

REPORT NUMBER: RAB01128

ISSUE DATE: 09/08/15

PREPARED FOR: RAB LIGHTING INC.

CATALOG NUMBER: SHARK2-25W/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 = 25.507 AT 277.0 VOLTS

LED DRIVERS: RD-026-A0450-C

(SEE PAGE 2 FOR MORE INFORMATION)

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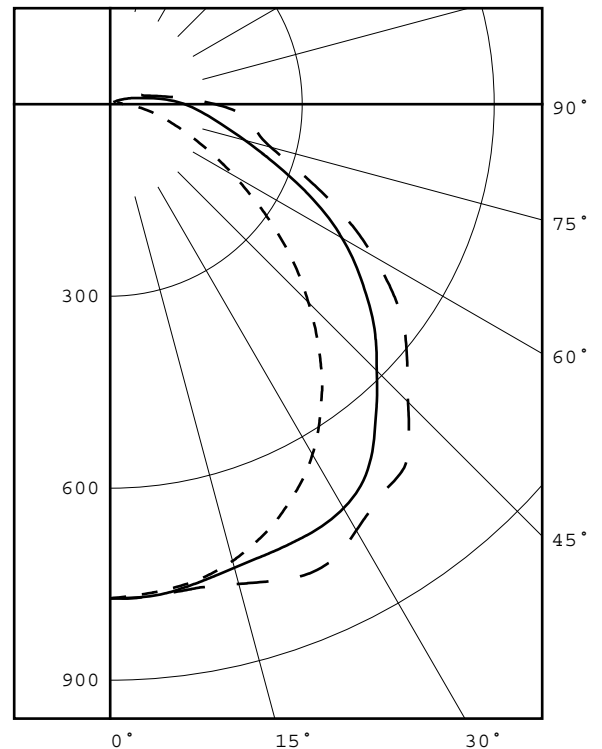
DATE SAMPLE TESTED: 09/08/15

CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0
0	772	772	772	772	772
5	766	768	771	772	770
15	739	740	750	768	776
25	676	684	740	785	795
35	574	615	700	725	742
45	438	509	589	651	658
55	292	365	479	534	549
65	167	228	348	386	396
75	88	127	218	253	260
85	40	70	144	194	210
90	21	51	116	156	165
95	16	37	86	109	112
105	10	14	37	49	53
115	7	6	14	25	30
125	4	4	4	7	10
135	2	3	2	2	2
145	1	1	1	1	1
155	1	1	1	1	1
165	1	1	1	1	1
175	1	1	1	1	1
180	1	1	1	1	1

FLUX

73
214
339
422
443
401
308
207
144
82
36
16
5
2
1
0
0



LEGEND:

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

ZONAL LUMEN SUMMARY

ZONE	LUMENS	%FIXT
0- 30	626	23.2
0- 40	1048	38.9
0- 60	1893	70.2
0- 90	2553	94.7
90-120	134	5.0
90-130	140	5.2
90-150	142	5.3
90-180	143	5.3
0-180	2697	100.0

TOTAL INPUT WATTS = 25.5

EFFICACY = 105.8 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%) : 95.7 X 129.8 DEGREES
FIELD ANGLE (10%): 153.0 X 198.3 DEGREES

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CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0
0.0	772	772	772	772	772
5.0	766	768	771	772	770
10.0	757	758	761	767	768
15.0	739	740	750	768	776
20.0	712	714	744	780	791
25.0	676	684	740	785	795
30.0	632	652	729	765	769
35.0	574	615	700	725	742
40.0	509	568	645	701	722
45.0	438	509	589	651	658
50.0	367	439	538	590	605
55.0	292	365	479	534	549
60.0	224	292	418	460	475
65.0	167	228	348	386	396
70.0	122	172	276	313	319
75.0	88	127	218	253	260
80.0	62	95	175	218	231
85.0	40	70	144	194	210
90.0	21	51	116	156	165
95.0	16	37	86	109	112
100.0	13	24	55	71	74
105.0	10	14	37	49	53
110.0	8	8	24	38	44
115.0	7	6	14	25	30
120.0	5	5	6	15	19
125.0	4	4	4	7	10
130.0	3	3	3	3	4
135.0	2	3	2	2	2
140.0	2	2	2	2	2
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	1	1	1
165.0	1	1	1	1	1
170.0	1	1	1	1	1
175.0	1	1	1	1	1
180.0	1	1	1	1	1

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ZONAL LUMEN SUMMARY

0- 5	18.
5- 10	55.
10- 15	90.
15- 20	124.
20- 25	156.
25- 30	184.
30- 35	204.
35- 40	218.
40- 45	224.
45- 50	220.
50- 55	210.
55- 60	192.
60- 65	168.
65- 70	140.
70- 75	114.
75- 80	94.
80- 85	79.
85- 90	65.
90- 95	49.
95-100	33.
100-105	21.
105-110	15.
110-115	10.
115-120	6.
120-125	4.
125-130	2.
130-135	1.
135-140	1.
140-145	1.
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	18
5- 10	55
10- 15	90
15- 20	124
20- 25	156
25- 30	184
30- 35	204
35- 40	218
40- 45	224
45- 50	220
50- 55	210
55- 60	192
60- 65	168
65- 70	140
70- 75	114
75- 80	94
80- 85	79
85- 90	65
90- 95	49
95-100	33
100-105	21
105-110	15
110-115	10
115-120	6
120-125	4
125-130	2
130-135	1
135-140	1
140-145	1
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	73
0- 20	287
0- 30	626
0- 40	1048
0- 50	1492
0- 60	1893
0- 70	2201
0- 80	2409
0- 90	2553
0-100	2635
0-110	2671
0-120	2688
0-130	2693
0-140	2695
0-150	2696
0-160	2696
0-170	2696
0-180	2697

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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	50	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	36	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

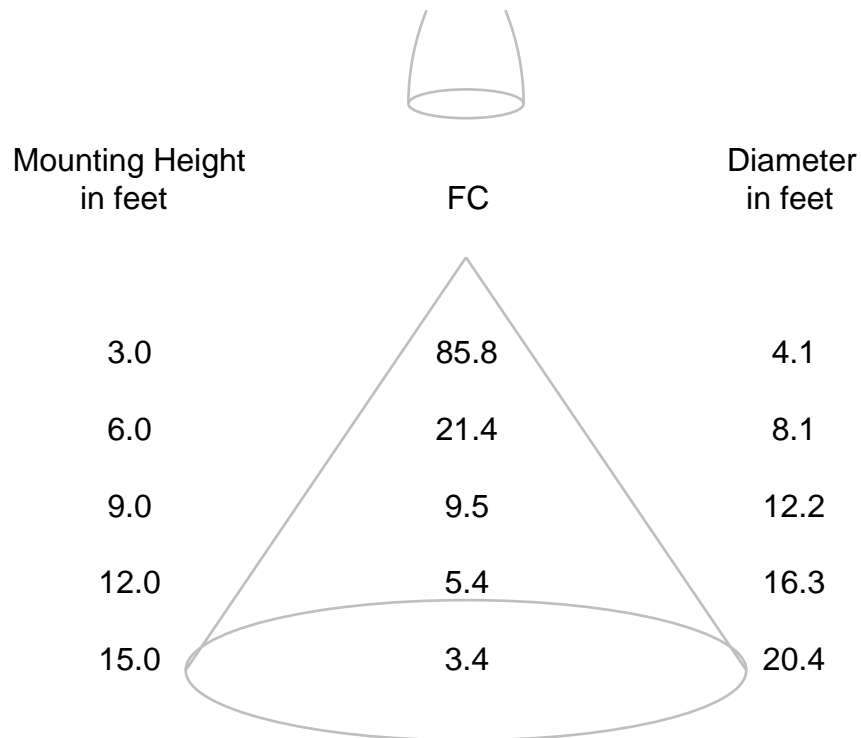
ALL CANDELA, LUMENS, LUMINANCE, AND VCP VALUES IN THIS REPORT ARE BASED ON ABSOLUTE PHOTOMETRY. THE COEFFICIENT OF UTILIZATION VALUES ARE BASED ON THE TOTAL ABSOLUTE LUMEN OUTPUT OF THIS LUMINAIRE SAMPLE.

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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: SHARK2-25W/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-026-A0450-C

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)	2697 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.3466
Chromaticity Ordinate y	0.3570
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2104
Chromaticity Ordinate v'	0.4875
Correlated Color Temp CCT (K)	4962
ANSI C78.377-2008 Duv	0.002
Total Radiant Flux (milliWatts)	8159 *
ELECTRICAL	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.211
Input Power (Watts)	25.0
Input Power Factor (%)	98.7
Input Current THD (%)	8.6
Input Voltage THD (%)	0.2
EFFICACY (Lumens/Watt)	
	107.9
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.101
Input Power (Watts)	25.5
Input Power Factor (%)	91.1
Input Current THD (%)	12.4
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	72
R6 Light blue	70
R7 Light violet	83
R8 Light reddish purple	61
R9 Strong red	-16
R10 Strong yellow	47
R11 Strong green	72
R12 Strong blue	44
R13 Light yellowish pink (skin)	73
R14 Moderate olive green (leaf)	90

*NOTE:

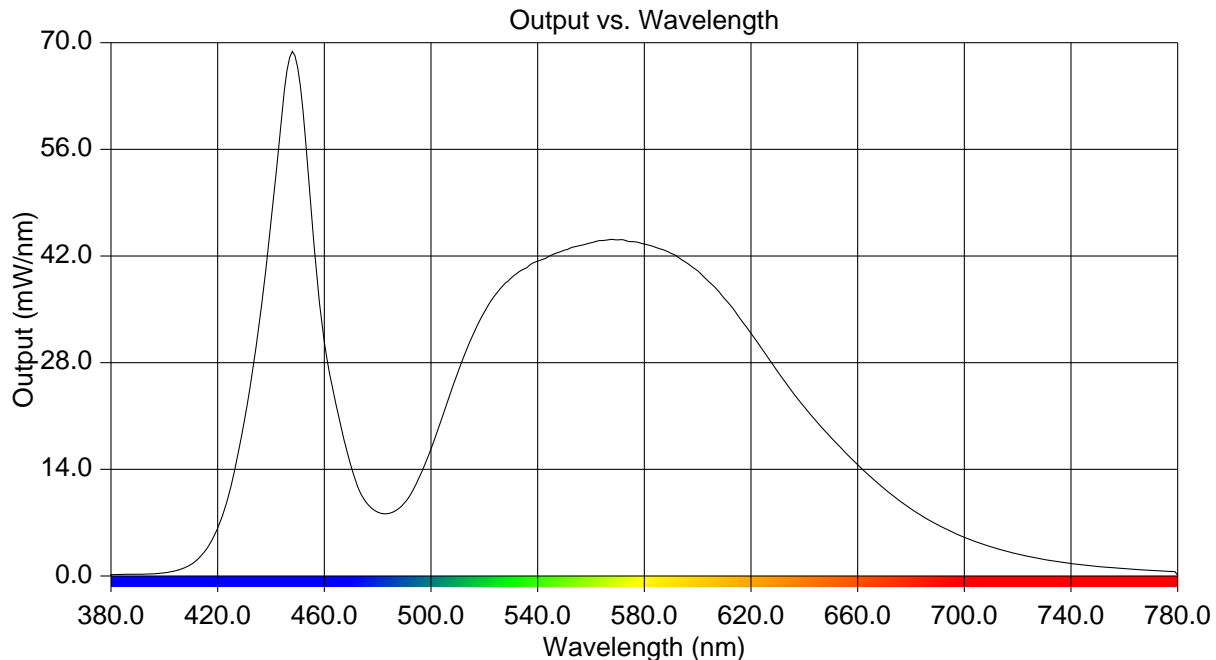
Proper calibration of integrating spheres for measuring total flux output of non-directional samples will produce reliable, repeatable results within the calibration tolerances of the equipment used. However, measurement of test samples with significant self absorption and/or directional output, even 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	0.164	515	31.084	650	18.189
385	0.199	520	34.639	655	16.349
390	0.225	525	37.312	660	14.620
395	0.277	530	39.101	665	12.972
400	0.417	535	40.313	670	11.458
405	0.747	540	41.320	675	10.055
410	1.517	545	42.105	680	8.805
415	3.155	550	42.767	685	7.697
420	6.246	555	43.300	690	6.719
425	11.808	560	43.741	695	5.863
430	20.360	565	44.047	700	5.049
435	31.763	570	44.112	705	4.385
440	46.213	575	43.886	710	3.794
445	63.720	580	43.570	715	3.309
450	66.747	585	43.042	720	2.896
455	48.346	590	42.353	725	2.518
460	30.754	595	41.270	730	2.179
465	21.509	600	40.072	735	1.887
470	14.433	605	38.401	740	1.640
475	10.020	610	36.438	745	1.426
480	8.362	615	34.232	750	1.254
485	8.287	620	31.848	755	1.084
490	9.572	625	29.397	760	0.952
495	12.427	630	26.827	765	0.828
500	16.742	635	24.404	770	0.728
505	21.675	640	22.200	775	0.639
510	26.655	645	20.072	780	0.097



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CIE Chromaticity Diagram

