

REPORT NUMBER: RAB01124

ISSUE DATE: 09/08/15

PREPARED FOR: RAB LIGHTING INC.

CATALOG NUMBER: SHARK4-50YNW/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 = 47.746 AT 277.0 VOLTS

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

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

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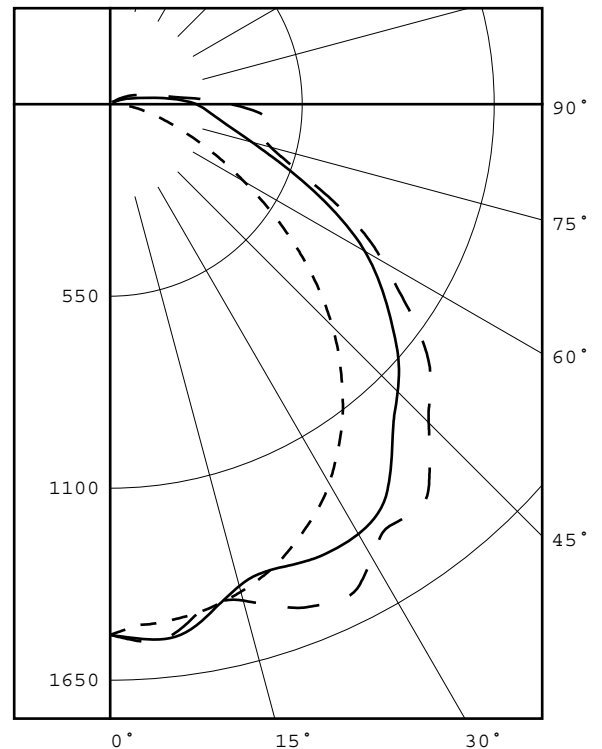
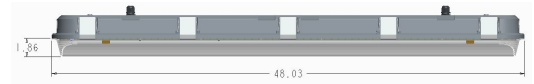
DATE SAMPLE TESTED: 09/08/15

### CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0
0	1520	1520	1520	1520	1520
5	1493	1508	1539	1548	1545
15	1446	1457	1429	1452	1472
25	1334	1300	1428	1531	1566
35	1152	1185	1375	1404	1453
45	900	1018	1165	1281	1290
55	593	741	958	1053	1054
65	319	462	694	744	750
75	143	246	421	465	477
85	49	123	288	407	447
90	19	88	247	334	361
95	16	62	177	215	214
105	11	19	65	93	98
115	7	8	25	48	54
125	5	6	7	14	19
135	4	4	5	6	6
145	4	4	4	4	4
155	4	4	4	4	4
165	4	4	3	3	3
175	4	4	3	3	3
180	3	3	3	3	3

### FLUX

145
412
658
826
879
797
603
390
286
159
64
28
9
4
3
2
1
0



LEGEND:

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

### ZONAL LUMEN SUMMARY

ZONE	LUMENS	%FIXT
0- 30	1215	23.1
0- 40	2040	38.8
0- 60	3717	70.6
0- 90	4995	94.9
90-120	251	4.8
90-130	260	4.9
90-150	266	5.1
90-180	269	5.1
0-180	5265	100.0

TOTAL INPUT WATTS = 47.7

EFFICACY = 110.4 Lm/W

CIE TYPE - DIRECT

PLANE : 0-DEG 90-DEG

SPACING CRITERIA : 1.2 1.5

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%) : 97.9 X 128.0 DEGREES  
FIELD ANGLE (10%): 148.1 X 196.5 DEGREES

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### CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0
0.0	1520	1520	1520	1520	1520
5.0	1493	1508	1539	1548	1545
10.0	1477	1501	1504	1482	1476
15.0	1446	1457	1429	1452	1472
20.0	1400	1379	1413	1507	1535
25.0	1334	1300	1428	1531	1566
30.0	1255	1245	1422	1502	1500
35.0	1152	1185	1375	1404	1453
40.0	1032	1113	1258	1385	1421
45.0	900	1018	1165	1281	1290
50.0	751	892	1070	1168	1197
55.0	593	741	958	1053	1054
60.0	443	595	842	890	904
65.0	319	462	694	744	750
70.0	218	345	542	590	584
75.0	143	246	421	465	477
80.0	89	172	339	414	444
85.0	49	123	288	407	447
90.0	19	88	247	334	361
95.0	16	62	177	215	214
100.0	13	36	105	130	131
105.0	11	19	65	93	98
110.0	9	10	42	70	76
115.0	7	8	25	48	54
120.0	6	7	10	29	34
125.0	5	6	7	14	19
130.0	4	5	6	7	8
135.0	4	4	5	6	6
140.0	4	4	4	5	5
145.0	4	4	4	4	4
150.0	4	4	4	4	4
155.0	4	4	4	4	4
160.0	4	4	3	3	3
165.0	4	4	3	3	3
170.0	4	4	3	3	3
175.0	4	4	3	3	3
180.0	3	3	3	3	3

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## ZONAL LUMEN SUMMARY

0- 5	36.
5- 10	108.
10- 15	174.
15- 20	238.
20- 25	301.
25- 30	357.
30- 35	398.
35- 40	428.
40- 45	442.
45- 50	437.
50- 55	418.
55- 60	380.
60- 65	331.
65- 70	272.
70- 75	215.
75- 80	175.
80- 85	153.
85- 90	132.
90- 95	98.
95-100	61.
100-105	38.
105-110	26.
110-115	17.
115-120	11.
120-125	6.
125-130	3.
130-135	2.
135-140	2.
140-145	1.
145-150	1.
150-155	1.
155-160	1.
160-165	1.
165-170	0.
170-175	0.
175-180	0.

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### 5-DEGREE ZONAL LUMEN SUMMARY

0- 5	36
5- 10	108
10- 15	174
15- 20	238
20- 25	301
25- 30	357
30- 35	398
35- 40	428
40- 45	442
45- 50	437
50- 55	418
55- 60	380
60- 65	331
65- 70	272
70- 75	215
75- 80	175
80- 85	153
85- 90	132
90- 95	98
95-100	61
100-105	38
105-110	26
110-115	17
115-120	11
120-125	6
125-130	3
130-135	2
135-140	2
140-145	1
145-150	1
150-155	1
155-160	1
160-165	1
165-170	0
170-175	0
175-180	0

### 10-DEGREE ZONAL LUMEN SUMMARY

0- 10	145
0- 20	557
0- 30	1215
0- 40	2040
0- 50	2920
0- 60	3717
0- 70	4320
0- 80	4710
0- 90	4995
0-100	5154
0-110	5218
0-120	5246
0-130	5255
0-140	5259
0-150	5262
0-160	5264
0-170	5265
0-180	5265

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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	114	114	114	114	108	108	108	103	103	103	97	97	97	95
1	106	101	96	91	103	98	93	89	93	89	86	88	85	82	83	81	79	76
2	96	87	80	73	93	85	78	72	80	75	70	76	71	67	72	69	65	63
3	87	76	67	61	84	74	66	60	70	64	58	67	61	56	64	59	55	52
4	80	67	58	51	77	65	57	50	62	55	49	59	53	48	57	51	47	44
5	73	60	51	44	71	58	50	43	56	48	42	53	46	41	51	45	40	38
6	67	54	44	38	65	52	44	37	50	42	37	48	41	36	46	40	35	33
7	62	49	40	33	60	47	39	33	45	38	32	44	37	32	42	36	31	29
8	58	44	35	30	56	43	35	29	41	34	29	40	33	28	38	32	28	26
9	54	40	32	26	52	40	32	26	38	31	26	37	30	25	35	29	25	23
10	51	37	29	24	49	37	29	24	35	28	23	34	28	23	33	27	23	21

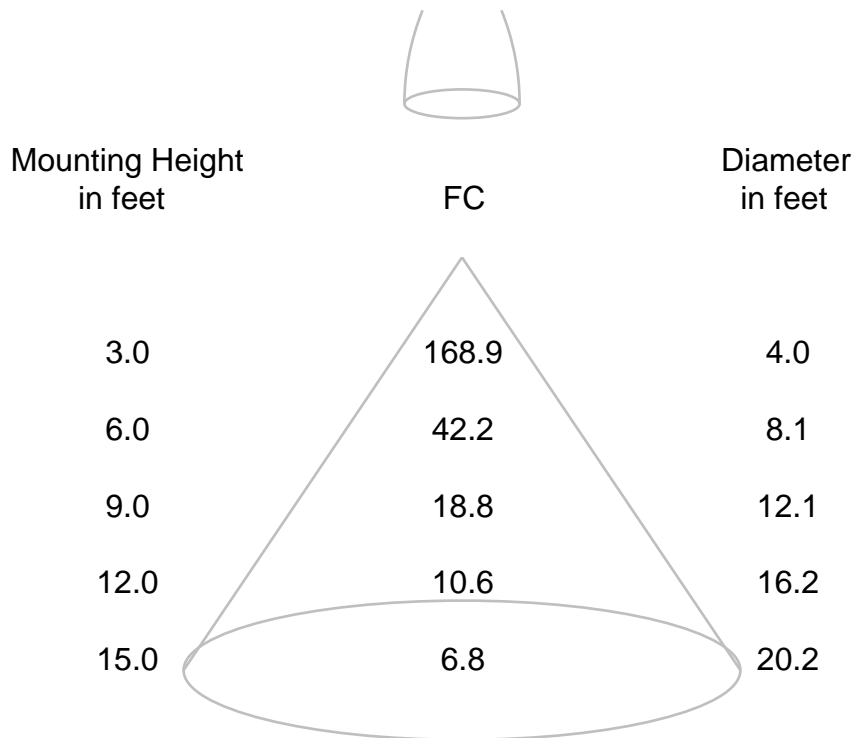
ALL CANDELA, LUMENS, LUMINANCE, AND VCP VALUES IN THIS REPORT ARE BASED ON ABSOLUTE PHOTOMETRY. THE COEFFICIENT OF UTILIZATION VALUES ARE BASED ON THE TOTAL ABSOLUTE LUMEN OUTPUT OF THIS LUMINAIRE SAMPLE.

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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: SHARK4-50YNW/D10

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	8/21/16
	RAB 2.0 meter Diameter Integrating Sphere, 4PI Geometry	8/21/16

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)	5265 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.4091
Chromaticity Ordinate y	0.3965
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2358
Chromaticity Ordinate v'	0.5142
Correlated Color Temp CCT (K)	3464
ANSI C78.377-2008 Duv	0.002
Total Radiant Flux (milliWatts)	15319 *
ELECTRICAL	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.398
Input Power (Watts)	47.4
Input Power Factor (%)	99.2
Input Current THD (%)	6.8
Input Voltage THD (%)	0.2
EFFICACY (Lumens/Watt)	
	111.1
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.182
Input Power (Watts)	47.7
Input Power Factor (%)	94.6
Input Current THD (%)	8.2
Input Voltage THD (%)	0.2
Off-State Power (Watts)	0.0

COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	74
R1 Light greyish red	71
R2 Dark greyish yellow	82
R3 Strong yellowish green	90
R4 Moderate yellowish green	71
R5 Light bluish green	70
R6 Light blue	74
R7 Light violet	83
R8 Light reddish purple	53
R9 Strong red	-17
R10 Strong yellow	56
R11 Strong green	65
R12 Strong blue	44
R13 Light yellowish pink (skin)	73
R14 Moderate olive green (leaf)	94

### \*NOTE:

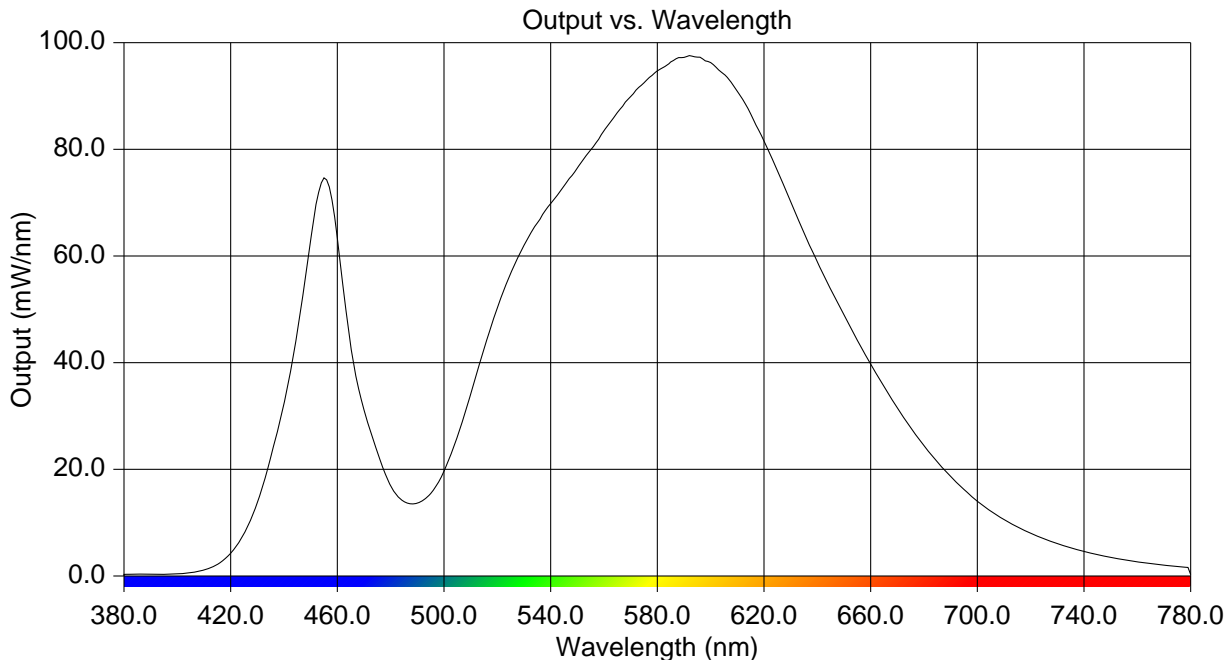
Proper calibration of integrating spheres for measuring total flux output of non-directional samples will produce reliable, repeatable results within the calibration tolerances of the equipment used. However, measurement of test samples with significant self absorption and/or directional output, even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

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### RESULTS:

Wavelength	mW per nm	Wavelength	mW per nm	Wavelength	mW per nm
380	0.300	515	42.562	650	48.960
385	0.310	520	50.250	655	44.190
390	0.314	525	56.750	660	39.790
395	0.346	530	61.992	665	35.509
400	0.430	535	66.194	670	31.567
405	0.620	540	69.833	675	27.832
410	1.088	545	73.126	680	24.416
415	2.177	550	76.475	685	21.382
420	4.278	555	79.887	690	18.661
425	7.916	560	83.493	695	16.221
430	13.774	565	86.891	700	14.010
435	22.222	570	89.895	705	12.138
440	32.493	575	92.470	710	10.556
445	45.689	580	94.754	715	9.201
450	63.148	585	96.377	720	8.036
455	74.653	590	97.235	725	7.001
460	63.353	595	97.287	730	6.080
465	43.212	600	96.269	735	5.274
470	31.143	605	94.079	740	4.584
475	23.238	610	90.927	745	3.989
480	16.928	615	86.650	750	3.496
485	13.915	620	81.555	755	3.045
490	13.686	625	76.125	760	2.664
495	15.451	630	70.197	765	2.326
500	19.642	635	64.372	770	2.024
505	26.134	640	58.940	775	1.778
510	34.102	645	53.711	780	0.271



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## CIE Chromaticity Diagram

