

REPORT NUMBER: RAB01062

ISSUE DATE: 07/30/15

PREPARED FOR: RAB LIGHTING INC.

CATALOG NUMBER: SHARK4-36YW/480 (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 = 37.161 AT 480.0 VOLTS

LED DRIVERS: RD-LT40-A0700-60PF

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

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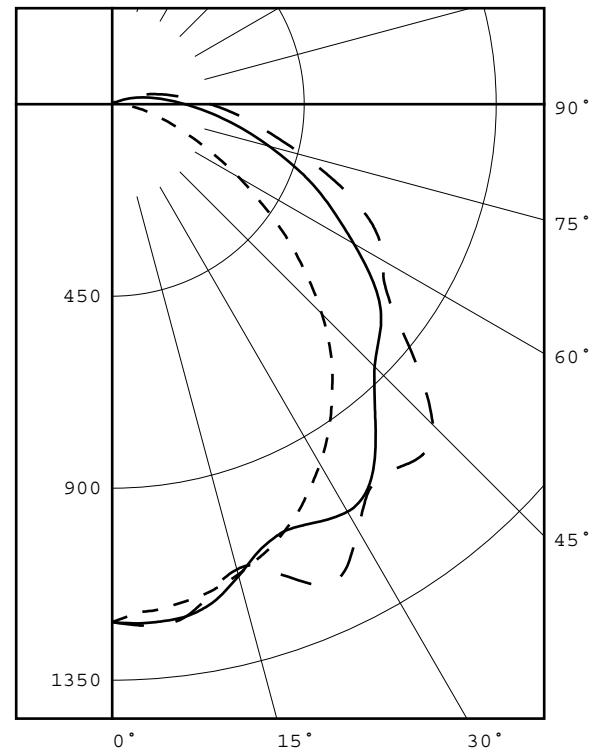
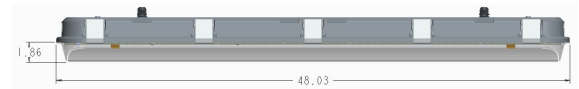
DATE SAMPLE TESTED: 07/30/15

### CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0
0	1214	1214	1214	1214	1214
5	1190	1199	1218	1225	1225
15	1141	1158	1145	1125	1129
25	1044	1041	1086	1203	1234
35	893	909	1062	1060	1078
45	695	776	870	1027	1063
55	455	563	754	795	791
65	243	355	562	640	675
75	110	198	380	456	463
85	38	100	230	281	296
90	13	68	170	215	229
95	11	48	125	163	173
105	9	15	60	84	91
115	7	6	19	35	40
125	4	4	3	8	13
135	3	3	3	2	2
145	3	3	2	2	2
155	3	3	2	2	2
165	3	3	2	2	2
175	4	3	3	2	2
180	3	3	3	3	3

### FLUX

115
324
513
631
681
614
498
351
214
118
57
21
6
2
1
1
1
0



LEGEND:

0-deg: - - - - -  
 45-deg: \_\_\_\_\_  
 90-deg: - - - - -

### ZONAL LUMEN SUMMARY

ZONE	LUMENS	%FIXT
0- 30	951	22.9
0- 40	1582	38.1
0- 60	2877	69.4
0- 90	3941	95.0
90-120	196	4.7
90-130	202	4.9
90-150	206	5.0
90-180	208	5.0
0-180	4148	100.0

TOTAL INPUT WATTS = 37.2

EFFICACY = 111.5 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 136.0 DEGREES  
FIELD ANGLE (10%): 147.4 X 201.1 DEGREES

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### CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0
0.0	1214	1214	1214	1214	1214
5.0	1190	1199	1218	1225	1225
10.0	1172	1185	1203	1195	1191
15.0	1141	1158	1145	1125	1129
20.0	1100	1110	1088	1141	1175
25.0	1044	1041	1086	1203	1234
30.0	974	971	1103	1159	1151
35.0	893	909	1062	1060	1078
40.0	802	849	959	1033	1094
45.0	695	776	870	1027	1063
50.0	576	677	821	927	922
55.0	455	563	754	795	791
60.0	343	451	654	706	732
65.0	243	355	562	640	675
70.0	166	270	473	554	574
75.0	110	198	380	456	463
80.0	70	143	300	363	370
85.0	38	100	230	281	296
90.0	13	68	170	215	229
95.0	11	48	125	163	173
100.0	10	31	89	120	128
105.0	9	15	60	84	91
110.0	8	7	36	56	62
115.0	7	6	19	35	40
120.0	5	5	5	21	26
125.0	4	4	3	8	13
130.0	4	4	3	3	3
135.0	3	3	3	2	2
140.0	3	3	2	2	2
145.0	3	3	2	2	2
150.0	3	3	2	2	2
155.0	3	3	2	2	2
160.0	3	3	2	2	2
165.0	3	3	2	2	2
170.0	3	3	2	2	2
175.0	4	3	3	2	2
180.0	3	3	3	3	3

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## ZONAL LUMEN SUMMARY

0- 5	29.
5- 10	86.
10- 15	138.
15- 20	186.
20- 25	235.
25- 30	278.
30- 35	306.
35- 40	325.
40- 45	340.
45- 50	340.
50- 55	321.
55- 60	293.
60- 65	265.
65- 70	233.
70- 75	195.
75- 80	156.
80- 85	122.
85- 90	92.
90- 95	68.
95-100	50.
100-105	35.
105-110	22.
110-115	14.
115-120	8.
120-125	4.
125-130	2.
130-135	1.
135-140	1.
140-145	1.
145-150	1.
150-155	1.
155-160	0.
160-165	0.
165-170	0.
170-175	0.
175-180	0.

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### 5-DEGREE ZONAL LUMEN SUMMARY

0- 5	29
5- 10	86
10- 15	138
15- 20	186
20- 25	235
25- 30	278
30- 35	306
35- 40	325
40- 45	340
45- 50	340
50- 55	321
55- 60	293
60- 65	265
65- 70	233
70- 75	195
75- 80	156
80- 85	122
85- 90	92
90- 95	68
95-100	50
100-105	35
105-110	22
110-115	14
115-120	8
120-125	4
125-130	2
130-135	1
135-140	1
140-145	1
145-150	1
150-155	1
155-160	0
160-165	0
165-170	0
170-175	0
175-180	0

### 10-DEGREE ZONAL LUMEN SUMMARY

0- 10	115
0- 20	439
0- 30	951
0- 40	1582
0- 50	2263
0- 60	2877
0- 70	3375
0- 80	3726
0- 90	3941
0-100	4059
0-110	4115
0-120	4137
0-130	4143
0-140	4145
0-150	4146
0-160	4147
0-170	4148
0-180	4148

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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	96	91	103	98	93	89	92	89	85	88	85	82	83	81	79	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

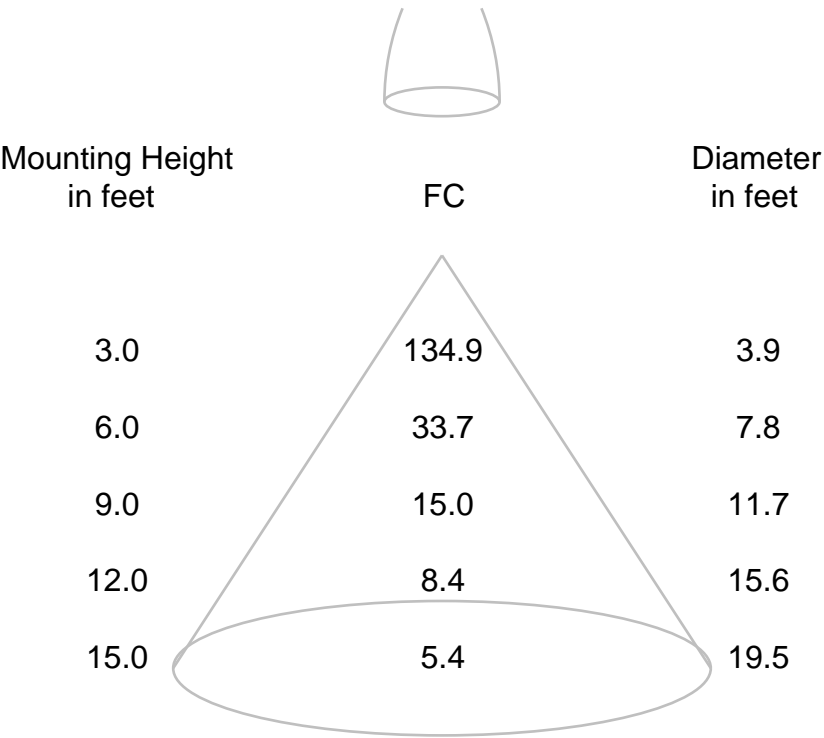
ALL CANDELA, LUMENS, LUMINANCE, AND VCP VALUES IN THIS REPORT ARE BASED ON ABSOLUTE PHOTOMETRY. THE COEFFICIENT OF UTILIZATION VALUES ARE BASED ON THE TOTAL ABSOLUTE LUMEN OUTPUT OF THIS LUMINAIRE SAMPLE.

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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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CATALOG NUMBER: SHARK4-36YW/480 (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-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:	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 (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	<u>X.CAO</u>
Approved	<u>D.WANG-MUNSON</u> Lighting Engineer

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### RESULTS:

PHOTOMETRIC	
Total Integrated Flux (lumens)	4148 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.4310
Chromaticity Ordinate y	0.4029
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2472
Chromaticity Ordinate v'	0.5200
Correlated Color Temp CCT (K)	3093
ANSI C78.377-2008 Duv	0.000
Total Radiant Flux (milliWatts)	12039 *
ELECTRICAL	
Input Voltage (Volts AC)	347.0
Input Current (Amps AC)	0.107
Input Power (Watts)	36.9
Input Power Factor (%)	99.4
Input Current THD (%)	11.7
Input Voltage THD (%)	0.2
EFFICACY (Lumens/Watt)	
	112.4
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	480.0
Input Current (Amps AC)	0.080
Input Power (Watts)	37.2
Input Power Factor (%)	96.9
Input Current THD (%)	8.0
Input Voltage THD (%)	0.2
Off-State Power (Watts)	0.0

COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	72
R1 Light greyish red	69
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	-22
R10 Strong yellow	53
R11 Strong green	64
R12 Strong blue	43
R13 Light yellowish pink (skin)	71
R14 Moderate olive green (leaf)	93

### \*NOTE:

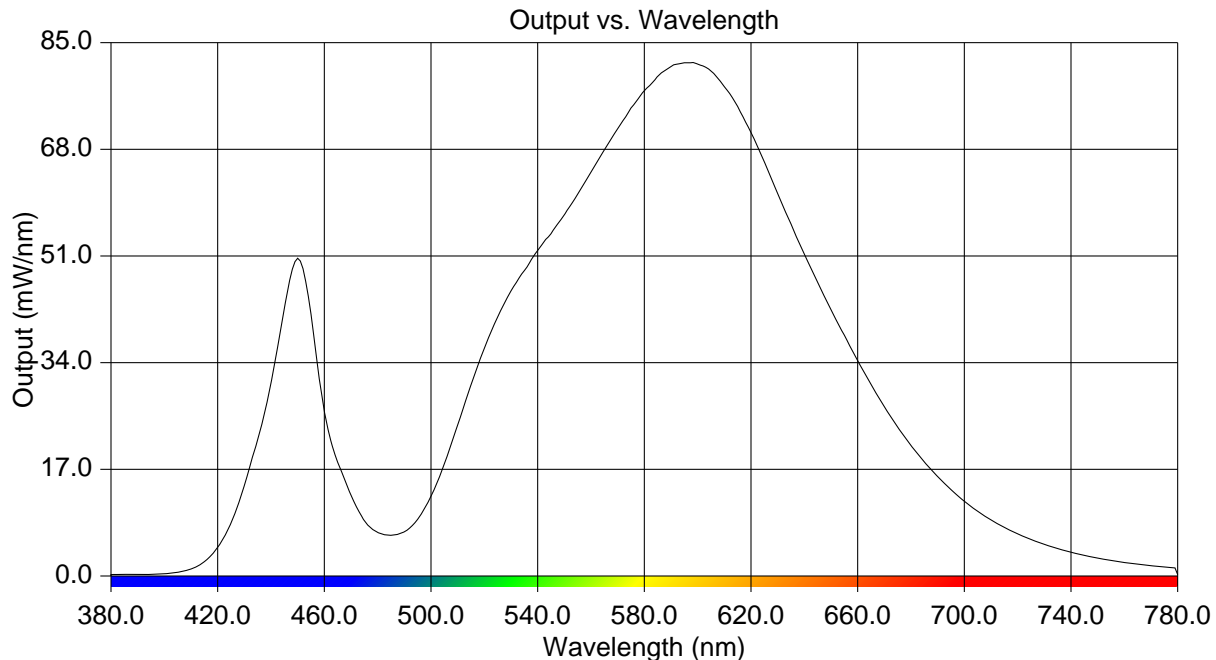
Proper calibration of integrating spheres for measuring total flux output of non-directional samples will produce reliable, repeatable results within the calibration tolerances of the equipment used. However, measurement of test samples with significant self absorption and/or directional output, even 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	0.219	515	30.419	650	42.478
385	0.235	520	36.253	655	38.390
390	0.233	525	41.322	660	34.308
395	0.269	530	45.435	665	30.510
400	0.367	535	48.667	670	26.982
405	0.579	540	51.847	675	23.729
410	1.102	545	54.549	680	20.810
415	2.280	550	57.573	685	18.179
420	4.575	555	60.868	690	15.848
425	8.440	560	64.355	695	13.765
430	14.359	565	67.918	700	11.911
435	21.759	570	71.257	705	10.307
440	30.619	575	74.591	710	8.920
445	42.722	580	77.373	715	7.756
450	50.640	585	79.618	720	6.730
455	41.745	590	81.186	725	5.832
460	26.293	595	81.796	730	5.036
465	18.124	600	81.573	735	4.351
470	12.867	605	80.505	740	3.759
475	8.862	610	77.985	745	3.269
480	6.939	615	74.834	750	2.856
485	6.506	620	70.761	755	2.477
490	7.027	625	65.946	760	2.163
495	9.035	630	60.906	765	1.882
500	12.705	635	56.109	770	1.641
505	17.860	640	51.332	775	1.438
510	24.031	645	46.783	780	0.218



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## CIE Chromaticity Diagram

