

REPORT NUMBER: RAB00971

ISSUE DATE: 07/29/15

PREPARED FOR: RAB LIGHTING INC.

CATALOG NUMBER: SHARK4-50YW/D10 (STANDARD DISTRIBUTION)

LUMINAIRE: FABRICATED WHITE PLASTIC HOUSING, PERFORATED WHITE METAL HEAT SINK, 2 WHITE CIRCUIT BOARDS EACH WITH 64 LEDS, FROSTED POLYCARBONATE LENS ENCLOSURE.

LAMPS: ONE HUNDRED AND TWENTY EIGHT WHITE EMITTING DIODES (LEDs), TILTED 15-DEGREE FROM VERTICAL BASE-UP POSITION.

TOTAL INPUT WATTS = 48.075 AT 277.0 VOLTS

LED DRIVERS: RD-052-A1050-C-089C

(SEE PAGE 2 FOR MORE INFORMATION)

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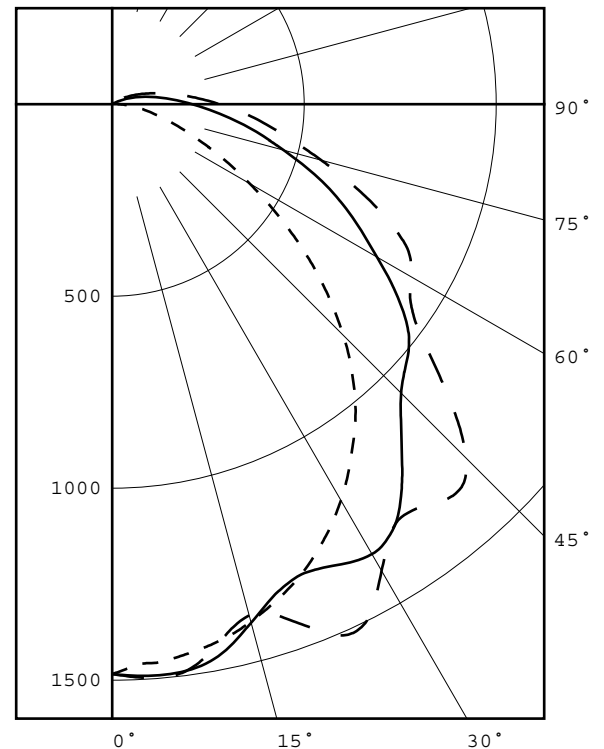
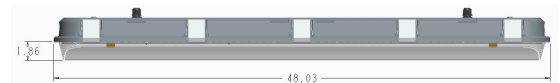
DATE SAMPLE TESTED: 07/29/15

CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0
0	1484	1484	1484	1484	1484
5	1458	1468	1492	1499	1498
15	1395	1417	1398	1375	1378
25	1275	1273	1329	1477	1512
35	1091	1116	1300	1295	1313
45	852	953	1064	1266	1302
55	555	689	920	968	958
65	296	433	687	790	834
75	135	244	462	558	564
85	47	124	281	347	363
90	17	85	208	265	280
95	14	59	152	201	211
105	11	19	73	104	110
115	8	7	23	44	49
125	5	5	4	10	16
135	4	4	3	2	2
145	3	3	3	2	2
155	4	3	3	2	2
165	4	4	3	2	2
175	4	4	3	2	3
180	3	3	3	3	3

FLUX

141
396
628
772
835
750
611
430
263
145
70
27
7
2
2
1
1
0



LEGEND:

0-deg: - - - - -
45-deg: _____
90-deg: - - - - -

ZONAL LUMEN SUMMARY

ZONE	LUMENS	%FIXT
0- 30	1165	22.9
0- 40	1937	38.1
0- 60	3522	69.3
0- 90	4826	95.0
90-120	241	4.7
90-130	248	4.9
90-150	252	5.0
90-180	255	5.0
0-180	5080	100.0

TOTAL INPUT WATTS = 48.1

EFFICACY = 105.6 Lm/W

CIE TYPE - DIRECT

PLANE : 0-DEG 90-DEG

SPACING CRITERIA : 1.2 1.4

Checked X.CAO
Approved D.WANG-MUNSON

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ADDITIONAL INFORMATION

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
ACCREDITED LABORATORY CODE 201058-0

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PLANE : 0-DEG 90-DEG
BEAM ANGLE (50%) : 96.6 X 136.1 DEGREES
FIELD ANGLE (10%): 147.4 X 201.0 DEGREES

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CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0
0.0	1484	1484	1484	1484	1484
5.0	1458	1468	1492	1499	1498
10.0	1433	1451	1473	1463	1453
15.0	1395	1417	1398	1375	1378
20.0	1343	1356	1330	1398	1441
25.0	1275	1273	1329	1477	1512
30.0	1191	1191	1353	1420	1403
35.0	1091	1116	1300	1295	1313
40.0	982	1042	1173	1265	1346
45.0	852	953	1064	1266	1302
50.0	706	834	1007	1134	1120
55.0	555	689	920	968	958
60.0	413	553	796	865	900
65.0	296	433	687	790	834
70.0	203	332	578	682	702
75.0	135	244	462	558	564
80.0	86	177	367	441	451
85.0	47	124	281	347	363
90.0	17	85	208	265	280
95.0	14	59	152	201	211
100.0	12	39	108	149	156
105.0	11	19	73	104	110
110.0	9	9	44	71	76
115.0	8	7	23	44	49
120.0	6	6	6	26	31
125.0	5	5	4	10	16
130.0	4	4	3	3	3
135.0	4	4	3	2	2
140.0	3	3	3	2	2
145.0	3	3	3	2	2
150.0	3	3	3	2	2
155.0	4	3	3	2	2
160.0	4	4	3	2	2
165.0	4	4	3	2	2
170.0	4	4	3	3	3
175.0	4	4	3	2	3
180.0	3	3	3	3	3

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ZONAL LUMEN SUMMARY

0- 5	35.
5- 10	105.
10- 15	169.
15- 20	227.
20- 25	287.
25- 30	341.
30- 35	374.
35- 40	398.
40- 45	418.
45- 50	417.
50- 55	392.
55- 60	358.
60- 65	325.
65- 70	286.
70- 75	239.
75- 80	191.
80- 85	150.
85- 90	113.
90- 95	84.
95-100	61.
100-105	42.
105-110	27.
110-115	17.
115-120	10.
120-125	5.
125-130	2.
130-135	1.
135-140	1.
140-145	1.
145-150	1.
150-155	1.
155-160	1.
160-165	0.
165-170	0.
170-175	0.
175-180	0.

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5-DEGREE ZONAL LUMEN SUMMARY

0- 5	35
5- 10	105
10- 15	169
15- 20	227
20- 25	287
25- 30	341
30- 35	374
35- 40	398
40- 45	418
45- 50	417
50- 55	392
55- 60	358
60- 65	325
65- 70	286
70- 75	239
75- 80	191
80- 85	150
85- 90	113
90- 95	84
95-100	61
100-105	42
105-110	27
110-115	17
115-120	10
120-125	5
125-130	2
130-135	1
135-140	1
140-145	1
145-150	1
150-155	1
155-160	1
160-165	0
165-170	0
170-175	0
175-180	0

10-DEGREE ZONAL LUMEN SUMMARY

0- 10	141
0- 20	537
0- 30	1165
0- 40	1937
0- 50	2772
0- 60	3522
0- 70	4133
0- 80	4563
0- 90	4826
0-100	4971
0-110	5040
0-120	5067
0-130	5074
0-140	5076
0-150	5078
0-160	5079
0-170	5080
0-180	5080

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COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

EFFECTIVE FLOOR CAVITY REFLECTANCE 0.20

RC	80				70				50			30			10			0
RW	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	0
0	118	118	118	118	115	115	115	115	108	108	108	103	103	103	97	97	97	95
1	106	100	95	91	103	98	93	89	92	89	85	88	85	82	83	81	78	76
2	96	87	79	73	92	84	77	72	80	74	69	76	71	67	72	68	65	62
3	87	76	67	60	84	74	66	59	70	63	57	66	61	56	63	58	54	52
4	79	67	57	50	77	65	56	50	62	54	49	59	52	47	56	51	46	44
5	73	59	50	43	70	58	49	43	55	48	42	53	46	41	50	45	40	38
6	67	53	44	37	65	52	43	37	50	42	36	48	41	36	46	40	35	33
7	62	48	39	33	60	47	39	33	45	38	32	43	36	31	41	35	31	29
8	58	44	35	29	56	43	35	29	41	34	28	40	33	28	38	32	27	25
9	54	40	32	26	52	39	31	26	38	31	26	36	30	25	35	29	25	23
10	51	37	29	24	49	36	29	23	35	28	23	34	27	23	33	27	22	21

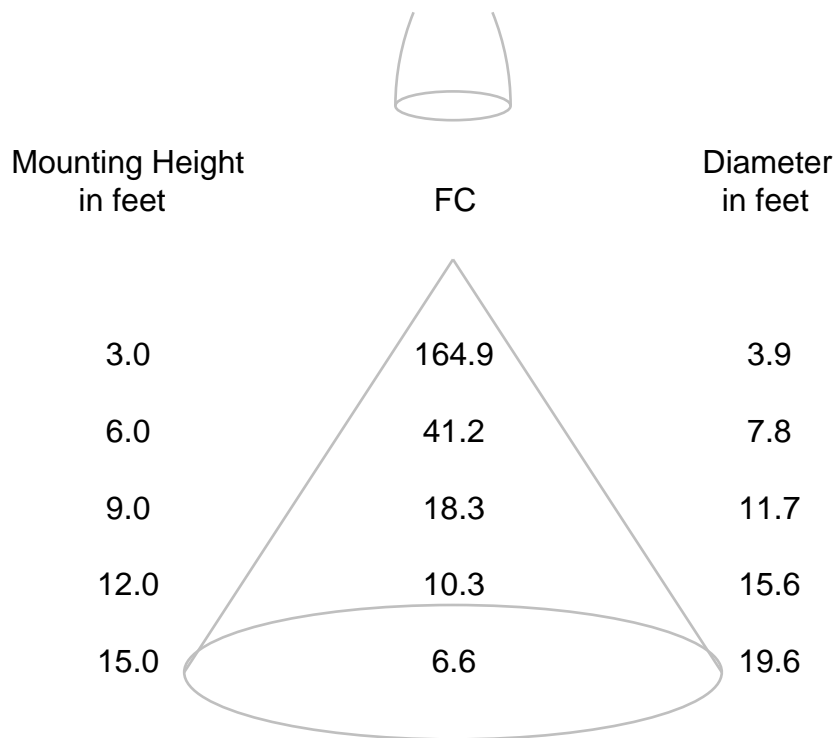
ALL CANDELA, LUMENS, LUMINANCE, AND VCP VALUES IN THIS REPORT ARE BASED ON ABSOLUTE PHOTOMETRY. THE COEFFICIENT OF UTILIZATION VALUES ARE BASED ON THE TOTAL ABSOLUTE LUMEN OUTPUT OF THIS LUMINAIRE SAMPLE.

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CONE OF LIGHT DIAGRAM

(diameter shown is where fc value is half the fc at nadir)



Note: The candela values used to generate this diagram were obtained by averaging the photometric data into a single plane.

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DATE: 7/29/2015
PREPARED FOR: RAB LIGHTING INC.
CATALOG NUMBER: SHARK4-50YW/D10 (STANDARD DISTRIBUTION)

ADDRESS: 170 LUDLOW AVE, NORTHVALE, NJ 07647

LUMINAIRE: FABRICATED WHITE PLASTIC HOUSING, PERFORATED WHITE METAL HEAT SINK, 2 WHITE CIRCUIT BOARDS EACH WITH 64 LEDS, FROSTED POLYCARBONATE LENS ENCLOSURE.

LAMP: ONE HUNDRED AND TWENTY EIGHT WHITE EMITTING DIODES (LEDs), TILTED 15-DEGREE FROM VERTICAL BASE-UP POSITION.

DRIVER: RD-052-A1050-C-089C

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	7/24/16
	RAB 2.0 meter Diameter Integrating Sphere, 4PI Geometry	7/24/16

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

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RESULTS:

PHOTOMETRIC	
Total Integrated Flux (lumens)	5080 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.4298
Chromaticity Ordinate y	0.4017
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2470
Chromaticity Ordinate v'	0.5194
Correlated Color Temp CCT (K)	3104
ANSI C78.377-2008 Duv	0.000
Total Radiant Flux (milliWatts)	14809 *
ELECTRICAL	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.403
Input Power (Watts)	47.9
Input Power Factor (%)	99.0
Input Current THD (%)	8.3
Input Voltage THD (%)	0.2
EFFICACY (Lumens/Watt)	
	106.1
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.182
Input Power (Watts)	48.1
Input Power Factor (%)	95.4
Input Current THD (%)	7.2
Input Voltage THD (%)	0.2
Off-State Power (Watts)	
	0.0

COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	72
R1 Light greyish red	70
R2 Dark greyish yellow	80
R3 Strong yellowish green	89
R4 Moderate yellowish green	70
R5 Light bluish green	68
R6 Light blue	72
R7 Light violet	80
R8 Light reddish purple	50
R9 Strong red	-21
R10 Strong yellow	53
R11 Strong green	64
R12 Strong blue	44
R13 Light yellowish pink (skin)	71
R14 Moderate olive green (leaf)	93

*NOTE:

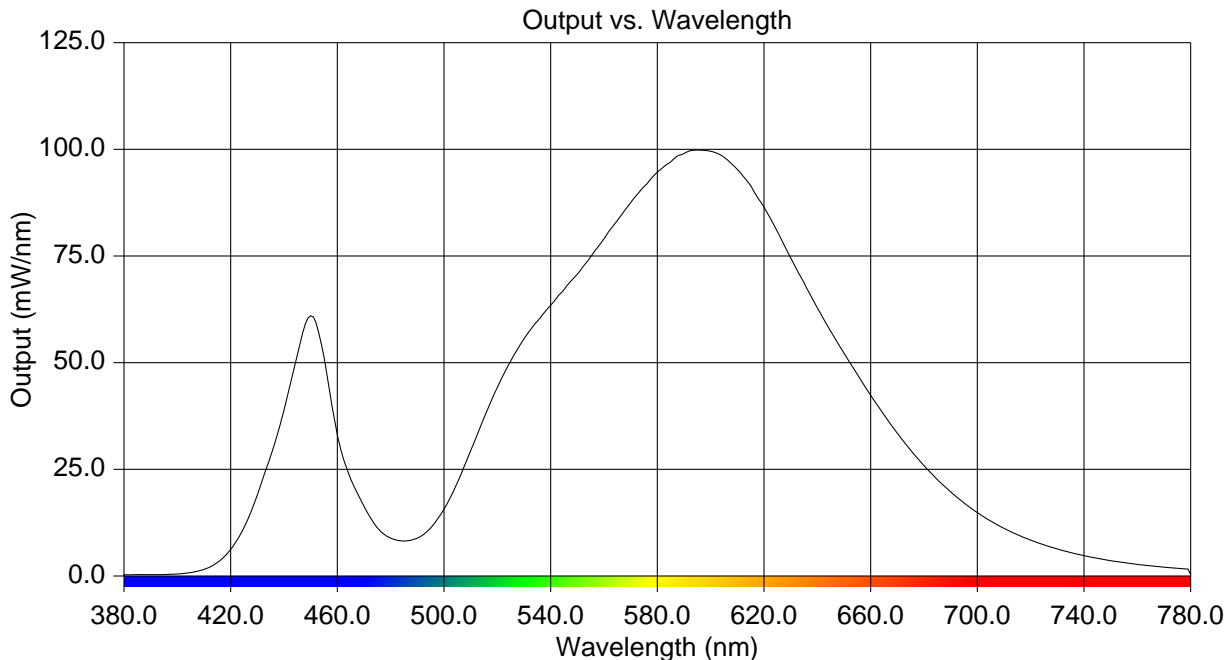
Proper calibration of integrating spheres for measuring total flux output of non-directional samples will produce reliable, repeatable results within the calibration tolerances of the equipment used. However, measurement of test samples with significant self absorption and/or directional output, even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

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RESULTS:

Wavelength	mW per nm	Wavelength	mW per nm	Wavelength	mW per nm
380	0.259	515	37.062	650	52.220
385	0.283	520	44.214	655	47.272
390	0.297	525	50.412	660	42.381
395	0.350	530	55.586	665	37.751
400	0.472	535	59.701	670	33.450
405	0.769	540	63.381	675	29.451
410	1.517	545	67.081	680	25.897
415	3.144	550	70.682	685	22.591
420	6.202	555	74.808	690	19.701
425	11.306	560	79.028	695	17.125
430	18.932	565	83.382	700	14.858
435	28.271	570	87.503	705	12.873
440	38.608	575	91.286	710	11.116
445	52.058	580	94.667	715	9.695
450	60.991	585	97.038	720	8.423
455	51.366	590	99.029	725	7.300
460	33.157	595	99.860	730	6.323
465	22.739	600	99.540	735	5.486
470	16.311	605	98.155	740	4.728
475	11.319	610	95.357	745	4.128
480	8.858	615	91.508	750	3.598
485	8.217	620	86.491	755	3.115
490	8.856	625	80.788	760	2.724
495	11.253	630	74.531	765	2.375
500	15.644	635	68.760	770	2.070
505	21.807	640	62.794	775	1.809
510	29.373	645	57.404	780	0.276



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CIE Chromaticity Diagram

