

REPORT NUMBER: RAB01116

ISSUE DATE: 09/08/15

PREPARED FOR: RAB LIGHTING INC.

CATALOG NUMBER: SHARK2-18NW/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 = 19.123 AT 277.0 VOLTS

LED DRIVERS: RD-LU018-A035C0SP

(SEE PAGE 2 FOR MORE INFORMATION)

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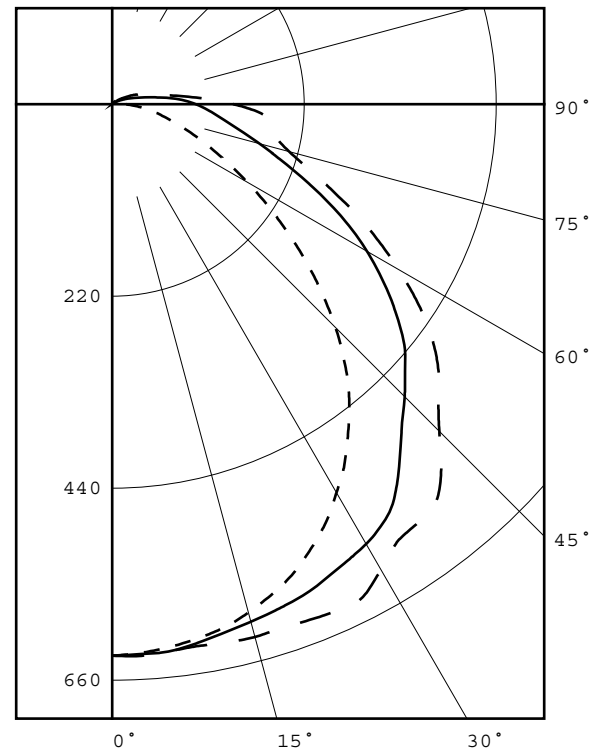
DATE SAMPLE TESTED: 09/03/15

CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0
0	632	632	632	632	632
5	627	628	631	632	631
15	603	606	614	627	632
25	552	561	594	624	636
35	470	497	560	581	595
45	362	415	474	530	530
55	235	297	390	437	441
65	132	185	279	309	316
75	68	101	175	205	210
85	29	54	116	163	178
90	14	40	97	135	140
95	11	29	72	91	92
105	8	11	28	40	43
115	5	5	11	20	23
125	3	3	3	5	8
135	2	2	2	1	1
145	1	1	1	1	1
155	1	1	1	1	1
165	1	1	0	0	0
175	1	1	0	0	0
180	1	1	1	1	1

FLUX

60
174
274
340
359
325
247
166
118
67
29
13
4
1
1
0
0
0



LEGEND:

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

ZONAL LUMEN SUMMARY

ZONE	LUMENS	%FIXT
0- 30	508	23.3
0- 40	847	38.9
0- 60	1532	70.3
0- 90	2064	94.7
90-120	109	5.0
90-130	113	5.2
90-150	115	5.3
90-180	115	5.3
0-180	2179	100.0

TOTAL INPUT WATTS = 19.1

EFFICACY = 114.1 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%) : 96.9 X 129.7 DEGREES
FIELD ANGLE (10%) : 152.0 X 198.5 DEGREES

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CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0
0.0	632	632	632	632	632
5.0	627	628	631	632	631
10.0	618	620	623	627	629
15.0	603	606	614	627	632
20.0	582	585	606	625	632
25.0	552	561	594	624	636
30.0	514	531	582	613	616
35.0	470	497	560	581	595
40.0	421	456	514	565	582
45.0	362	415	474	530	530
50.0	298	358	438	479	489
55.0	235	297	390	437	441
60.0	179	238	337	372	379
65.0	132	185	279	309	316
70.0	96	138	221	252	255
75.0	68	101	175	205	210
80.0	47	75	140	176	188
85.0	29	54	116	163	178
90.0	14	40	97	135	140
95.0	11	29	72	91	92
100.0	9	19	45	58	59
105.0	8	11	28	40	43
110.0	6	6	19	30	33
115.0	5	5	11	20	23
120.0	4	4	4	12	14
125.0	3	3	3	5	8
130.0	3	3	2	2	3
135.0	2	2	2	1	1
140.0	1	1	1	1	1
145.0	1	1	1	1	1
150.0	1	1	1	1	1
155.0	1	1	1	1	1
160.0	1	1	0	1	0
165.0	1	1	0	0	0
170.0	1	1	1	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	15.
5- 10	45.
10- 15	74.
15- 20	101.
20- 25	126.
25- 30	148.
30- 35	164.
35- 40	175.
40- 45	181.
45- 50	178.
50- 55	170.
55- 60	155.
60- 65	135.
65- 70	113.
70- 75	91.
75- 80	75.
80- 85	64.
85- 90	54.
90- 95	41.
95-100	27.
100-105	17.
105-110	12.
110-115	8.
115-120	5.
120-125	3.
125-130	1.
130-135	1.
135-140	1.
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	15
5- 10	45
10- 15	74
15- 20	101
20- 25	126
25- 30	148
30- 35	164
35- 40	175
40- 45	181
45- 50	178
50- 55	170
55- 60	155
60- 65	135
65- 70	113
70- 75	91
75- 80	75
80- 85	64
85- 90	54
90- 95	41
95-100	27
100-105	17
105-110	12
110-115	8
115-120	5
120-125	3
125-130	1
130-135	1
135-140	1
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	60
0- 20	234
0- 30	508
0- 40	847
0- 50	1206
0- 60	1532
0- 70	1779
0- 80	1946
0- 90	2064
0-100	2131
0-110	2160
0-120	2173
0-130	2177
0-140	2178
0-150	2179
0-160	2179
0-170	2179
0-180	2179

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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	101	96	91	103	98	93	89	92	89	85	88	85	82	83	81	78	76
2	96	87	80	73	93	85	78	72	80	74	70	76	71	67	72	68	65	62
3	87	76	67	61	84	74	66	60	70	63	58	67	61	56	63	59	55	52
4	80	67	58	51	77	65	57	50	62	55	49	59	53	48	56	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	45	38	65	52	44	38	50	42	37	48	41	36	46	40	35	33
7	62	49	40	33	60	48	39	33	45	38	32	44	37	32	42	36	31	29
8	58	44	36	30	56	43	35	29	42	34	29	40	33	28	38	32	28	26
9	54	41	32	27	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

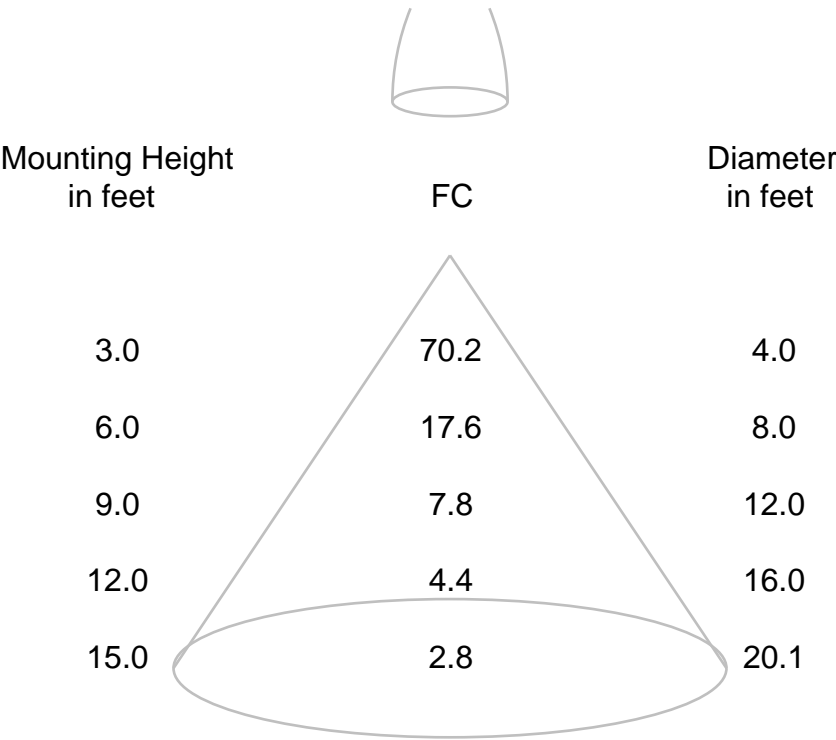
ALL CANDELA, LUMENS, LUMINANCE, AND VCP VALUES IN THIS REPORT ARE BASED ON ABSOLUTE PHOTOMETRY. THE COEFFICIENT OF UTILIZATION VALUES ARE BASED ON THE TOTAL ABSOLUTE LUMEN OUTPUT OF THIS LUMINAIRE SAMPLE.

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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.

REPORT NUMBER: RAB01115
DATE: 9/2/2015
PREPARED FOR: RAB LIGHTING INC.
CATALOG NUMBER: SHARK2-18NW/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 MULTI-CHIP 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)	2179 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.3855
Chromaticity Ordinate y	0.3839
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2256
Chromaticity Ordinate v'	0.5055
Correlated Color Temp CCT (K)	3918
ANSI C78.377-2008 Duv	0.002
Total Radiant Flux (milliWatts)	6347 *
ELECTRICAL	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.159
Input Power (Watts)	18.8
Input Power Factor (%)	98.5
Input Current THD (%)	7.2
Input Voltage THD (%)	0.2
EFFICACY (Lumens/Watt)	
	115.9
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.073
Input Power (Watts)	19.1
Input Power Factor (%)	94.5
Input Current THD (%)	7.8
Input Voltage THD (%)	0.2
Off-State Power (Watts)	
	0.0

COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	73
R1 Light greyish red	70
R2 Dark greyish yellow	78
R3 Strong yellowish green	84
R4 Moderate yellowish green	72
R5 Light bluish green	69
R6 Light blue	69
R7 Light violet	83
R8 Light reddish purple	56
R9 Strong red	-19
R10 Strong yellow	47
R11 Strong green	67
R12 Strong blue	39
R13 Light yellowish pink (skin)	71
R14 Moderate olive green (leaf)	90

*NOTE:

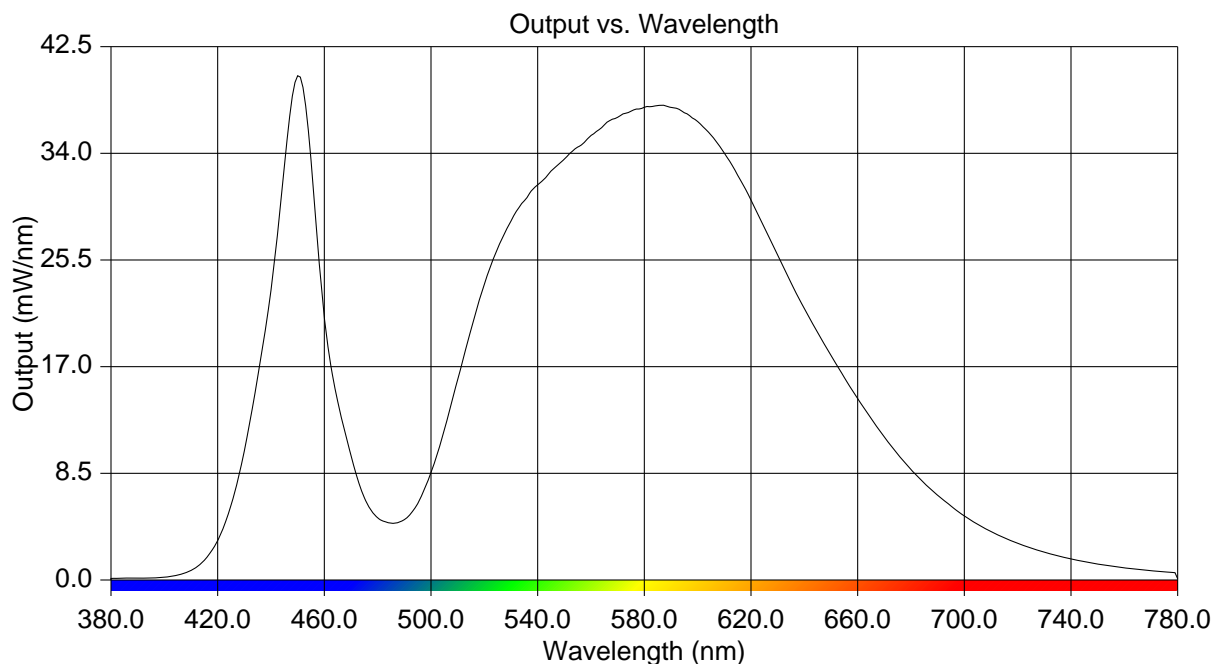
Proper calibration of integrating spheres for measuring total flux output of non-directional samples will produce reliable, repeatable results within the calibration tolerances of the equipment used. However, measurement of test samples with significant self absorption and/or directional output, even 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	0.122	515	19.973	650	17.882
385	0.134	520	23.543	655	16.133
390	0.141	525	26.433	660	14.458
395	0.170	530	28.603	665	12.876
400	0.233	535	30.221	670	11.395
405	0.376	540	31.492	675	10.026
410	0.752	545	32.585	680	8.798
415	1.569	550	33.547	685	7.707
420	3.137	555	34.499	690	6.748
425	5.955	560	35.413	695	5.894
430	10.283	565	36.266	700	5.098
435	16.167	570	36.872	705	4.430
440	23.089	575	37.357	710	3.854
445	32.959	580	37.670	715	3.362
450	40.184	585	37.793	720	2.925
455	33.489	590	37.664	725	2.554
460	20.975	595	37.233	730	2.217
465	14.245	600	36.535	735	1.926
470	9.906	605	35.454	740	1.675
475	6.562	610	34.017	745	1.459
480	4.950	615	32.253	750	1.277
485	4.524	620	30.290	755	1.112
490	4.808	625	28.130	760	0.968
495	6.076	630	25.904	765	0.848
500	8.572	635	23.689	770	0.740
505	11.970	640	21.644	775	0.650
510	15.958	645	19.715	780	0.098



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CIE Chromaticity Diagram

