

REPORT NUMBER: RAB01060

ISSUE DATE: 07/30/15

PREPARED FOR: RAB LIGHTING INC.

CATALOG NUMBER: SHARK4-50YW/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 = 52.616 AT 480.0 VOLTS

LED DRIVERS: RD-H065-A1360-480

(SEE PAGE 2 FOR MORE INFORMATION)

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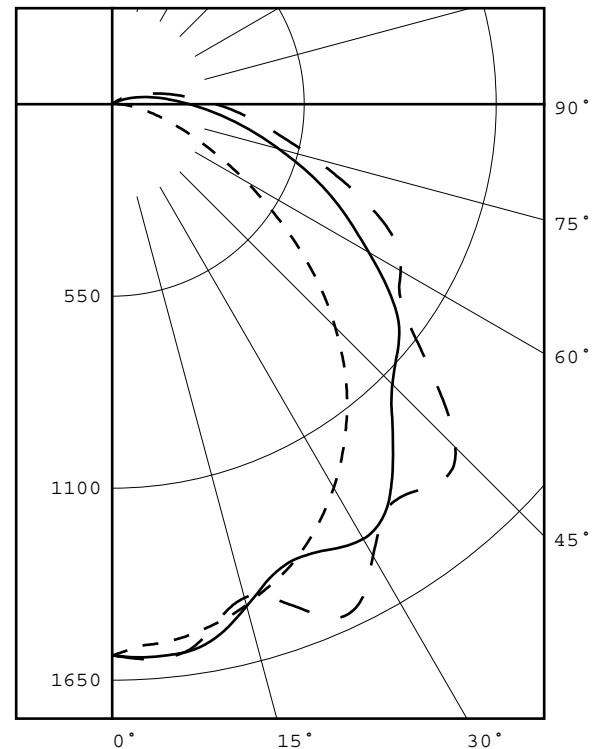
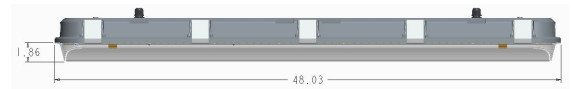
DATE SAMPLE TESTED: 07/30/15

CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0
0	1579	1579	1579	1579	1579
5	1550	1562	1587	1596	1592
15	1485	1509	1489	1462	1464
25	1359	1355	1413	1570	1609
35	1163	1186	1383	1377	1396
45	903	1012	1135	1344	1390
55	592	732	981	1027	1017
65	316	463	731	836	884
75	144	258	493	594	599
85	50	131	299	367	384
90	18	89	221	280	297
95	15	62	162	212	224
105	12	20	77	110	118
115	8	8	25	46	52
125	5	5	4	10	17
135	4	4	3	3	3
145	4	4	3	3	3
155	4	4	3	3	3
165	4	4	3	3	3
175	5	4	3	3	3
180	4	4	4	4	4

FLUX

150
421
668
821
888
797
649
456
279
154
74
28
8
3
2
2
1
0



LEGEND:

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

ZONAL LUMEN SUMMARY

ZONE	LUMENS	%FIXT
0- 30	1239	22.9
0- 40	2060	38.2
0- 60	3745	69.4
0- 90	5130	95.0
90-120	256	4.7
90-130	263	4.9
90-150	268	5.0
90-180	271	5.0
0-180	5401	100.0

TOTAL INPUT WATTS = 52.6

EFFICACY = 102.7 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%): 147.5 X 201.0 DEGREES

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CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0
0.0	1579	1579	1579	1579	1579
5.0	1550	1562	1587	1596	1592
10.0	1526	1544	1568	1556	1546
15.0	1485	1509	1489	1462	1464
20.0	1431	1444	1414	1486	1531
25.0	1359	1355	1413	1570	1609
30.0	1269	1266	1438	1511	1494
35.0	1163	1186	1383	1377	1396
40.0	1043	1108	1251	1344	1428
45.0	903	1012	1135	1344	1390
50.0	752	885	1071	1205	1193
55.0	592	732	981	1027	1017
60.0	445	587	849	918	954
65.0	316	463	731	836	884
70.0	217	351	614	723	744
75.0	144	258	493	594	599
80.0	90	186	390	470	477
85.0	50	131	299	367	384
90.0	18	89	221	280	297
95.0	15	62	162	212	224
100.0	13	40	115	156	166
105.0	12	20	77	110	118
110.0	10	10	47	74	81
115.0	8	8	25	46	52
120.0	7	6	7	27	34
125.0	5	5	4	10	17
130.0	5	4	4	3	3
135.0	4	4	3	3	3
140.0	4	4	3	3	3
145.0	4	4	3	3	3
150.0	4	4	3	3	3
155.0	4	4	3	3	3
160.0	4	4	3	3	3
165.0	4	4	3	3	3
170.0	5	4	3	3	3
175.0	5	4	3	3	3
180.0	4	4	4	4	4

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ZONAL LUMEN SUMMARY

0- 5	38.
5- 10	112.
10- 15	180.
15- 20	242.
20- 25	306.
25- 30	362.
30- 35	398.
35- 40	423.
40- 45	444.
45- 50	444.
50- 55	417.
55- 60	380.
60- 65	345.
65- 70	304.
70- 75	253.
75- 80	203.
80- 85	159.
85- 90	120.
90- 95	89.
95-100	65.
100-105	45.
105-110	29.
110-115	18.
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	1.
165-170	0.
170-175	0.
175-180	0.

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5-DEGREE ZONAL LUMEN SUMMARY

0- 5	38
5- 10	112
10- 15	180
15- 20	242
20- 25	306
25- 30	362
30- 35	398
35- 40	423
40- 45	444
45- 50	444
50- 55	417
55- 60	380
60- 65	345
65- 70	304
70- 75	253
75- 80	203
80- 85	159
85- 90	120
90- 95	89
95-100	65
100-105	45
105-110	29
110-115	18
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	1
165-170	0
170-175	0
175-180	0

10-DEGREE ZONAL LUMEN SUMMARY

0- 10	150
0- 20	571
0- 30	1239
0- 40	2060
0- 50	2948
0- 60	3745
0- 70	4395
0- 80	4851
0- 90	5130
0-100	5283
0-110	5357
0-120	5385
0-130	5393
0-140	5396
0-150	5398
0-160	5399
0-170	5400
0-180	5401

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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	93	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	28	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

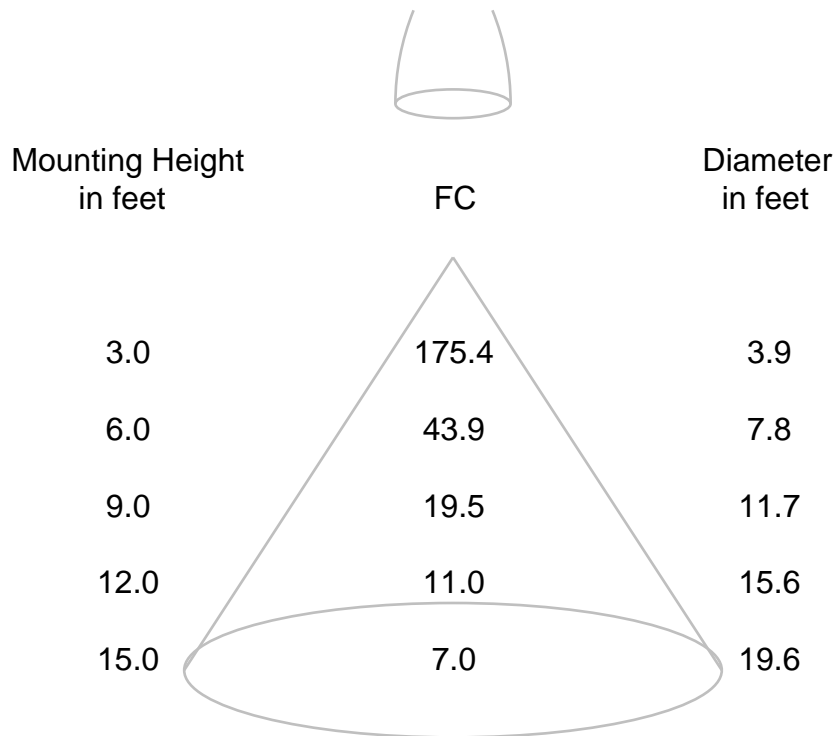
ALL CANDELA, LUMENS, LUMINANCE, AND VCP VALUES IN THIS REPORT ARE BASED ON ABSOLUTE PHOTOMETRY. THE COEFFICIENT OF UTILIZATION VALUES ARE BASED ON THE TOTAL ABSOLUTE LUMEN OUTPUT OF THIS LUMINAIRE SAMPLE.

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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.

REPORT NUMBER: RAB01061
DATE: 7/30/2015
PREPARED FOR: RAB LIGHTING INC.
CATALOG NUMBER: SHARK4-50YW/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-H065-A1360-480

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)	5401 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.4300
Chromaticity Ordinate y	0.4017
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2471
Chromaticity Ordinate v'	0.5194
Correlated Color Temp CCT (K)	3100
ANSI C78.377-2008 Duv	0.000
Total Radiant Flux (milliWatts)	15738 *
ELECTRICAL	
Input Voltage (Volts AC)	347.0
Input Current (Amps AC)	0.152
Input Power (Watts)	51.4
Input Power Factor (%)	97.5
Input Current THD (%)	7.8
Input Voltage THD (%)	0.2
EFFICACY (Lumens/Watt)	
	105.1
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	480.0
Input Current (Amps AC)	0.123
Input Power (Watts)	52.6
Input Power Factor (%)	89.1
Input Current THD (%)	16.6
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	63
R12 Strong blue	44
R13 Light yellowish pink (skin)	71
R14 Moderate olive green (leaf)	93

*NOTE:

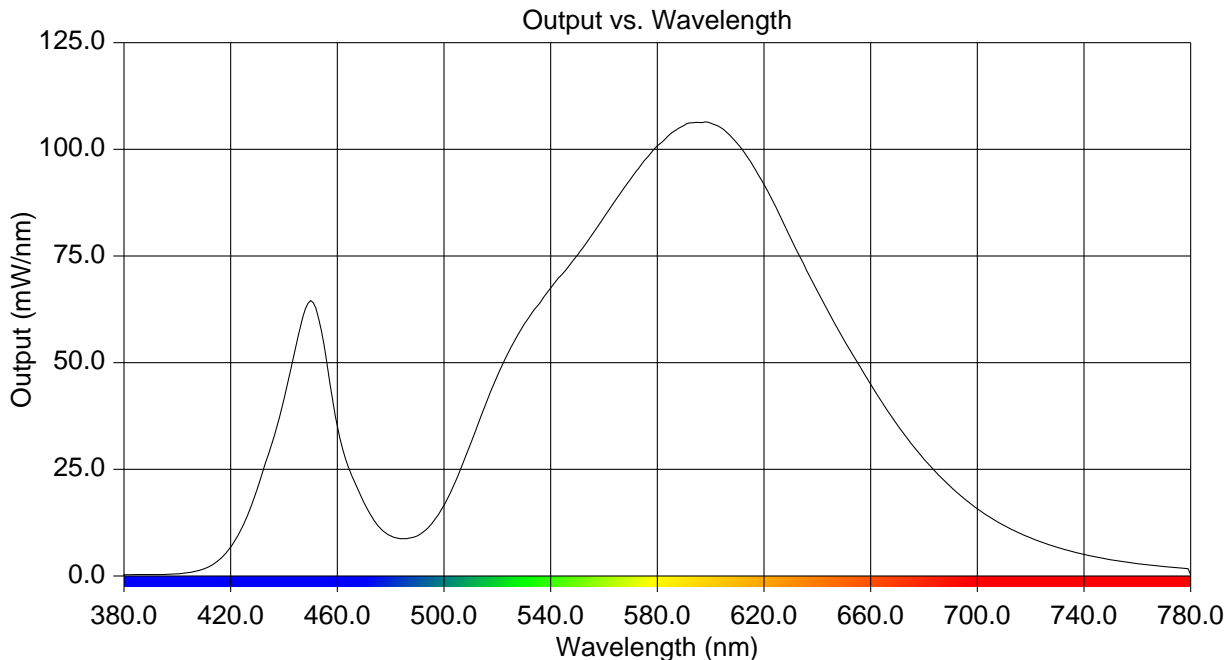
Proper calibration of integrating spheres for measuring total flux output of non-directional samples will produce reliable, repeatable results within the calibration tolerances of the equipment used. However, measurement of test samples with significant self absorption and/or directional output, even 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	0.274	515	39.273	650	55.348
385	0.296	520	46.858	655	50.124
390	0.315	525	53.513	660	44.906
395	0.368	530	58.944	665	39.949
400	0.513	535	63.263	670	35.383
405	0.854	540	67.480	675	31.172
410	1.656	545	71.147	680	27.421
415	3.443	550	75.168	685	23.980
420	6.771	555	79.482	690	20.908
425	12.312	560	84.022	695	18.174
430	20.435	565	88.696	700	15.744
435	30.238	570	93.046	705	13.623
440	41.206	575	97.279	710	11.804
445	55.515	580	100.848	715	10.278
450	64.547	585	103.671	720	8.940
455	54.251	590	105.599	725	7.753
460	35.062	595	106.321	730	6.705
465	24.132	600	106.134	735	5.807
470	17.168	605	104.605	740	5.029
475	12.031	610	101.365	745	4.381
480	9.367	615	97.107	750	3.823
485	8.725	620	91.850	755	3.326
490	9.398	625	85.720	760	2.903
495	11.940	630	79.085	765	2.531
500	16.585	635	72.980	770	2.214
505	23.127	640	66.812	775	1.938
510	31.039	645	60.925	780	0.291



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CIE Chromaticity Diagram

