

REPORT NUMBER: RAB01118

ISSUE DATE: 09/04/15

PREPARED FOR: RAB LIGHTING INC.

CATALOG NUMBER: SHARK2-18W/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 = 19.078 AT 277.0 VOLTS

LED DRIVERS: RD-LU018-A035C0SP

(SEE PAGE 2 FOR MORE INFORMATION)

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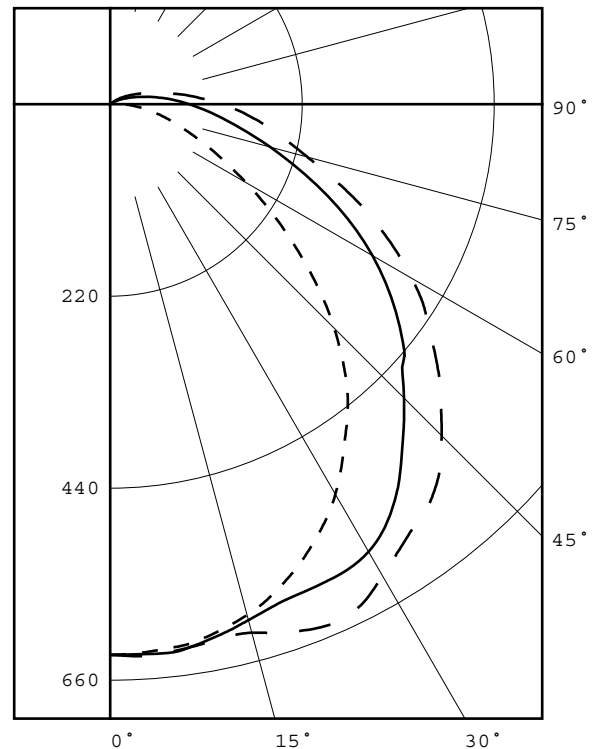
DATE SAMPLE TESTED: 09/03/15

CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0
0	631	631	631	631	631
5	628	629	632	634	633
15	606	608	612	622	627
25	553	558	600	636	646
35	469	497	564	588	599
45	363	417	476	530	537
55	236	297	395	441	445
65	134	186	294	335	344
75	71	107	190	229	234
85	30	58	117	151	161
90	14	41	90	121	128
95	11	30	68	91	97
105	8	11	32	45	48
115	5	5	12	21	24
125	3	3	2	5	8
135	2	2	1	1	1
145	1	1	1	1	1
155	1	1	1	0	0
165	1	1	0	0	0
175	1	1	0	0	0
180	1	1	1	1	1

FLUX

60
174
276
342
361
329
261
181
116
67
32
13
4
1
1
0
0
0



LEGEND:

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

ZONAL LUMEN SUMMARY

ZONE	LUMENS	%FIXT
0- 30	510	23.0
0- 40	852	38.4
0- 60	1542	69.5
0- 90	2100	94.7
90-120	112	5.1
90-130	116	5.2
90-150	118	5.3
90-180	119	5.3
0-180	2218	100.0

TOTAL INPUT WATTS = 19.1

EFFICACY = 116.1 Lm/W

CIE TYPE - DIRECT

PLANE : 0-DEG 90-DEG

SPACING CRITERIA : 1.2 1.5

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%) : 96.3 X 133.7 DEGREES
FIELD ANGLE (10%) : 152.9 X 202.2 DEGREES

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CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0
0.0	631	631	631	631	631
5.0	628	629	632	634	633
10.0	621	623	625	626	627
15.0	606	608	612	622	627
20.0	583	584	602	632	642
25.0	553	558	600	636	646
30.0	516	530	592	619	624
35.0	469	497	564	588	599
40.0	422	458	520	564	578
45.0	363	417	476	530	537
50.0	299	360	440	485	493
55.0	236	297	395	441	445
60.0	180	238	347	389	399
65.0	134	186	294	335	344
70.0	98	142	239	280	287
75.0	71	107	190	229	234
80.0	50	80	149	185	194
85.0	30	58	117	151	161
90.0	14	41	90	121	128
95.0	11	30	68	91	97
100.0	9	20	48	66	70
105.0	8	11	32	45	48
110.0	7	7	20	32	35
115.0	5	5	12	21	24
120.0	4	4	4	13	15
125.0	3	3	2	5	8
130.0	2	2	2	2	1
135.0	2	2	1	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	0	0
160.0	1	1	1	0	0
165.0	1	1	0	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	15.
5- 10	45.
10- 15	73.
15- 20	101.
20- 25	127.
25- 30	149.
30- 35	166.
35- 40	176.
40- 45	182.
45- 50	179.
50- 55	171.
55- 60	158.
60- 65	141.
65- 70	120.
70- 75	100.
75- 80	81.
80- 85	65.
85- 90	51.
90- 95	39.
95-100	28.
100-105	19.
105-110	13.
110-115	8.
115-120	5.
120-125	3.
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	15
5- 10	45
10- 15	73
15- 20	101
20- 25	127
25- 30	149
30- 35	166
35- 40	176
40- 45	182
45- 50	179
50- 55	171
55- 60	158
60- 65	141
65- 70	120
70- 75	100
75- 80	81
80- 85	65
85- 90	51
90- 95	39
95-100	28
100-105	19
105-110	13
110-115	8
115-120	5
120-125	3
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	60
0- 20	234
0- 30	510
0- 40	852
0- 50	1213
0- 60	1542
0- 70	1803
0- 80	1984
0- 90	2100
0-100	2167
0-110	2198
0-120	2212
0-130	2216
0-140	2217
0-150	2218
0-160	2218
0-170	2218
0-180	2218

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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	87	84	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	66	61	56	63	58	54	52
4	79	67	58	51	77	65	57	50	62	54	49	59	53	47	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	53	44	38	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	37	31	41	35	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	39	31	26	38	31	26	36	30	25	35	29	25	23
10	51	37	29	24	49	36	29	24	35	28	23	34	27	23	33	27	22	21

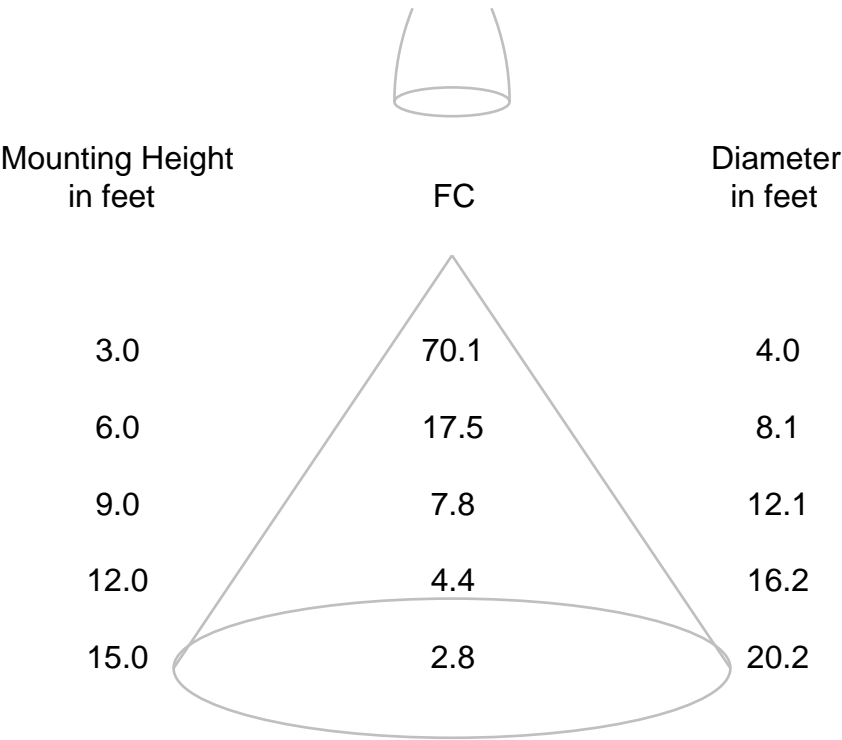
ALL CANDELA, LUMENS, LUMINANCE, AND VCP VALUES IN THIS REPORT ARE BASED ON ABSOLUTE PHOTOMETRY. THE COEFFICIENT OF UTILIZATION VALUES ARE BASED ON THE TOTAL ABSOLUTE LUMEN OUTPUT OF THIS LUMINAIRE SAMPLE.

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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: RAB01117
DATE: 9/2/2015
PREPARED FOR: RAB LIGHTING INC.
CATALOG NUMBER: SHARK2-18W/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)	2218 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.3464
Chromaticity Ordinate y	0.3572
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2102
Chromaticity Ordinate v'	0.4876
Correlated Color Temp CCT (K)	4970
ANSI C78.377-2008 Duv	0.002
Total Radiant Flux (milliWatts)	6701 *
ELECTRICAL	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.158
Input Power (Watts)	18.8
Input Power Factor (%)	99.2
Input Current THD (%)	7.5
Input Voltage THD (%)	0.2
EFFICACY (Lumens/Watt)	
	118.0
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 (%)	7.6
Input Voltage THD (%)	0.2
Off-State Power (Watts)	
	0.0

COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	74
R1 Light greyish red	72
R2 Dark greyish yellow	78
R3 Strong yellowish green	82
R4 Moderate yellowish green	75
R5 Light bluish green	73
R6 Light blue	70
R7 Light violet	83
R8 Light reddish purple	62
R9 Strong red	-16
R10 Strong yellow	47
R11 Strong green	73
R12 Strong blue	43
R13 Light yellowish pink (skin)	73
R14 Moderate olive green (leaf)	90

*NOTE:

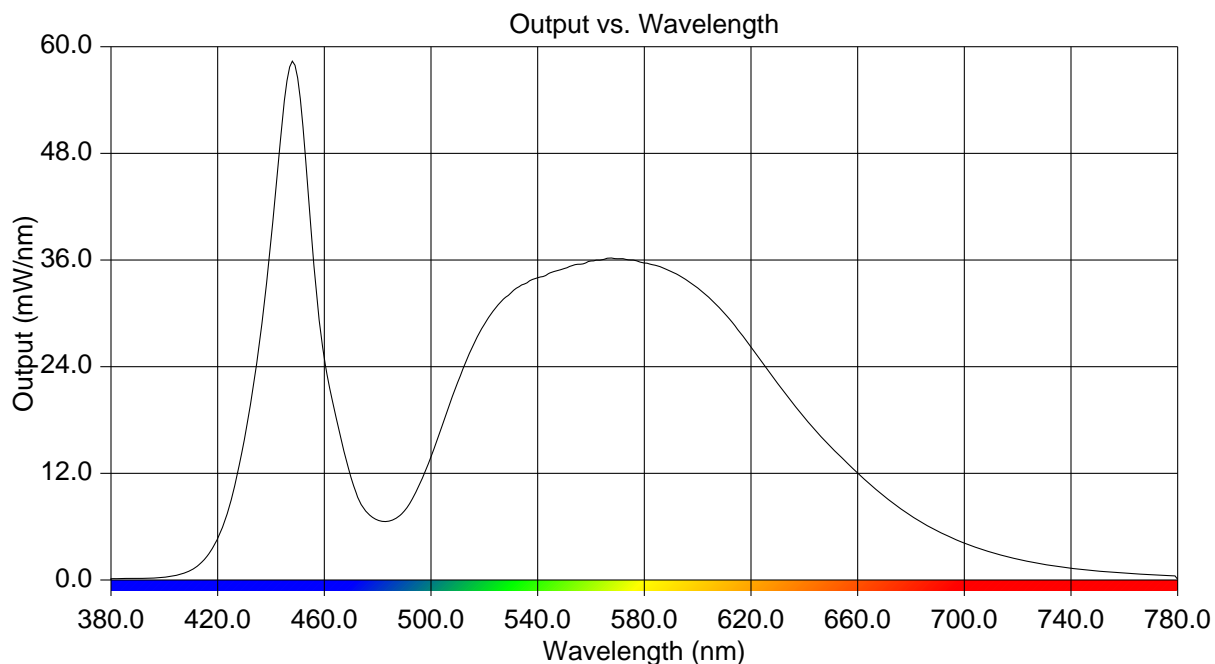
Proper calibration of integrating spheres for measuring total flux output of non-directional samples will produce reliable, repeatable results within the calibration tolerances of the equipment used. However, measurement of test samples with significant self absorption and/or directional output, even 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	0.143	515	25.878	650	14.970
385	0.162	520	28.753	655	13.483
390	0.177	525	30.887	660	12.020
395	0.217	530	32.302	665	10.675
400	0.312	535	33.295	670	9.424
405	0.550	540	34.002	675	8.259
410	1.105	545	34.605	680	7.215
415	2.300	550	35.042	685	6.317
420	4.637	555	35.519	690	5.495
425	8.971	560	35.889	695	4.792
430	15.776	565	36.080	700	4.129
435	25.254	570	36.140	705	3.568
440	38.010	575	35.997	710	3.098
445	53.915	580	35.679	715	2.699
450	56.484	585	35.325	720	2.342
455	39.480	590	34.712	725	2.040
460	24.914	595	33.873	730	1.769
465	17.513	600	32.867	735	1.535
470	11.534	605	31.578	740	1.327
475	7.966	610	30.015	745	1.151
480	6.730	615	28.176	750	1.009
485	6.677	620	26.250	755	0.875
490	7.763	625	24.190	760	0.766
495	10.244	630	22.133	765	0.668
500	13.914	635	20.106	770	0.584
505	18.060	640	18.283	775	0.516
510	22.230	645	16.559	780	0.078



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CIE Chromaticity Diagram

