

REPORT NUMBER: RAB01120

ISSUE DATE: 09/08/15

PREPARED FOR: RAB LIGHTING INC.

CATALOG NUMBER: SHARK2-18YW/D10 (STANDARD DISTRIBUTION)

LUMINAIRE: FABRICATED WHITE PLASTIC HOUSING, PERFORATED WHITE METAL HEAT SINK, 2 WHITE CIRCUIT BOARDS EACH WITH 32 LEDS, FROSTED POLYCARBONATE LENS ENCLOSURE.

LAMPS: SIXTY FOUR WHITE LIGHT EMITTING DIODES (LEDS), TILTED 15-DEGREE FROM VERTICAL BASE-UP POSITION.

TOTAL INPUT WATTS = 19.093 AT 277.0 VOLTS

LED DRIVERS: RD-LU018-A035C0SP

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

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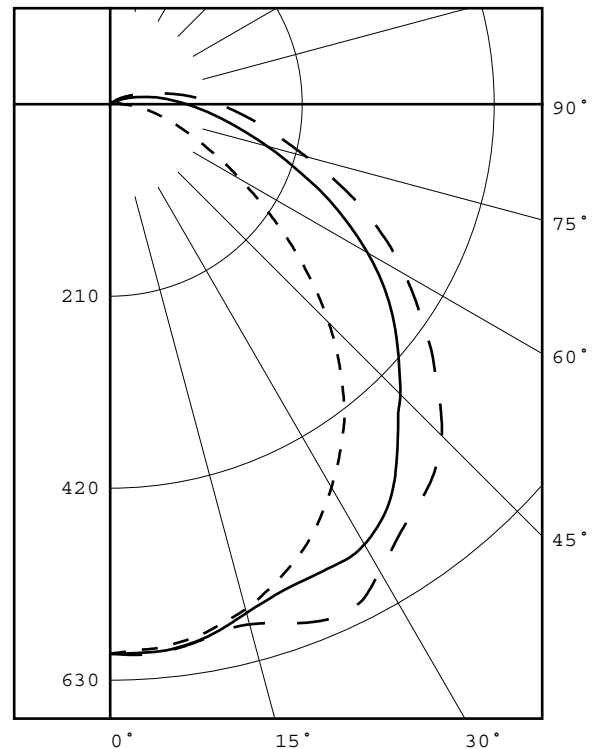
DATE SAMPLE TESTED: 09/03/15

### CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0
0	601	601	601	601	601
5	597	597	601	603	602
15	572	575	576	584	589
25	521	524	561	602	612
35	443	463	532	552	562
45	338	388	449	500	513
55	217	276	371	411	417
65	122	171	275	313	324
75	64	98	178	216	222
85	28	53	109	139	148
90	13	38	84	110	119
95	10	27	63	85	91
105	7	10	30	42	45
115	5	4	10	18	21
125	3	3	2	5	7
135	1	1	1	1	1
145	1	1	1	0	0
155	1	1	0	0	0
165	1	1	1	0	0
175	1	1	0	0	0
180	1	1	1	1	1

### FLUX

57
164
259
321
339
308
244
169
107
62
30
12
4
1
1
0
0
0
0



#### LEGEND:

0-deg: - - - - -  
 45-deg: ————  
 90-deg: ————

### ZONAL LUMEN SUMMARY

ZONE	LUMENS	%FIXT
0- 30	481	23.1
0- 40	801	38.6
0- 60	1448	69.7
0- 90	1967	94.8
90-120	103	5.0
90-130	107	5.1
90-150	108	5.2
90-180	109	5.2
0-180	2076	100.0

TOTAL INPUT WATTS = 19.1

EFFICACY = 108.7 Lm/W

CIE TYPE - DIRECT

PLANE : 0-DEG 90-DEG

SPACING CRITERIA : 1.2 1.4

Checked M.MILNIKIEWICZ

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%) : 95.3 X 133.8 DEGREES  
FIELD ANGLE (10%) : 151.4 X 202.2 DEGREES

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## CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0
0.0	601	601	601	601	601
5.0	597	597	601	603	602
10.0	588	590	593	594	594
15.0	572	575	576	584	589
20.0	549	552	564	592	604
25.0	521	524	561	602	612
30.0	484	494	556	585	590
35.0	443	463	532	552	562
40.0	394	431	489	526	543
45.0	338	388	449	500	513
50.0	277	334	410	458	465
55.0	217	276	371	411	417
60.0	164	219	325	359	372
65.0	122	171	275	313	324
70.0	89	131	223	264	273
75.0	64	98	178	216	222
80.0	45	73	140	174	181
85.0	28	53	109	139	148
90.0	13	38	84	110	119
95.0	10	27	63	85	91
100.0	9	18	45	61	66
105.0	7	10	30	42	45
110.0	6	6	18	28	31
115.0	5	4	10	18	21
120.0	4	4	4	11	14
125.0	3	3	2	5	7
130.0	2	2	2	1	1
135.0	1	1	1	1	1
140.0	1	1	1	1	1
145.0	1	1	1	0	0
150.0	1	1	1	1	0
155.0	1	1	0	0	0
160.0	1	1	1	0	0
165.0	1	1	1	0	0
170.0	1	1	0	0	0
175.0	1	1	0	0	0
180.0	1	1	1	1	1

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## ZONAL LUMEN SUMMARY

0- 5	14.
5- 10	43.
10- 15	69.
15- 20	95.
20- 25	119.
25- 30	140.
30- 35	155.
35- 40	165.
40- 45	170.
45- 50	169.
50- 55	160.
55- 60	147.
60- 65	131.
65- 70	113.
70- 75	94.
75- 80	76.
80- 85	60.
85- 90	47.
90- 95	36.
95-100	26.
100-105	18.
105-110	12.
110-115	7.
115-120	4.
120-125	2.
125-130	1.
130-135	1.
135-140	0.
140-145	0.
145-150	0.
150-155	0.
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	14
5- 10	43
10- 15	69
15- 20	95
20- 25	119
25- 30	140
30- 35	155
35- 40	165
40- 45	170
45- 50	169
50- 55	160
55- 60	147
60- 65	131
65- 70	113
70- 75	94
75- 80	76
80- 85	60
85- 90	47
90- 95	36
95-100	26
100-105	18
105-110	12
110-115	7
115-120	4
120-125	2
125-130	1
130-135	1
135-140	0
140-145	0
145-150	0
150-155	0
155-160	0
160-165	0
165-170	0
170-175	0
175-180	0

### 10-DEGREE ZONAL LUMEN SUMMARY

0- 10	57
0- 20	221
0- 30	481
0- 40	801
0- 50	1140
0- 60	1448
0- 70	1691
0- 80	1860
0- 90	1967
0-100	2029
0-110	2059
0-120	2071
0-130	2074
0-140	2075
0-150	2076
0-160	2076
0-170	2076
0-180	2076

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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	102	102	102	97	97	97	95
1	106	100	96	91	103	98	93	89	92	89	85	88	85	82	83	81	78	76
2	96	87	79	73	93	84	78	72	80	74	69	76	71	67	72	68	65	62
3	87	76	67	60	84	74	66	59	70	63	58	67	61	56	63	58	54	52
4	79	67	58	51	77	65	57	50	62	55	49	59	53	48	56	51	46	44
5	73	60	50	43	70	58	49	43	55	48	42	53	46	41	50	45	40	38
6	67	54	44	38	65	52	44	37	50	42	37	48	41	36	46	40	35	33
7	62	48	39	33	60	47	39	33	45	38	32	43	37	32	42	36	31	29
8	58	44	35	29	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	36	29	24	35	28	23	34	27	23	33	27	23	21

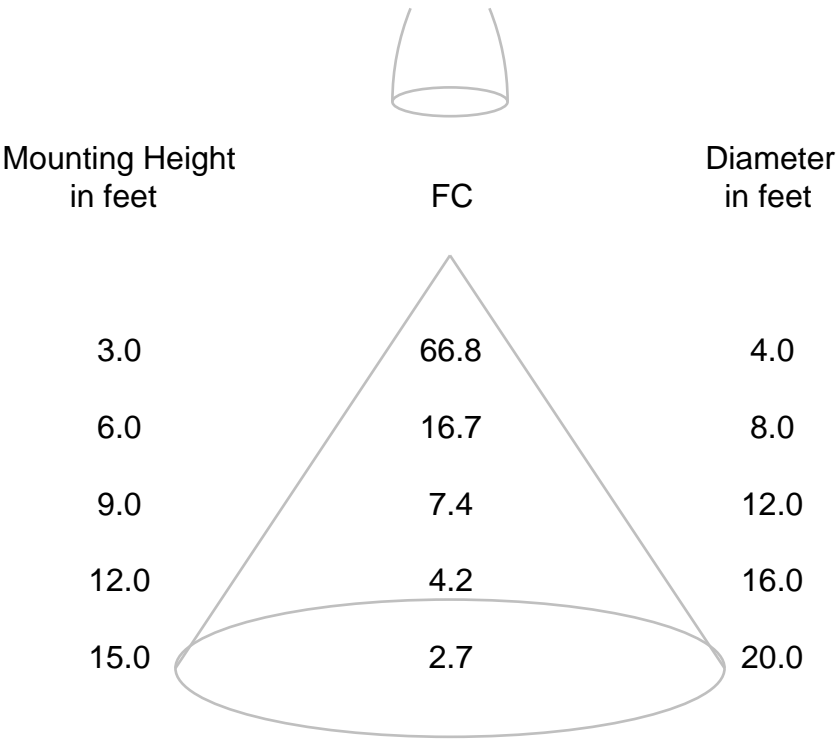
ALL CANDELA, LUMENS, LUMINANCE, AND VCP VALUES IN THIS REPORT ARE BASED ON ABSOLUTE PHOTOMETRY. THE COEFFICIENT OF UTILIZATION VALUES ARE BASED ON THE TOTAL ABSOLUTE LUMEN OUTPUT OF THIS LUMINAIRE SAMPLE.

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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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DATE: 9/2/2015  
PREPARED FOR: RAB LIGHTING INC.  
CATALOG NUMBER: SHARK2-18YW/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 32 LEDS, FROSTED POLYCARBONATE LENS ENCLOSURE.

LAMP: SIXTY FOUR WHITE LIGHT EMITTING DIODES (LEDs), TILTED 15-DEGREE FROM VERTICAL BASE-UP POSITION.

DRIVER: RD-LU018-A035C0SP

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>M. MILNIKIEWICZ</u>
Approved	<u>D. WANG-MUNSON</u> Lighting Engineer

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### RESULTS:

PHOTOMETRIC	
Total Integrated Flux (lumens)	2076 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.4319
Chromaticity Ordinate y	0.4010
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2486
Chromaticity Ordinate v'	0.5194
Correlated Color Temp CCT (K)	3061
ANSI C78.377-2008 Duv	-0.001
Total Radiant Flux (milliWatts)	6083 *
ELECTRICAL	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.157
Input Power (Watts)	18.8
Input Power Factor (%)	99.6
Input Current THD (%)	6.4
Input Voltage THD (%)	0.1
EFFICACY (Lumens/Watt)	
	110.4
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.076
Input Power (Watts)	19.1
Input Power Factor (%)	90.7
Input Current THD (%)	11.5
Input Voltage THD (%)	0.1
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	91
R4 Moderate yellowish green	70
R5 Light bluish green	69
R6 Light blue	75
R7 Light violet	80
R8 Light reddish purple	50
R9 Strong red	-18
R10 Strong yellow	57
R11 Strong green	64
R12 Strong blue	46
R13 Light yellowish pink (skin)	73
R14 Moderate olive green (leaf)	94

### \*NOTE:

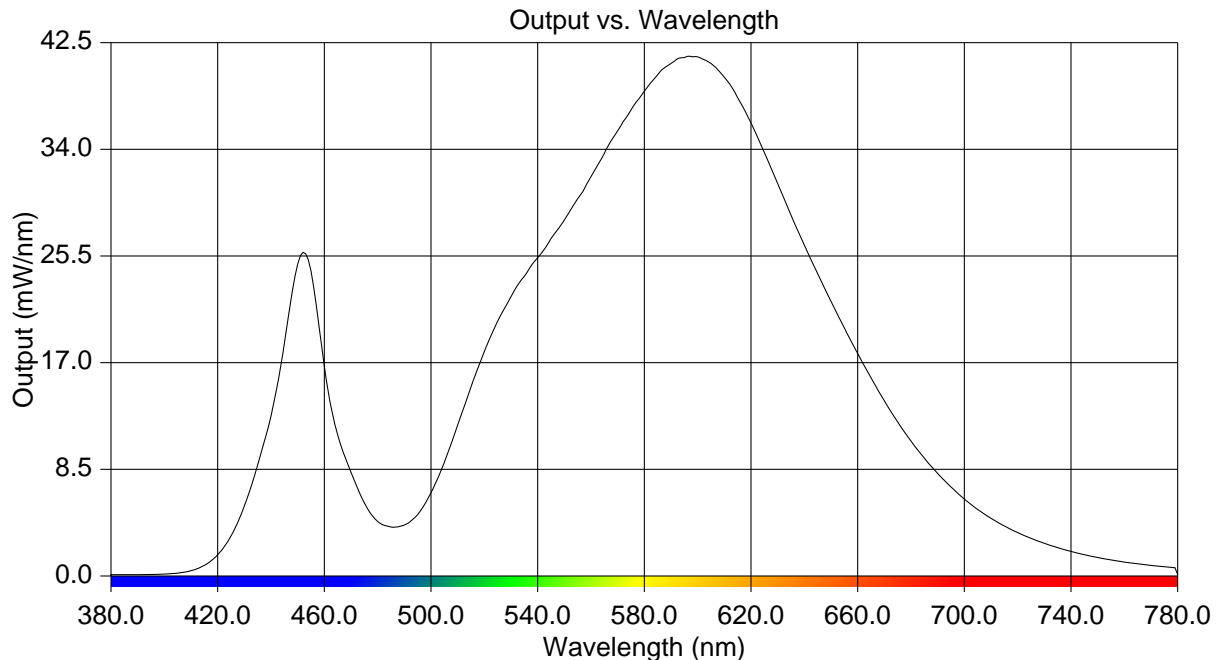
Proper calibration of integrating spheres for measuring total flux output of non-directional samples will produce reliable, repeatable results within the calibration tolerances of the equipment used. However, measurement of test samples with significant self absorption and/or directional output, even 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	0.104	515	15.067	650	21.864
385	0.105	520	17.893	655	19.773
390	0.109	525	20.291	660	17.724
395	0.125	530	22.244	665	15.781
400	0.155	535	23.880	670	13.955
405	0.223	540	25.361	675	12.271
410	0.411	545	26.895	680	10.738
415	0.847	550	28.361	685	9.382
420	1.679	555	30.066	690	8.179
425	3.195	560	31.844	695	7.095
430	5.556	565	33.674	700	6.135
435	8.860	570	35.463	705	5.293
440	12.740	575	37.137	710	4.585
445	18.524	580	38.636	715	3.994
450	24.850	585	39.943	720	3.465
455	24.312	590	40.852	725	3.006
460	16.728	595	41.309	730	2.597
465	11.250	600	41.371	735	2.255
470	8.270	605	40.833	740	1.951
475	5.827	610	39.750	745	1.684
480	4.341	615	38.111	750	1.470
485	3.908	620	36.110	755	1.285
490	4.061	625	33.782	760	1.115
495	4.892	630	31.317	765	0.964
500	6.624	635	28.759	770	0.845
505	9.083	640	26.368	775	0.737
510	12.001	645	24.070	780	0.112



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## CIE Chromaticity Diagram

