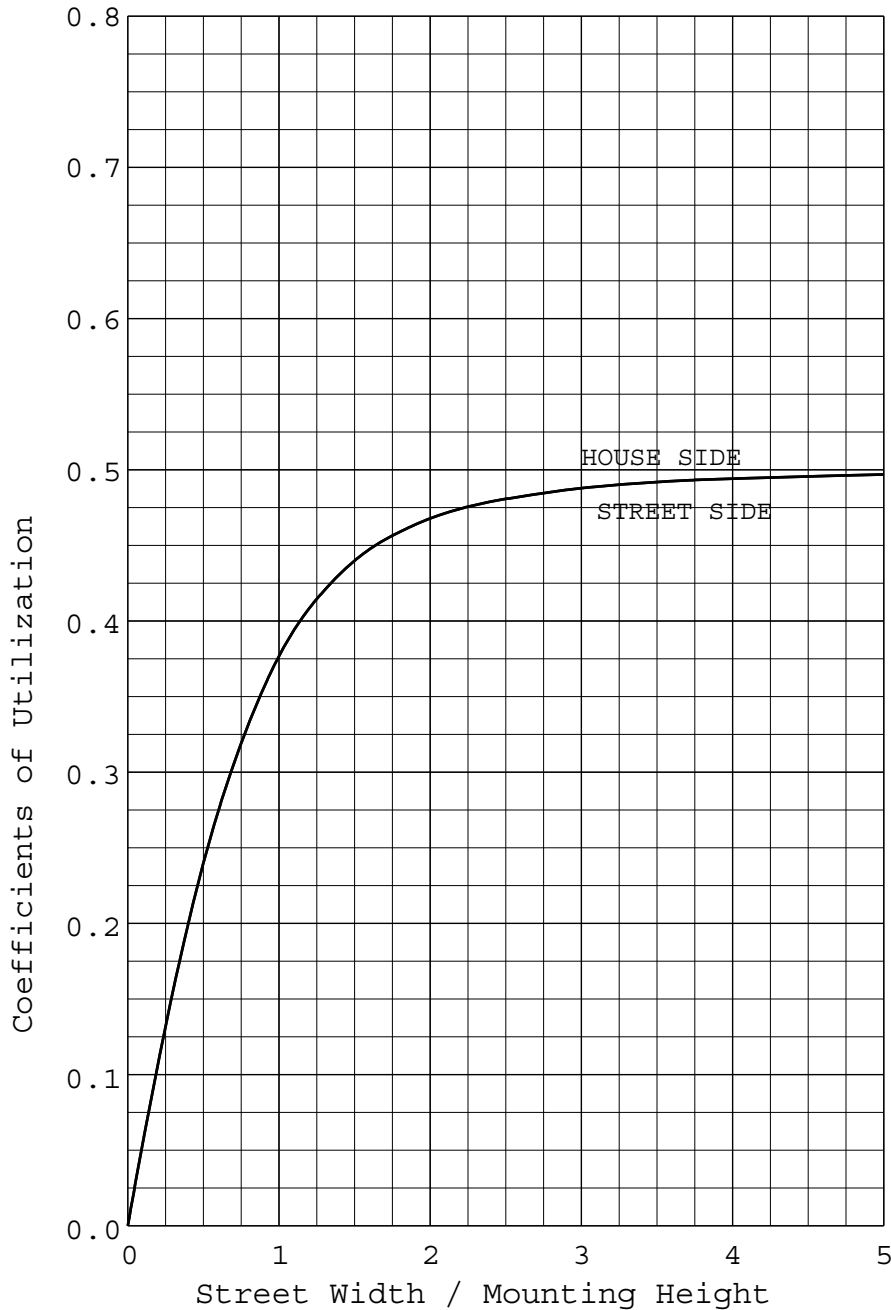
REPORT NUMBER: RAB00897
 ISSUE DATE: 06/02/15 PAGE: 3 OF 9
 PREPARED FOR: RAB LIGHTING INC.
 CATALOG NUMBER: MASI20-160YW/D10
 LUMINAIRE: CAST METAL HOUSING, CAST
 METAL HEAT SINK, 1 WHITE CIRCUIT
 BOARD WITH 576 LEDS, CLEAR FLAT GLASS
 DOOR IN CAST WHITE PAINTED METAL
 FRAME.
 LAMPS: FIVE HUNDRED AND SEVENTY SIX
 WHITE LIGHT EMITTING DIODES (LEDS),
 VERTICAL BASE-UP POSITION.
 TOTAL INPUT WATTS = 157.37 AT 120.0
 VOLTS
 LED DRIVERS: PSDV151101A
 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: RAB00897
ISSUE DATE: 06/02/15
PREPARED FOR: RAB LIGHTING INC.

PAGE: 4 OF 9

COEFFICIENTS OF UTILIZATION AND FLUX DISTRIBUTION



	LUMENS	PERCENT OF FIXTURE
DOWNWARD STREET SIDE	10729.	50.0
DOWNWARD HOUSE SIDE	10729.	50.0
DOWNWARD TOTAL	21458.	100.0
UPWARD STREET SIDE	0.	0.0
UPWARD HOUSE SIDE	0.	0.0
UPWARD TOTAL	0.	0.0
TOTAL FLUX	21458.	100.0
TOTAL INPUT WATTS = 157.4		
EFFICACY = 136.3 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: RAB00897
 ISSUE DATE: 06/02/15
 PREPARED FOR: RAB LIGHTING INC.

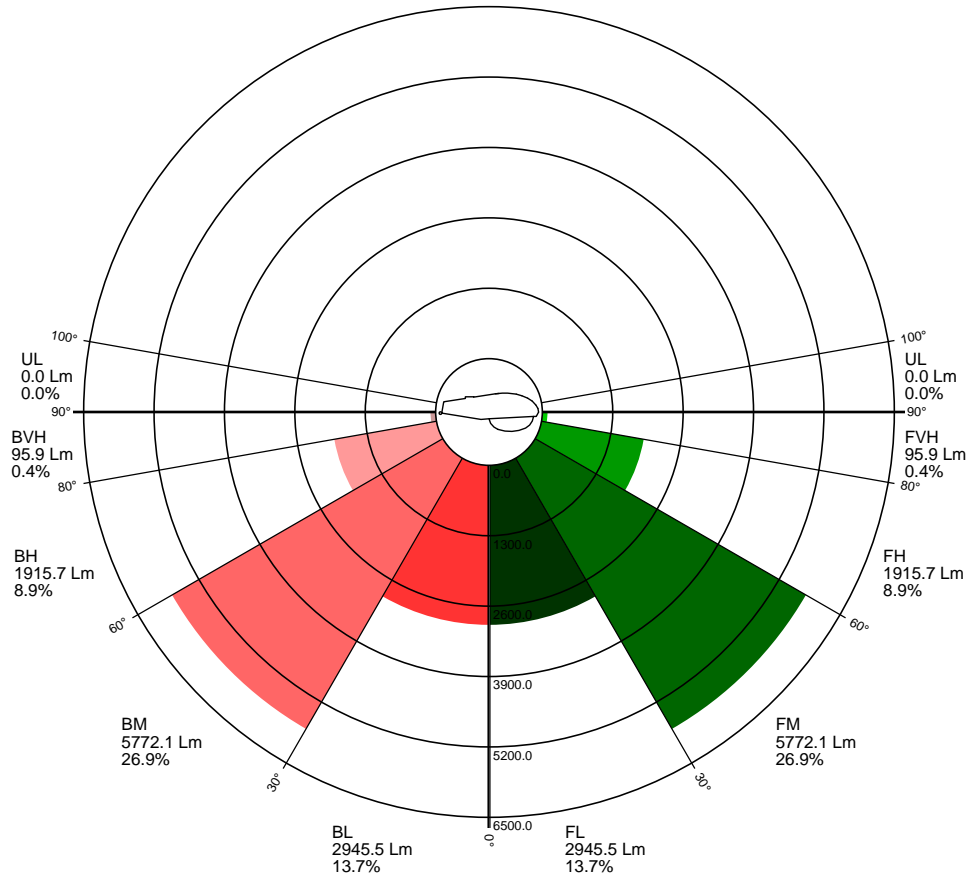
PAGE: 5 OF 9

BUG Rating:				B4 U0 G2		
Zonal Summary		Lumens	% of Fixture	Zone Ratings		
				B	U	G
Forward		10729	50.0			
FL	(0° - 30°)	2945.5	13.7			
FM	(30° - 60°)	5772.1	26.9			
FH	(60° - 80°)	1915.7	8.9			G2
FVH	(80° - 90°)	95.9	0.4			G1
Backward		10729	50.0			
BL	(0° - 30°)	2945.5	13.7	B4		
BM	(30° - 60°)	5772.1	26.9	B4		
BH	(60° - 80°)	1915.7	8.9	B3		G2
BVH	(80° - 90°)	95.9	0.4			G1
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		21458	100.0			

Zonal Lumen Summary

(Linear scale)

UH
0.0 Lm
0.0%



Glare Rating Details

Uplight Rating Details

REPORT NUMBER: RAB00897
 ISSUE DATE: 06/02/15
 PREPARED FOR: RAB LIGHTING INC.

PAGE: 7 OF 9

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	42.	43.	46.	48.	49.	48.	50.	49.	47. 44.
	85.0	120.	123.	125.	125.	125.	122.	126.	125.	124. 119.
	82.5	279.	280.	283.	282.	281.	275.	279.	280.	282. 276.
	80.0	509.	518.	521.	511.	507.	496.	506.	504.	518. 506.
	77.5	810.	824.	824.	796.	793.	797.	791.	797.	823. 810.
	75.0	1121.	1137.	1146.	1138.	1131.	1093.	1129.	1140.	1138. 1130.
	72.5	1507.	1511.	1508.	1507.	1470.	1507.	1464.	1506.	1504. 1503.
V	70.0	1858.	1863.	1856.	1890.	1869.	1871.	1869.	1878.	1855. 1852.
E	67.5	2264.	2272.	2296.	2311.	2291.	2227.	2299.	2312.	2285. 2234.
R	65.0	2652.	2664.	2659.	2672.	2666.	2568.	2667.	2672.	2651. 2652.
T	62.5	3006.	3013.	3012.	3016.	3025.	3098.	3027.	3016.	3000. 3002.
I	60.0	3346.	3352.	3348.	3345.	3395.	3485.	3377.	3347.	3348. 3340.
C	57.5	3668.	3672.	3676.	3686.	3833.	3827.	3822.	3671.	3673. 3661.
A	55.0	3988.	3979.	4044.	4130.	4145.	4136.	4139.	4121.	4022. 3973.
L	52.5	4426.	4420.	4458.	4441.	4456.	4445.	4446.	4430.	4446. 4402.
	50.0	4723.	4727.	4746.	4738.	4722.	4738.	4730.	4735.	4741. 4717.
A	47.5	4992.	5008.	5013.	5006.	5002.	4994.	5008.	5008.	5019. 4998.
N	45.0	5250.	5260.	5258.	5263.	5252.	5252.	5261.	5263.	5269. 5255.
G	42.5	5494.	5508.	5513.	5508.	5495.	5493.	5506.	5512.	5518. 5501.
L	40.0	5725.	5726.	5740.	5730.	5724.	5723.	5736.	5739.	5736. 5726.
E	37.5	5945.	5939.	5948.	5947.	5940.	5945.	5949.	5957.	5954. 5942.
	35.0	6143.	6144.	6145.	6149.	6145.	6144.	6154.	6154.	6152. 6146.
	30.0	6501.	6501.	6506.	6507.	6507.	6503.	6510.	6512.	6507. 6504.
	25.0	6795.	6798.	6801.	6802.	6806.	6806.	6813.	6803.	6799. 6797.
	20.0	7044.	7045.	7047.	7046.	7048.	7050.	7049.	7048.	7048. 7044.
	15.0	7242.	7244.	7247.	7243.	7243.	7241.	7243.	7245.	7247. 7245.
	10.0	7372.	7375.	7377.	7378.	7379.	7380.	7380.	7380.	7380. 7377.
	5.0	7442.	7443.	7446.	7446.	7447.	7449.	7450.	7448.	7447. 7446.
	0.0<<	7478.	7478.	7478.	7478.	7478.	7478.	7478.	7478.	7478. 7478.

||
 PLANE OF MAXIMUM CANDELA
 |
 CONE OF MAXIMUM CANDELA

REPORT NUMBER: RAB00897
 ISSUE DATE: 06/02/15
 PREPARED FOR: RAB LIGHTING INC.

PAGE: 8 OF 9

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	44.	44.	47.	49.	50.	48.	49.	48.	46.	43.	42.
85.0	122.	119.	124.	125.	126.	122.	125.	125.	125.	123.	120.
82.5	282.	276.	282.	280.	279.	275.	281.	282.	283.	280.	279.
80.0	498.	506.	518.	504.	506.	496.	507.	511.	521.	518.	509.
77.5	794.	810.	823.	797.	791.	797.	793.	796.	824.	824.	810.
75.0	1113.	1130.	1138.	1140.	1129.	1093.	1131.	1138.	1146.	1137.	1121.
72.5	1499.	1503.	1504.	1506.	1464.	1507.	1470.	1507.	1508.	1511.	1507.
V 70.0	1849.	1852.	1855.	1878.	1869.	1871.	1869.	1890.	1856.	1863.	1858.
E 67.5	2229.	2234.	2285.	2312.	2299.	2227.	2291.	2311.	2296.	2272.	2264.
R 65.0	2639.	2652.	2651.	2672.	2667.	2568.	2666.	2672.	2659.	2664.	2652.
T 62.5	2995.	3002.	3000.	3016.	3027.	3098.	3025.	3016.	3012.	3013.	3006.
I 60.0	3336.	3340.	3348.	3347.	3377.	3485.	3395.	3345.	3348.	3352.	3346.
C 57.5	3664.	3661.	3673.	3671.	3822.	3827.	3833.	3686.	3676.	3672.	3668.
A 55.0	3968.	3973.	4022.	4121.	4139.	4136.	4145.	4130.	4044.	3979.	3988.
L 52.5	4408.	4402.	4446.	4430.	4446.	4445.	4456.	4441.	4458.	4420.	4426.
50.0	4729.	4717.	4741.	4735.	4730.	4738.	4722.	4738.	4746.	4727.	4723.
A 47.5	5008.	4998.	5019.	5008.	5008.	4994.	5002.	5006.	5013.	5008.	4992.
N 45.0	5269.	5255.	5269.	5263.	5261.	5252.	5252.	5263.	5258.	5260.	5250.
G 42.5	5513.	5501.	5518.	5512.	5506.	5493.	5495.	5508.	5513.	5508.	5494.
L 40.0	5738.	5726.	5736.	5739.	5736.	5723.	5724.	5730.	5740.	5726.	5725.
E 37.5	5955.	5942.	5954.	5957.	5949.	5945.	5940.	5947.	5948.	5939.	5945.
35.0	6154.	6146.	6152.	6154.	6154.	6144.	6145.	6149.	6145.	6144.	6143.
30.0	6505.	6504.	6507.	6512.	6510.	6503.	6507.	6507.	6506.	6501.	6501.
25.0	6800.	6797.	6799.	6803.	6813.	6806.	6806.	6802.	6801.	6798.	6795.
20.0	7044.	7044.	7048.	7048.	7049.	7050.	7048.	7046.	7047.	7045.	7044.
15.0	7240.	7245.	7247.	7245.	7243.	7241.	7243.	7243.	7247.	7244.	7242.
10.0	7374.	7377.	7380.	7380.	7380.	7380.	7379.	7378.	7377.	7375.	7372.
5.0	7441.	7446.	7447.	7448.	7450.	7449.	7447.	7446.	7446.	7443.	7442.
0.0<<	7478.	7478.	7478.	7478.	7478.	7478.	7478.	7478.	7478.	7478.	7478.

CONE OF MAXIMUM CANDELA

REPORT NUMBER: RAB00897
 ISSUE DATE: 06/02/15
 PREPARED FOR: RAB LIGHTING INC.

PAGE: 9 OF 9

5-DEGREE ZONAL LUMEN SUMMARY

0- 5	178
5- 10	530
10- 15	867
15- 20	1178
20- 25	1453
25- 30	1684
30- 35	1864
35- 40	1982
40- 45	2036
45- 50	2020
50- 55	1922
55- 60	1720
60- 65	1466
65- 70	1149
70- 75	782
75- 80	434
80- 85	162
85- 90	30

10-DEGREE ZONAL LUMEN SUMMARY

0- 10	709
0- 20	2754
0- 30	5891
0- 40	9737
0- 50	13793
0- 60	17435
0- 70	20050
0- 80	21266
0- 90	21458

REPORT NUMBER: RAB00930
 DATE: 6/2/2015
 PREPARED FOR: RAB LIGHTING INC.
 CATALOG NUMBER: MASI20-160YW/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: PSDV151101A

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: RAB00930
 DATE: 6/2/2015
 PREPARED FOR: RAB LIGHTING INC.
 CATALOG NUMBER: MASI20-160YW/D10

Page 2 of 4

RESULTS:

PHOTOMETRIC	
Total Integrated Flux (lumens)	21458 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.4336
Chromaticity Ordinate y	0.4004
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2500
Chromaticity Ordinate v'	0.5194
Correlated Color Temp CCT (K)	3025
ANSI C78.377-2008 Duv	-0.001
Total Radiant Flux (milliWatts)	62011 *
ELECTRICAL	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	1.31
Input Power (Watts)	157.4
Input Power Factor (%)	99.7
Input Current THD (%)	5.7
Input Voltage THD (%)	0.2
EFFICACY (Lumens/Watt)	
	136.3
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.579
Input Power (Watts)	154.5
Input Power Factor (%)	96.3
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	-26
R10 Strong yellow	54
R11 Strong green	62
R12 Strong blue	44
R13 Light yellowish pink (skin)	70
R14 Moderate olive green (leaf)	94

*NOTE:

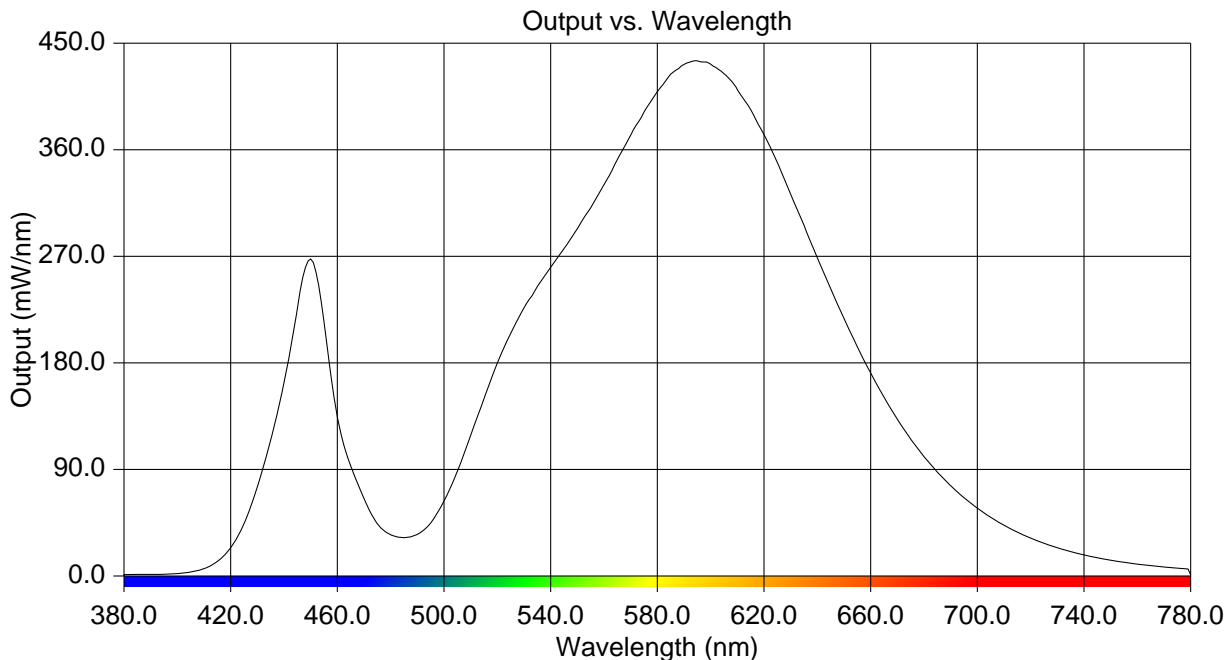
Proper calibration of integrating spheres for measuring total flux output of non-directional samples will produce reliable, repeatable results within the calibration tolerances of the equipment used. However, measurement of test samples with significant self absorption and/or directional output, even 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: RAB00930
 DATE: 6/2/2015
 PREPARED FOR: RAB LIGHTING INC.
 CATALOG NUMBER: MASI20-160YW/D10

Page 3 of 4

RESULTS:

Wavelength	mW per nm	Wavelength	mW per nm	Wavelength	mW per nm
380	1.103	515	149.505	650	217.060
385	1.203	520	179.675	655	193.334
390	1.226	525	204.435	660	171.362
395	1.546	530	226.255	665	150.848
400	2.101	535	244.255	670	132.380
405	3.266	540	260.609	675	115.513
410	6.095	545	276.220	680	100.720
415	12.305	550	292.650	685	87.820
420	23.811	555	310.611	690	76.264
425	44.103	560	330.221	695	66.072
430	75.169	565	351.544	700	57.160
435	115.121	570	371.890	705	49.482
440	162.542	575	391.434	710	42.829
445	226.736	580	408.510	715	37.042
450	267.463	585	423.398	720	31.995
455	214.495	590	431.611	725	27.545
460	134.507	595	434.697	730	23.768
465	92.966	600	431.703	735	20.479
470	65.269	605	424.113	740	17.707
475	44.306	610	410.336	745	15.418
480	34.729	615	393.568	750	13.358
485	32.461	620	372.280	755	11.532
490	35.057	625	349.040	760	10.018
495	44.635	630	322.505	765	8.683
500	63.210	635	296.007	770	7.575
505	88.367	640	268.535	775	6.595
510	118.402	645	242.362	780	1.001



REPORT NUMBER: RAB00930
DATE: 6/2/2015
PREPARED FOR: RAB LIGHTING INC.
CATALOG NUMBER: MASI20-160YW/D10

Page 4 of 4

CIE Chromaticity Diagram

