

REPORT NUMBER: RAB01134

ISSUE DATE: 09/09/15

PREPARED FOR: RAB LIGHTING INC.

CATALOG NUMBER: SHARK4-36YNW/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 = 36.087 AT 277.0 VOLTS

LED DRIVERS: RD-042-A0700-C

(SEE PAGE 2 FOR MORE INFORMATION)

PAGE: 1 OF 8

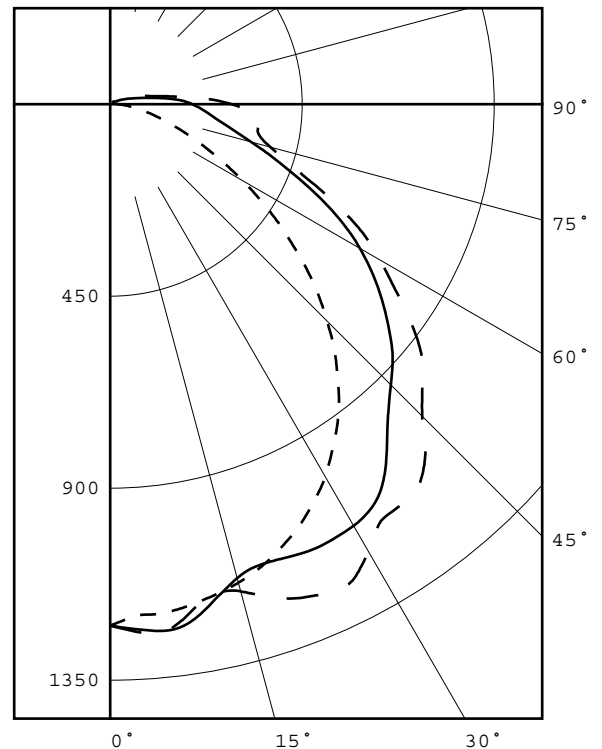
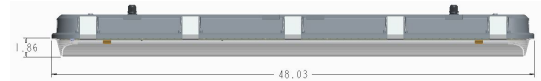
DATE SAMPLE TESTED: 09/09/15

CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0
0	1222	1222	1222	1222	1222
5	1200	1214	1239	1247	1246
15	1161	1177	1150	1167	1182
25	1073	1047	1147	1230	1256
35	926	951	1105	1127	1161
45	719	816	930	1031	1034
55	478	595	772	848	847
65	255	376	562	605	611
75	114	198	342	382	389
85	39	99	229	317	348
90	16	70	195	266	286
95	13	50	143	179	181
105	9	15	52	74	77
115	6	6	19	37	42
125	4	4	5	10	15
135	3	4	4	4	5
145	3	3	3	4	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

117
332
529
663
705
641
488
316
226
130
51
22
7
3
2
1
1
0



LEGEND:

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

ZONAL LUMEN SUMMARY

ZONE	LUMENS	%FIXT
0- 30	977	23.1
0- 40	1640	38.7
0- 60	2986	70.5
0- 90	4017	94.9
90-120	202	4.8
90-130	209	4.9
90-150	215	5.1
90-180	217	5.1
0-180	4234	100.0

TOTAL INPUT WATTS = 36.1

EFFICACY = 117.3 Lm/W

CIE TYPE - DIRECT

PLANE : 0-DEG 90-DEG

SPACING CRITERIA : 1.2 1.5

Checked X.CAO
Approved D.WANG-MUNSON

REPORT NUMBER: RAB01134
ISSUE DATE: 09/09/15
PREPARED FOR: RAB LIGHTING INC.

PAGE: 2 OF 8
DATE SAMPLE TESTED: 09/09/15

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

REPORT NUMBER: RAB01134
ISSUE DATE: 09/09/15
PREPARED FOR: RAB LIGHTING INC.

PAGE: 3 OF 8
DATE SAMPLE TESTED: 09/09/15

PLANE : 0-DEG 90-DEG
BEAM ANGLE (50%) : 97.8 X 128.7 DEGREES
FIELD ANGLE (10%): 147.9 X 197.3 DEGREES

REPORT NUMBER: RAB01134
ISSUE DATE: 09/09/15
PREPARED FOR: RAB LIGHTING INC.

PAGE: 4 OF 8
DATE SAMPLE TESTED: 09/09/15

CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0
0.0	1222	1222	1222	1222	1222
5.0	1200	1214	1239	1247	1246
10.0	1185	1209	1214	1198	1191
15.0	1161	1177	1150	1167	1182
20.0	1124	1114	1137	1209	1233
25.0	1073	1047	1147	1230	1256
30.0	1008	999	1141	1212	1210
35.0	926	951	1105	1127	1161
40.0	828	893	1010	1106	1137
45.0	719	816	930	1031	1034
50.0	601	714	859	939	957
55.0	478	595	772	848	847
60.0	359	477	676	720	731
65.0	255	376	562	605	611
70.0	174	279	440	481	476
75.0	114	198	342	382	389
80.0	71	139	273	330	351
85.0	39	99	229	317	348
90.0	16	70	195	266	286
95.0	13	50	143	179	181
100.0	10	29	85	107	108
105.0	9	15	52	74	77
110.0	7	8	33	54	60
115.0	6	6	19	37	42
120.0	5	5	7	23	27
125.0	4	4	5	10	15
130.0	4	4	5	5	6
135.0	3	4	4	4	5
140.0	3	3	4	4	4
145.0	3	3	3	4	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	3
175.0	4	3	3	2	2
180.0	3	3	3	3	3

REPORT NUMBER: RAB01134
ISSUE DATE: 09/09/15
PREPARED FOR: RAB LIGHTING INC.

PAGE: 5 OF 8
DATE SAMPLE TESTED: 09/09/15

ZONAL LUMEN SUMMARY

0- 5	29.
5- 10	87.
10- 15	140.
15- 20	192.
20- 25	242.
25- 30	287.
30- 35	320.
35- 40	343.
40- 45	354.
45- 50	351.
50- 55	335.
55- 60	306.
60- 65	267.
65- 70	221.
70- 75	175.
75- 80	141.
80- 85	121.
85- 90	104.
90- 95	79.
95-100	50.
100-105	31.
105-110	20.
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.

REPORT NUMBER: RAB01134
 ISSUE DATE: 09/09/15
 PREPARED FOR: RAB LIGHTING INC.

PAGE: 6 OF 8
 DATE SAMPLE TESTED: 09/09/15

5-DEGREE ZONAL LUMEN SUMMARY

0- 5	29
5- 10	87
10- 15	140
15- 20	192
20- 25	242
25- 30	287
30- 35	320
35- 40	343
40- 45	354
45- 50	351
50- 55	335
55- 60	306
60- 65	267
65- 70	221
70- 75	175
75- 80	141
80- 85	121
85- 90	104
90- 95	79
95-100	50
100-105	31
105-110	20
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	117
0- 20	448
0- 30	977
0- 40	1640
0- 50	2345
0- 60	2986
0- 70	3475
0- 80	3791
0- 90	4017
0-100	4146
0-110	4197
0-120	4219
0-130	4226
0-140	4229
0-150	4231
0-160	4233
0-170	4233
0-180	4234

REPORT NUMBER: RAB01134
ISSUE DATE: 09/09/15

PAGE: 7 OF 8
DATE SAMPLE TESTED: 09/09/15

PREPARED FOR: RAB LIGHTING INC.

COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

EFFECTIVE FLOOR CAVITY REFLECTANCE 0.20

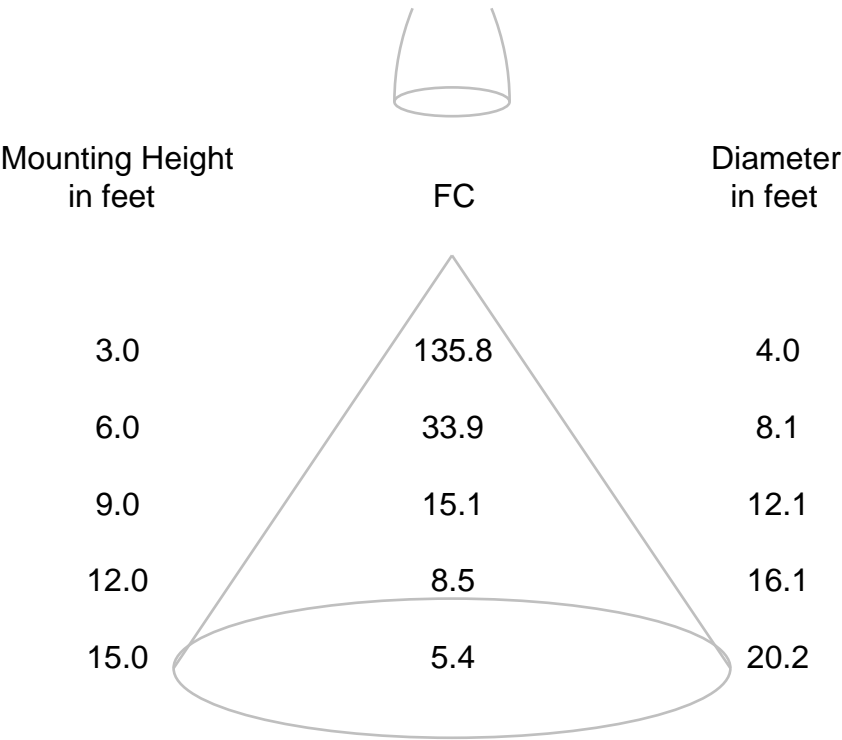
RC	80				70				50			30			10			0
RW	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	0
0	118	118	118	118	114	114	114	114	108	108	108	103	103	103	97	97	97	95
1	106	101	96	91	103	98	93	89	93	89	86	88	85	82	83	81	79	76
2	96	87	80	73	93	85	78	72	80	75	70	76	71	67	72	69	65	63
3	87	76	67	61	84	74	66	60	70	64	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	49	40	33	60	47	39	33	45	38	32	44	37	32	42	36	31	29
8	58	44	35	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.

REPORT NUMBER: RAB01134	PAGE: 8 OF 8
ISSUE DATE: 09/09/15	DATE SAMPLE TESTED: 09/09/15
PREPARED FOR: RAB LIGHTING INC.	

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: RAB01133
DATE: 9/9/2015
PREPARED FOR: RAB LIGHTING INC.
CATALOG NUMBER: SHARK4-36YNW/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	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

REPORT NUMBER: RAB01133
 DATE: 9/9/2015
 PREPARED FOR: RAB LIGHTING INC.
 CATALOG NUMBER: SHARK4-36YNW/D10 (STANDARD DISTRIBUTION)

Page 2 of 4

RESULTS:

PHOTOMETRIC	
Total Integrated Flux (lumens)	4234 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.4086
Chromaticity Ordinate y	0.3950
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2361
Chromaticity Ordinate v'	0.5135
Correlated Color Temp CCT (K)	3464
ANSI C78.377-2008 Duv	0.001
Total Radiant Flux (milliWatts)	12358 *
ELECTRICAL	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.301
Input Power (Watts)	35.8
Input Power Factor (%)	99.1
Input Current THD (%)	8.6
Input Voltage THD (%)	0.2
EFFICACY (Lumens/Watt)	
	118.3
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.136
Input Power (Watts)	36.1
Input Power Factor (%)	95.8
Input Current THD (%)	8.1
Input Voltage THD (%)	0.2
Off-State Power (Watts)	
	0.0

COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	74
R1 Light greyish red	71
R2 Dark greyish yellow	82
R3 Strong yellowish green	89
R4 Moderate yellowish green	71
R5 Light bluish green	70
R6 Light blue	74
R7 Light violet	82
R8 Light reddish purple	53
R9 Strong red	-18
R10 Strong yellow	55
R11 Strong green	65
R12 Strong blue	44
R13 Light yellowish pink (skin)	73
R14 Moderate olive green (leaf)	93

*NOTE:

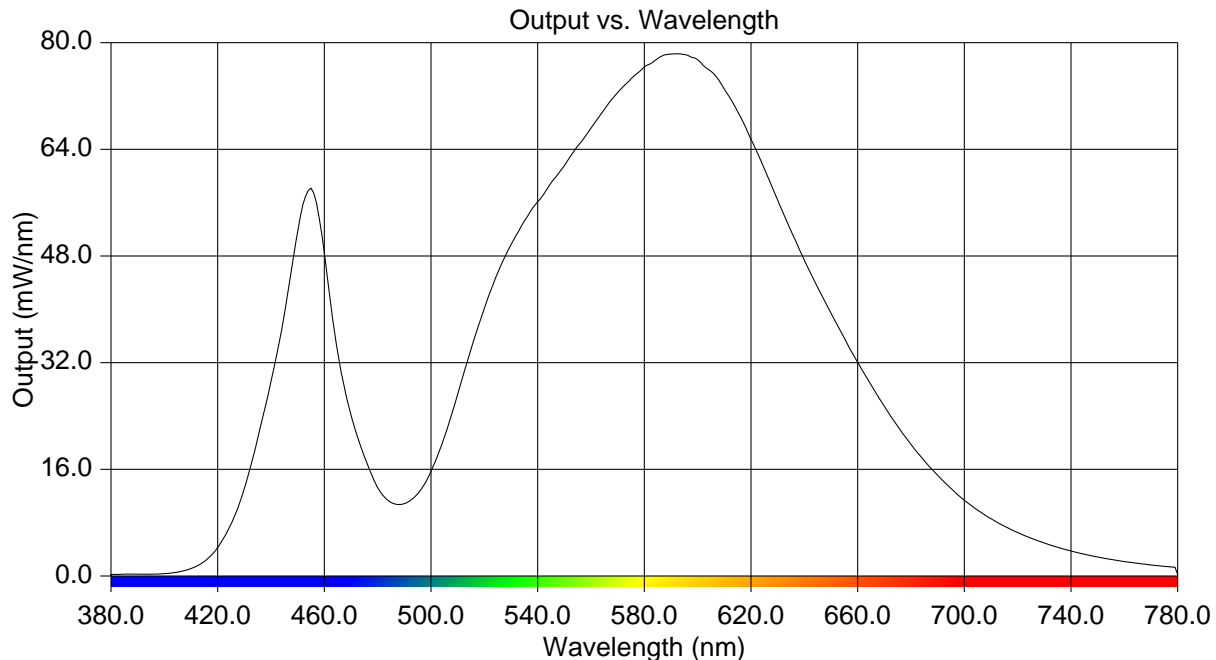
Proper calibration of integrating spheres for measuring total flux output of non-directional samples will produce reliable, repeatable results within the calibration tolerances of the equipment used. However, measurement of test samples with significant self absorption and/or directional output, even 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.

REPORT NUMBER: RAB01133
 DATE: 9/9/2015
 PREPARED FOR: RAB LIGHTING INC.
 CATALOG NUMBER: SHARK4-36YNW/D10 (STANDARD DISTRIBUTION)

Page 3 of 4

RESULTS:

Wavelength	mW per nm	Wavelength	mW per nm	Wavelength	mW per nm
380	0.235	515	33.999	650	39.422
385	0.241	520	40.089	655	35.697
390	0.261	525	45.434	660	32.085
395	0.291	530	49.727	665	28.691
400	0.373	535	53.250	670	25.457
405	0.579	540	56.119	675	22.434
410	1.074	545	58.983	680	19.683
415	2.179	550	61.543	685	17.276
420	4.230	555	64.502	690	15.092
425	7.768	560	67.169	695	13.143
430	13.116	565	69.957	700	11.349
435	20.627	570	72.487	705	9.858
440	29.129	575	74.569	710	8.569
445	39.215	580	76.362	715	7.468
450	51.584	585	77.618	720	6.546
455	58.165	590	78.292	725	5.701
460	48.525	595	78.225	730	4.959
465	33.452	600	77.444	735	4.282
470	24.138	605	75.706	740	3.733
475	18.011	610	73.030	745	3.264
480	13.220	615	69.639	750	2.832
485	11.047	620	65.502	755	2.481
490	10.864	625	61.098	760	2.166
495	12.330	630	56.382	765	1.898
500	15.675	635	51.755	770	1.660
505	20.835	640	47.389	775	1.444
510	27.249	645	43.245	780	0.222



REPORT NUMBER: RAB01133
DATE: 9/9/2015
PREPARED FOR: RAB LIGHTING INC.
CATALOG NUMBER: SHARK4-36YNW/D10 (STANDARD DISTRIBUTION)

Page 4 of 4

CIE Chromaticity Diagram

