

REPORT NUMBER: RAB00965

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ISSUE DATE: 07/23/15

DATE SAMPLE TESTED: 07/23/15

PREPARED FOR: RAB LIGHTING INC.

CATALOG NUMBER: SHARK4-36YW/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 = 37.24 AT 277.0 VOLTS

LED DRIVERS: RD-042-A0700-C

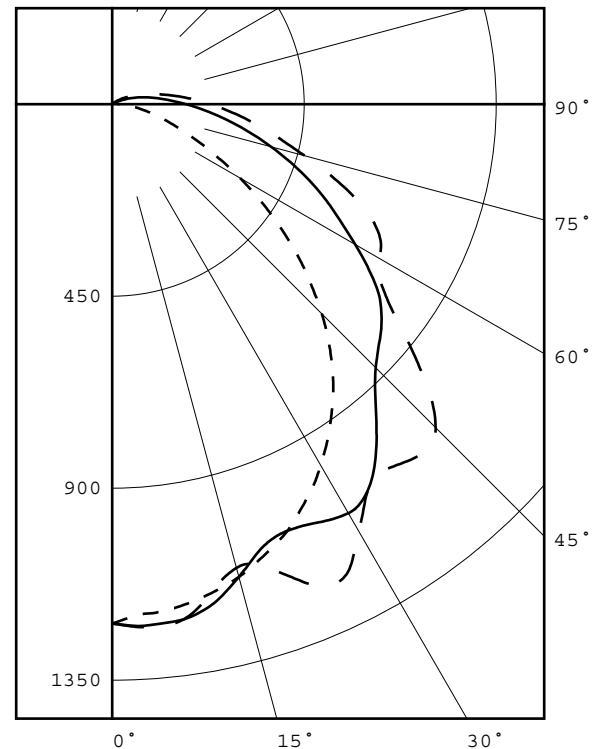
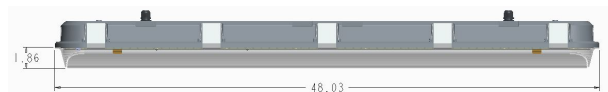
\*(SEE PAGE 2 FOR MORE INFORMATION)\*

### CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0
0	1217	1217	1217	1217	1217
5	1196	1205	1223	1229	1228
15	1147	1161	1147	1123	1125
25	1047	1041	1087	1208	1240
35	895	917	1064	1060	1072
45	695	781	874	1029	1072
55	460	567	759	797	783
65	246	365	564	641	683
75	112	206	386	459	467
85	39	105	234	283	297
90	16	72	172	216	230
95	11	50	126	163	174
105	9	16	61	84	90
115	6	6	20	36	41
125	4	4	3	8	13
135	3	3	3	2	2
145	3	3	2	2	2
155	3	3	3	2	2
165	4	3	3	2	2
175	4	3	3	3	3
180	3	3	3	3	3

### FLUX

116
324
514
632
683
616
502
357
217
119
57
22
6
2
1
1
1
0



#### LEGEND:

0-deg: - - - - -  
 45-deg: \_\_\_\_\_  
 90-deg: - - - - -

### ZONAL LUMEN SUMMARY

ZONE	LUMENS	%FIXT
0- 30	954	22.9
0- 40	1586	38.0
0- 60	2886	69.2
0- 90	3962	95.0
90-120	198	4.8
90-130	204	4.9
90-150	208	5.0
90-180	210	5.0
0-180	4172	100.0

TOTAL INPUT WATTS = 37.2

EFFICACY = 112.2 Lm/W

CIE TYPE - DIRECT

PLANE : 0-DEG 90-DEG

SPACING CRITERIA : 1.2 1.4

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%) : 96.4 X 136.8 DEGREES  
FIELD ANGLE (10%): 147.8 X 200.8 DEGREES

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### CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0
0.0	1217	1217	1217	1217	1217
5.0	1196	1205	1223	1229	1228
10.0	1177	1190	1207	1198	1193
15.0	1147	1161	1147	1123	1125
20.0	1103	1109	1087	1138	1171
25.0	1047	1041	1087	1208	1240
30.0	977	976	1107	1167	1157
35.0	895	917	1064	1060	1072
40.0	802	857	963	1026	1088
45.0	695	781	874	1029	1072
50.0	580	683	823	935	930
55.0	460	567	759	797	783
60.0	346	458	658	702	725
65.0	246	365	564	641	683
70.0	169	279	475	560	585
75.0	112	206	386	459	467
80.0	71	149	304	366	374
85.0	39	105	234	283	297
90.0	16	72	172	216	230
95.0	11	50	126	163	174
100.0	10	33	89	119	127
105.0	9	16	61	84	90
110.0	8	7	37	57	63
115.0	6	6	20	36	41
120.0	5	5	6	21	26
125.0	4	4	3	8	13
130.0	4	3	3	2	3
135.0	3	3	3	2	2
140.0	3	3	2	2	2
145.0	3	3	2	2	2
150.0	3	3	2	2	2
155.0	3	3	3	2	2
160.0	3	3	3	2	2
165.0	4	3	3	2	2
170.0	4	3	3	2	2
175.0	4	3	3	3	3
180.0	3	3	3	3	3

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## ZONAL LUMEN SUMMARY

0- 5	29.
5- 10	86.
10- 15	138.
15- 20	186.
20- 25	235.
25- 30	279.
30- 35	307.
35- 40	325.
40- 45	341.
45- 50	342.
50- 55	323.
55- 60	294.
60- 65	266.
65- 70	236.
70- 75	198.
75- 80	159.
80- 85	124.
85- 90	94.
90- 95	69.
95-100	50.
100-105	35.
105-110	23.
110-115	14.
115-120	8.
120-125	4.
125-130	2.
130-135	1.
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	138
15- 20	186
20- 25	235
25- 30	279
30- 35	307
35- 40	325
40- 45	341
45- 50	342
50- 55	323
55- 60	294
60- 65	266
65- 70	236
70- 75	198
75- 80	159
80- 85	124
85- 90	94
90- 95	69
95-100	50
100-105	35
105-110	23
110-115	14
115-120	8
120-125	4
125-130	2
130-135	1
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	116
0- 20	440
0- 30	954
0- 40	1586
0- 50	2269
0- 60	2886
0- 70	3388
0- 80	3745
0- 90	3962
0-100	4081
0-110	4139
0-120	4160
0-130	4166
0-140	4168
0-150	4170
0-160	4171
0-170	4172
0-180	4172

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## COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

EFFECTIVE FLOOR CAVITY REFLECTANCE 0.20

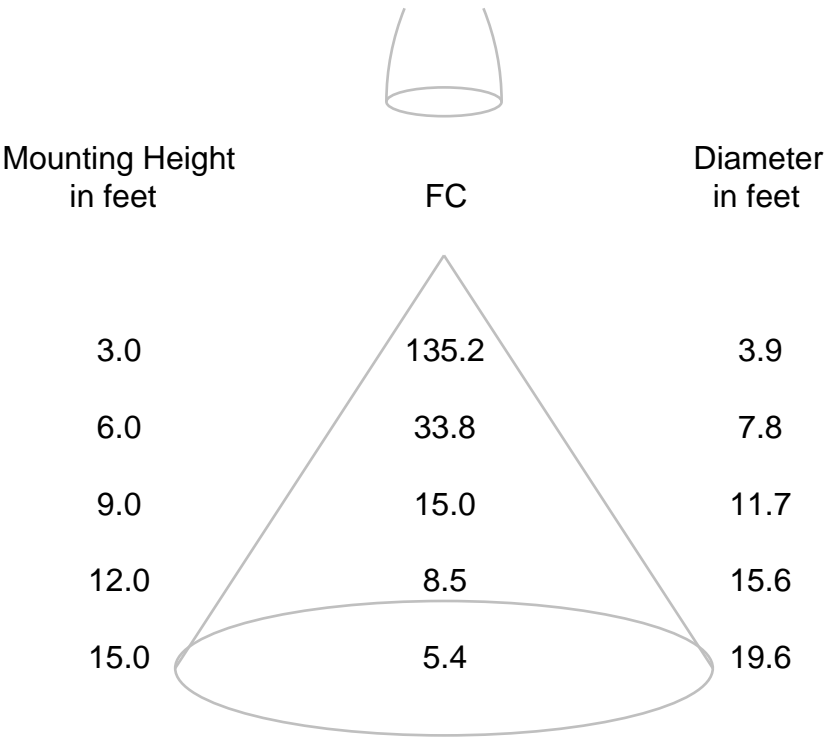
RC	80				70				50			30			10			0
RW	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	0
0	118	118	118	118	115	115	115	115	108	108	108	103	103	103	97	97	97	95
1	106	100	95	91	103	98	93	89	92	89	85	87	84	82	83	81	78	76
2	96	87	79	73	92	84	77	72	80	74	69	76	71	67	72	68	65	62
3	87	76	67	60	84	74	65	59	70	63	57	66	61	56	63	58	54	52
4	79	67	57	50	77	65	56	50	62	54	48	59	52	47	56	51	46	44
5	73	59	50	43	70	58	49	43	55	47	42	53	46	41	50	44	40	37
6	67	53	44	37	65	52	43	37	50	42	36	47	41	35	45	39	35	33
7	62	48	39	33	60	47	39	32	45	37	32	43	36	31	41	35	31	29
8	58	44	35	29	56	43	35	29	41	34	28	40	33	28	38	32	27	25
9	54	40	32	26	52	39	31	26	38	31	25	36	30	25	35	29	25	23
10	50	37	29	24	49	36	29	23	35	28	23	34	27	23	32	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.



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PREPARED FOR: RAB LIGHTING INC.  
CATALOG NUMBER: SHARK4-36YW/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)	4172 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.4306
Chromaticity Ordinate y	0.4028
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2471
Chromaticity Ordinate v'	0.5199
Correlated Color Temp CCT (K)	3098
ANSI C78.377-2008 Duv	0.000
Total Radiant Flux (milliWatts)	12125 *
ELECTRICAL	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.309
Input Power (Watts)	36.9
Input Power Factor (%)	99.5
Input Current THD (%)	6.0
Input Voltage THD (%)	0.2
EFFICACY (Lumens/Watt)	
	113.1
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.140
Input Power (Watts)	37.2
Input Power Factor (%)	95.9
Input Current THD (%)	8.5
Input Voltage THD (%)	0.2
Off-State Power (Watts)	
	0.0

COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	72
R1 Light greyish red	70
R2 Dark greyish yellow	80
R3 Strong yellowish green	89
R4 Moderate yellowish green	70
R5 Light bluish green	68
R6 Light blue	72
R7 Light violet	80
R8 Light reddish purple	50
R9 Strong red	-22
R10 Strong yellow	53
R11 Strong green	64
R12 Strong blue	43
R13 Light yellowish pink (skin)	71
R14 Moderate olive green (leaf)	93

### \*NOTE:

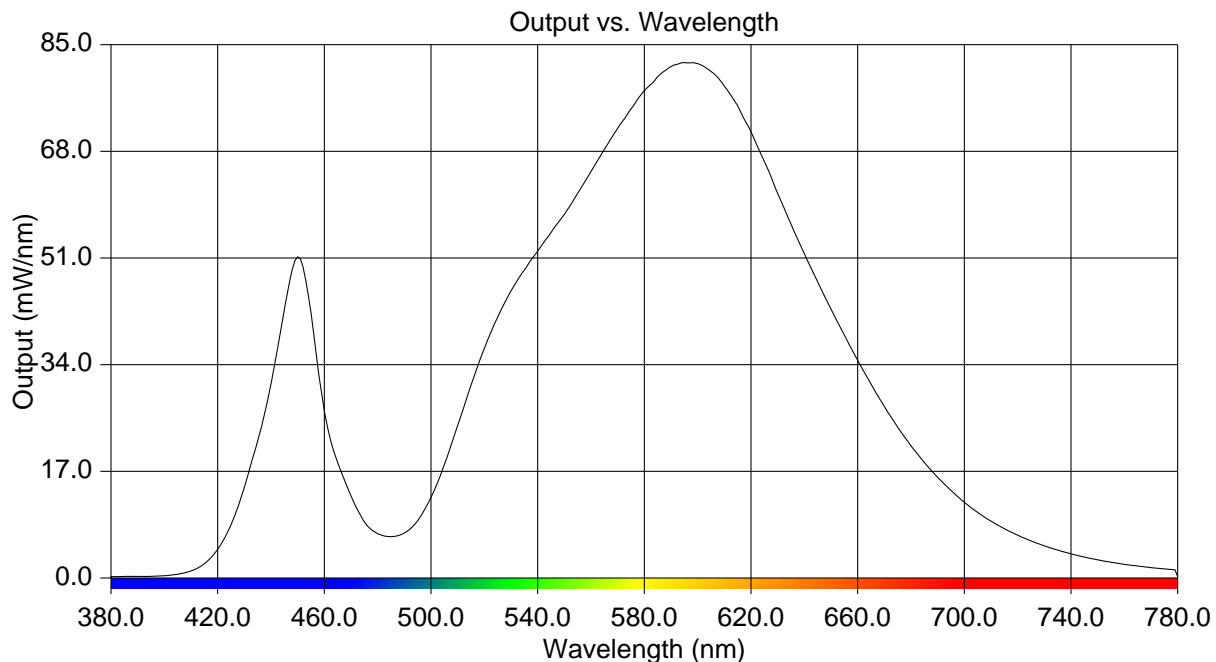
Proper calibration of integrating spheres for measuring total flux output of non-directional samples will produce reliable, repeatable results within the calibration tolerances of the equipment used. However, measurement of test samples with significant self absorption and/or directional output, even 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	0.212	515	30.729	650	42.840
385	0.230	520	36.635	655	38.728
390	0.234	525	41.551	660	34.668
395	0.291	530	45.754	665	30.859
400	0.369	535	49.088	670	27.315
405	0.584	540	52.052	675	23.995
410	1.109	545	55.047	680	21.083
415	2.268	550	57.994	685	18.421
420	4.559	555	61.312	690	16.021
425	8.491	560	64.764	695	13.950
430	14.418	565	68.283	700	12.086
435	21.915	570	71.649	705	10.456
440	30.750	575	74.766	710	9.046
445	42.823	580	77.680	715	7.865
450	51.184	585	79.871	720	6.835
455	42.290	590	81.532	725	5.922
460	26.694	595	82.147	730	5.113
465	18.396	600	81.976	735	4.420
470	13.067	605	80.741	740	3.825
475	9.012	610	78.389	745	3.329
480	7.045	615	75.286	750	2.898
485	6.632	620	71.131	755	2.517
490	7.147	625	66.405	760	2.187
495	9.119	630	61.266	765	1.904
500	12.828	635	56.411	770	1.663
505	18.011	640	51.700	775	1.448
510	24.297	645	47.240	780	0.222



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## CIE Chromaticity Diagram

