

REPORT NUMBER: RAB00963

ISSUE DATE: 07/23/15

PREPARED FOR: RAB LIGHTING INC.

CATALOG NUMBER: SHARK4-36W/D10 (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 = 36.83 AT 277.0 VOLTS

LED DRIVERS: RD-042-A0700-C

(SEE PAGE 2 FOR MORE INFORMATION)

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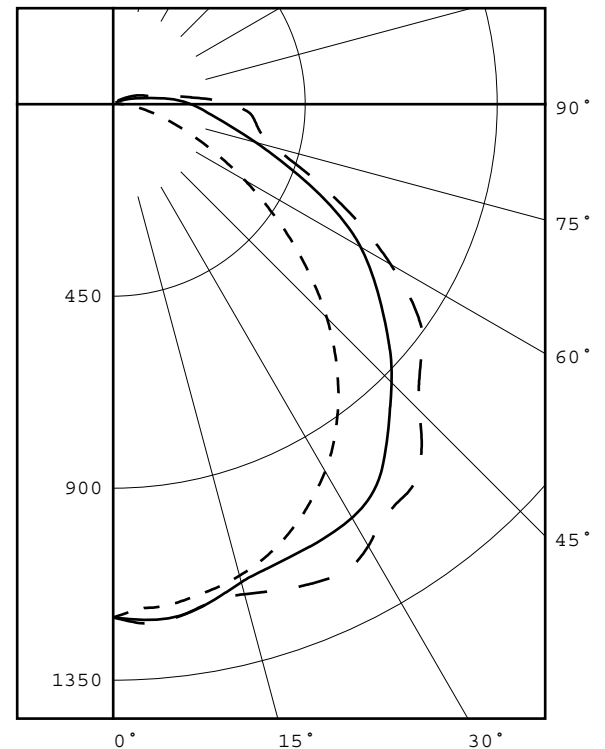
DATE SAMPLE TESTED: 07/23/15

CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0
0	1203	1203	1203	1203	1203
5	1183	1192	1212	1219	1219
15	1144	1153	1160	1179	1189
25	1057	1056	1133	1201	1222
35	913	948	1081	1121	1149
45	708	800	923	1008	1015
55	467	576	754	855	874
65	256	363	562	609	619
75	119	196	346	388	394
85	43	100	221	301	328
90	23	70	183	255	274
95	14	50	137	175	183
105	10	16	52	73	77
115	7	7	19	36	41
125	4	5	5	10	14
135	3	4	4	4	5
145	3	3	3	3	4
155	3	3	3	3	3
165	3	3	3	2	3
175	4	3	3	2	2
180	3	3	3	3	3

FLUX

115
330
522
655
693
636
489
319
220
127
51
22
7
3
2
1
1
0



LEGEND:

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

ZONAL LUMEN SUMMARY

ZONE	LUMENS	%FIXT
0- 30	967	23.1
0- 40	1622	38.7
0- 60	2950	70.4
0- 90	3978	94.9
90-120	200	4.8
90-130	207	4.9
90-150	212	5.1
90-180	214	5.1
0-180	4192	100.0

TOTAL INPUT WATTS = 36.8

EFFICACY = 113.9 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%) : 98.1 X 130.6 DEGREES
FIELD ANGLE (10%): 149.4 X 198.2 DEGREES

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CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0
0.0	1203	1203	1203	1203	1203
5.0	1183	1192	1212	1219	1219
10.0	1167	1182	1196	1195	1195
15.0	1144	1153	1160	1179	1189
20.0	1108	1109	1142	1192	1208
25.0	1057	1056	1133	1201	1222
30.0	994	1003	1120	1185	1196
35.0	913	948	1081	1121	1149
40.0	817	883	1002	1086	1117
45.0	708	800	923	1008	1015
50.0	588	694	839	919	941
55.0	467	576	754	855	874
60.0	356	464	670	742	751
65.0	256	363	562	609	619
70.0	178	272	443	485	492
75.0	119	196	346	388	394
80.0	76	140	272	328	347
85.0	43	100	221	301	328
90.0	23	70	183	255	274
95.0	14	50	137	175	183
100.0	12	30	83	106	110
105.0	10	16	52	73	77
110.0	8	9	33	54	60
115.0	7	7	19	36	41
120.0	5	5	9	21	26
125.0	4	5	5	10	14
130.0	4	4	4	5	5
135.0	3	4	4	4	5
140.0	3	3	4	4	4
145.0	3	3	3	3	4
150.0	3	3	3	3	3
155.0	3	3	3	3	3
160.0	3	3	3	3	3
165.0	3	3	3	2	3
170.0	4	3	3	2	2
175.0	4	3	3	2	2
180.0	3	3	3	3	3

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ZONAL LUMEN SUMMARY

0- 5	29.
5- 10	86.
10- 15	139.
15- 20	191.
20- 25	239.
25- 30	283.
30- 35	316.
35- 40	339.
40- 45	349.
45- 50	344.
50- 55	330.
55- 60	306.
60- 65	267.
65- 70	222.
70- 75	177.
75- 80	142.
80- 85	119.
85- 90	101.
90- 95	77.
95-100	50.
100-105	30.
105-110	21.
110-115	14.
115-120	8.
120-125	5.
125-130	2.
130-135	2.
135-140	1.
140-145	1.
145-150	1.
150-155	1.
155-160	1.
160-165	0.
165-170	0.
170-175	0.
175-180	0.

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5-DEGREE ZONAL LUMEN SUMMARY

0- 5	29
5- 10	86
10- 15	139
15- 20	191
20- 25	239
25- 30	283
30- 35	316
35- 40	339
40- 45	349
45- 50	344
50- 55	330
55- 60	306
60- 65	267
65- 70	222
70- 75	177
75- 80	142
80- 85	119
85- 90	101
90- 95	77
95-100	50
100-105	30
105-110	21
110-115	14
115-120	8
120-125	5
125-130	2
130-135	2
135-140	1
140-145	1
145-150	1
150-155	1
155-160	1
160-165	0
165-170	0
170-175	0
175-180	0

10-DEGREE ZONAL LUMEN SUMMARY

0- 10	115
0- 20	445
0- 30	967
0- 40	1622
0- 50	2314
0- 60	2950
0- 70	3439
0- 80	3758
0- 90	3978
0-100	4105
0-110	4156
0-120	4178
0-130	4185
0-140	4188
0-150	4190
0-160	4191
0-170	4192
0-180	4192

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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	103	103	103	97	97	97	95
1	106	101	96	91	103	98	93	89	93	89	86	88	85	82	83	81	79	76
2	96	87	80	73	93	85	78	72	80	75	70	76	71	67	72	68	65	62
3	87	76	67	61	84	74	66	60	70	63	58	67	61	56	64	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	48	40	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	37	29	24	35	28	23	34	27	23	33	27	23	21

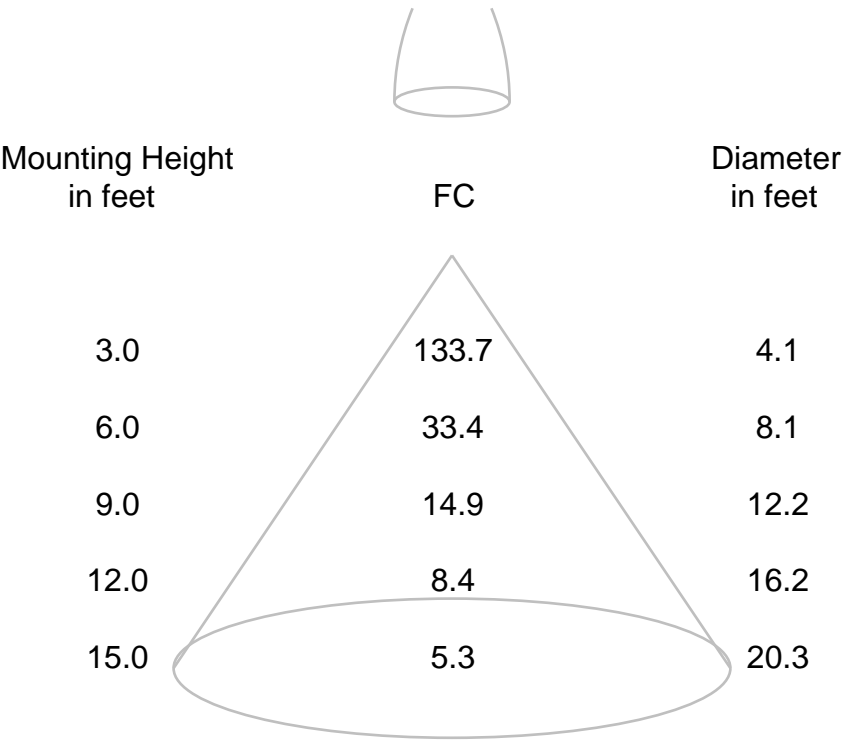
ALL CANDELA, LUMENS, LUMINANCE, AND VCP VALUES IN THIS REPORT ARE BASED ON ABSOLUTE PHOTOMETRY. THE COEFFICIENT OF UTILIZATION VALUES ARE BASED ON THE TOTAL ABSOLUTE LUMEN OUTPUT OF THIS LUMINAIRE SAMPLE.

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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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CATALOG NUMBER: SHARK4-36W/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 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-042-A0700-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	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 (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)	4192 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.3413
Chromaticity Ordinate y	0.3500
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2095
Chromaticity Ordinate v'	0.4833
Correlated Color Temp CCT (K)	5142
ANSI C78.377-2008 Duv	0.001
Total Radiant Flux (milliWatts)	12845 *
ELECTRICAL	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.307
Input Power (Watts)	36.5
Input Power Factor (%)	99.1
Input Current THD (%)	7.0
Input Voltage THD (%)	0.2
EFFICACY (Lumens/Watt)	
	114.8
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.139
Input Power (Watts)	36.8
Input Power Factor (%)	95.6
Input Current THD (%)	8.2
Input Voltage THD (%)	0.2
Off-State Power (Watts)	
	0.0

COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	75
R1 Light greyish red	74
R2 Dark greyish yellow	79
R3 Strong yellowish green	82
R4 Moderate yellowish green	77
R5 Light bluish green	75
R6 Light blue	72
R7 Light violet	82
R8 Light reddish purple	63
R9 Strong red	-12
R10 Strong yellow	50
R11 Strong green	75
R12 Strong blue	48
R13 Light yellowish pink (skin)	74
R14 Moderate olive green (leaf)	90

*NOTE:

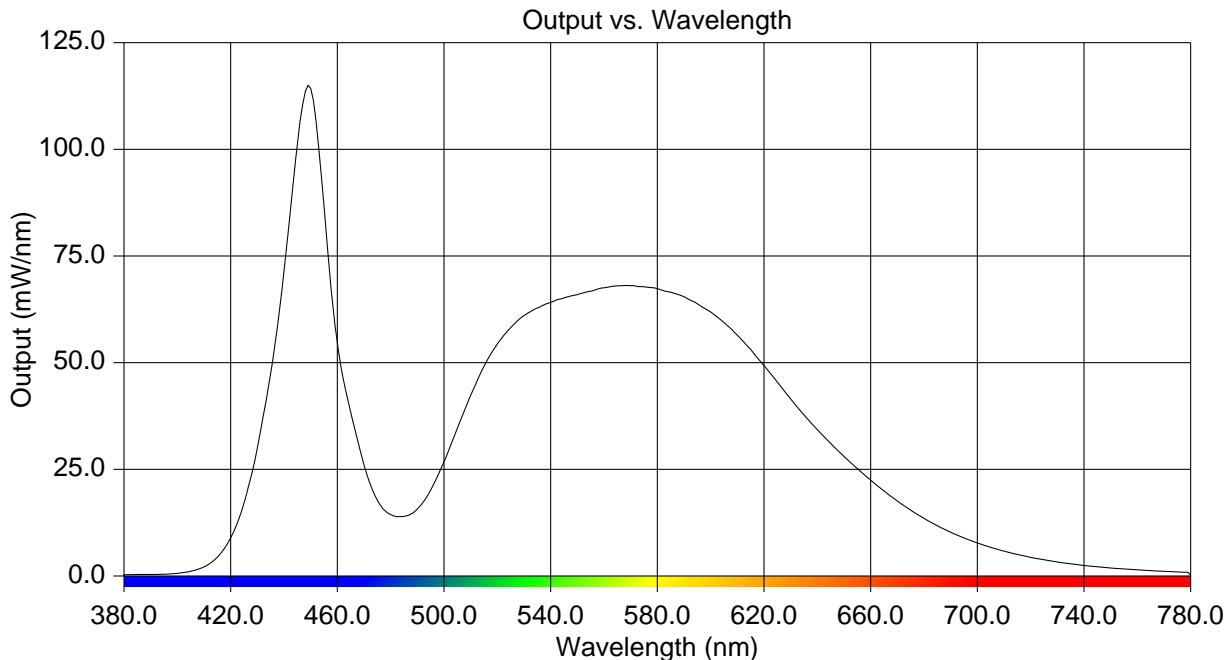
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RESULTS:

Wavelength	mW per nm	Wavelength	mW per nm	Wavelength	mW per nm
380	0.278	515	49.113	650	28.038
385	0.314	520	54.390	655	25.167
390	0.347	525	58.188	660	22.469
395	0.435	530	61.042	665	19.916
400	0.640	535	62.811	670	17.561
405	1.066	540	64.108	675	15.418
410	2.123	545	65.126	680	13.495
415	4.395	550	65.941	685	11.797
420	8.940	555	66.807	690	10.248
425	17.053	560	67.538	695	8.912
430	29.966	565	68.026	700	7.716
435	47.612	570	68.017	705	6.694
440	70.882	575	67.784	710	5.788
445	101.474	580	67.353	715	5.052
450	114.307	585	66.500	720	4.382
455	86.822	590	65.458	725	3.797
460	54.606	595	63.838	730	3.293
465	38.408	600	61.884	735	2.846
470	26.026	605	59.411	740	2.462
475	17.760	610	56.440	745	2.147
480	14.406	615	53.124	750	1.874
485	13.990	620	49.387	755	1.635
490	15.681	625	45.460	760	1.430
495	20.098	630	41.438	765	1.245
500	26.777	635	37.752	770	1.086
505	34.497	640	34.296	775	0.958
510	42.359	645	31.075	780	0.147



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CIE Chromaticity Diagram

