

REPORT NUMBER: RAB00964

ISSUE DATE: 07/23/15

PREPARED FOR: RAB LIGHTING INC.

CATALOG NUMBER: SHARK4-36NW/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 = 36.724 AT 277.0 VOLTS

LED DRIVERS: RD-042-A0700-C

(SEE PAGE 2 FOR MORE INFORMATION)

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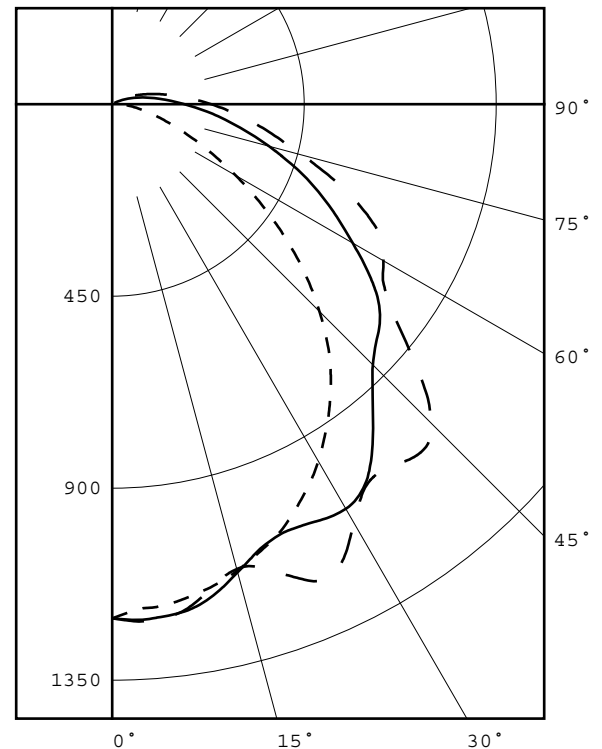
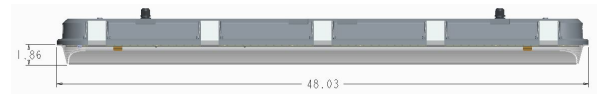
DATE SAMPLE TESTED: 07/23/15

CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0
0	1205	1205	1205	1205	1205
5	1183	1192	1208	1213	1211
15	1132	1146	1136	1125	1128
25	1034	1037	1085	1190	1217
35	885	912	1050	1051	1067
45	687	771	864	1023	1057
55	448	559	751	796	787
65	237	353	560	647	681
75	107	197	381	458	462
85	37	99	230	286	298
90	12	68	170	219	231
95	11	47	124	166	175
105	9	15	60	86	92
115	6	6	19	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	2	2
180	3	3	3	3	3

FLUX

114
322
509
626
677
611
498
351
215
119
57
22
6
2
1
1
0



LEGEND:

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

ZONAL LUMEN SUMMARY

ZONE	LUMENS	%FIXT
0- 30	945	22.9
0- 40	1572	38.0
0- 60	2860	69.2
0- 90	3925	94.9
90-120	197	4.8
90-130	203	4.9
90-150	207	5.0
90-180	209	5.1
0-180	4134	100.0

TOTAL INPUT WATTS = 36.7

EFFICACY = 112.6 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%) : 96.8 X 137.1 DEGREES
FIELD ANGLE (10%): 147.1 X 201.8 DEGREES

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CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0
0.0	1205	1205	1205	1205	1205
5.0	1183	1192	1208	1213	1211
10.0	1163	1175	1190	1185	1178
15.0	1132	1146	1136	1125	1128
20.0	1090	1099	1088	1139	1172
25.0	1034	1037	1085	1190	1217
30.0	966	973	1095	1145	1133
35.0	885	912	1050	1051	1067
40.0	795	849	951	1025	1086
45.0	687	771	864	1023	1057
50.0	570	673	817	927	917
55.0	448	559	751	796	787
60.0	335	447	651	708	734
65.0	237	353	560	647	681
70.0	162	268	472	562	577
75.0	107	197	381	458	462
80.0	67	141	299	368	373
85.0	37	99	230	286	298
90.0	12	68	170	219	231
95.0	11	47	124	166	175
100.0	10	30	88	122	128
105.0	9	15	60	86	92
110.0	8	7	36	58	63
115.0	6	6	19	36	41
120.0	5	5	5	21	26
125.0	4	4	3	8	13
130.0	4	4	3	3	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	3	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	2	2
180.0	3	3	3	3	3

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ZONAL LUMEN SUMMARY

0- 5	29.
5- 10	85.
10- 15	137.
15- 20	185.
20- 25	233.
25- 30	276.
30- 35	304.
35- 40	323.
40- 45	338.
45- 50	339.
50- 55	320.
55- 60	292.
60- 65	265.
65- 70	234.
70- 75	195.
75- 80	156.
80- 85	123.
85- 90	93.
90- 95	69.
95-100	50.
100-105	35.
105-110	22.
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	85
10- 15	137
15- 20	185
20- 25	233
25- 30	276
30- 35	304
35- 40	323
40- 45	338
45- 50	339
50- 55	320
55- 60	292
60- 65	265
65- 70	234
70- 75	195
75- 80	156
80- 85	123
85- 90	93
90- 95	69
95-100	50
100-105	35
105-110	22
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	114
0- 20	436
0- 30	945
0- 40	1572
0- 50	2249
0- 60	2860
0- 70	3358
0- 80	3710
0- 90	3925
0-100	4044
0-110	4101
0-120	4122
0-130	4128
0-140	4130
0-150	4132
0-160	4133
0-170	4134
0-180	4134

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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	66	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	33	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

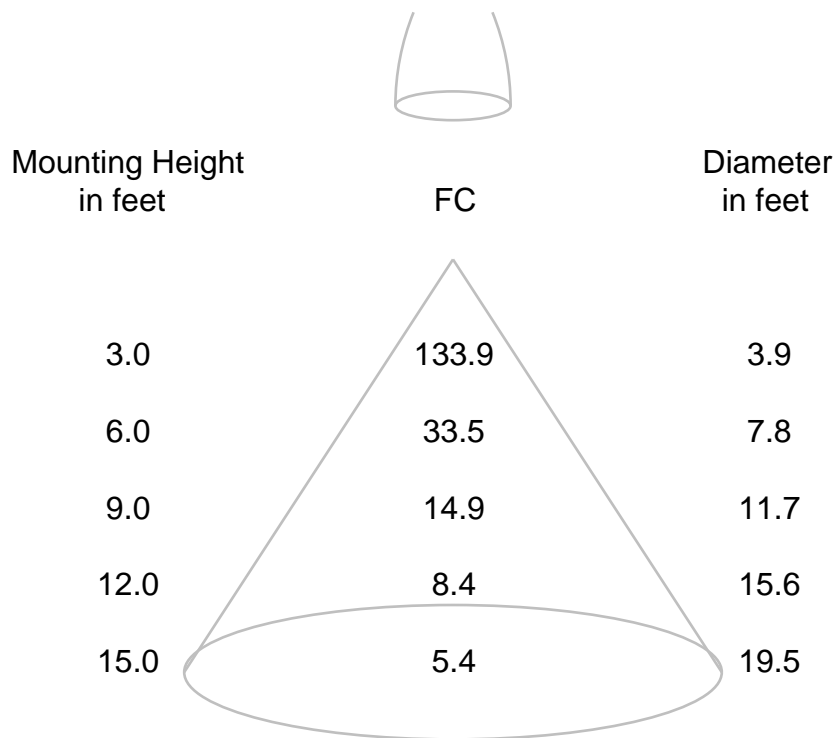
ALL CANDELA, LUMENS, LUMINANCE, AND VCP VALUES IN THIS REPORT ARE BASED ON ABSOLUTE PHOTOMETRY. THE COEFFICIENT OF UTILIZATION VALUES ARE BASED ON THE TOTAL ABSOLUTE LUMEN OUTPUT OF THIS LUMINAIRE SAMPLE.

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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.

REPORT NUMBER: RAB00967
DATE: 7/27/2015
PREPARED FOR: RAB LIGHTING INC.
CATALOG NUMBER: SHARK4-36NW/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 X.CAO

Approved D.WANG-MUNSON
Lighting Engineer

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RESULTS:

PHOTOMETRIC	
Total Integrated Flux (lumens)	4134 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.3835
Chromaticity Ordinate y	0.3807
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2255
Chromaticity Ordinate v'	0.5038
Correlated Color Temp CCT (K)	3947
ANSI C78.377-2008 Duv	0.001
Total Radiant Flux (milliWatts)	12156 *
ELECTRICAL	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.306
Input Power (Watts)	36.5
Input Power Factor (%)	99.4
Input Current THD (%)	5.9
Input Voltage THD (%)	0.2
EFFICACY (Lumens/Watt)	
	113.3
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.139
Input Power (Watts)	36.7
Input Power Factor (%)	95.3
Input Current THD (%)	8.5
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	80
R3 Strong yellowish green	85
R4 Moderate yellowish green	73
R5 Light bluish green	71
R6 Light blue	71
R7 Light violet	84
R8 Light reddish purple	58
R9 Strong red	-15
R10 Strong yellow	52
R11 Strong green	67
R12 Strong blue	41
R13 Light yellowish pink (skin)	73
R14 Moderate olive green (leaf)	91

*NOTE:

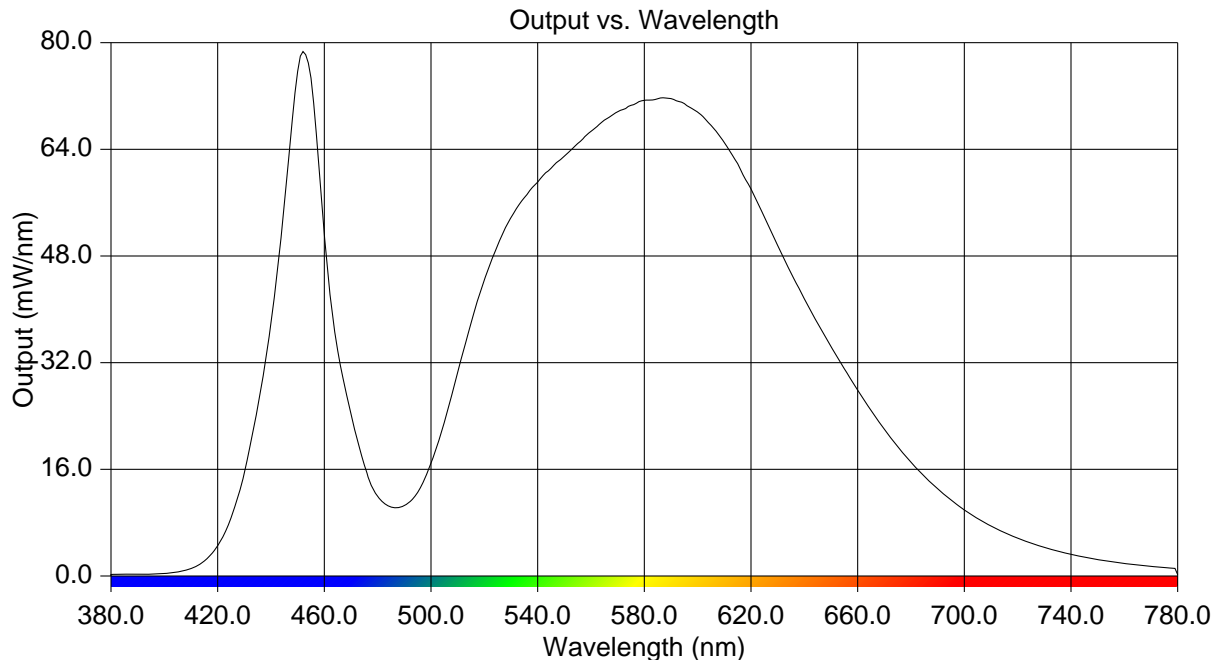
Proper calibration of integrating spheres for measuring total flux output of non-directional samples will produce reliable, repeatable results within the calibration tolerances of the equipment used. However, measurement of test samples with significant self absorption and/or directional output, even 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	0.226	515	37.912	650	34.418
385	0.243	520	44.391	655	31.081
390	0.265	525	49.564	660	27.867
395	0.289	530	53.708	665	24.827
400	0.385	535	56.749	670	22.024
405	0.600	540	59.082	675	19.392
410	1.096	545	61.149	680	17.052
415	2.250	550	62.974	685	14.969
420	4.553	555	64.868	690	13.059
425	8.705	560	66.665	695	11.416
430	15.479	565	68.379	700	9.896
435	25.305	570	69.614	705	8.600
440	37.824	575	70.599	710	7.467
445	55.740	580	71.362	715	6.520
450	75.698	585	71.584	720	5.694
455	74.706	590	71.611	725	4.946
460	51.314	595	70.863	730	4.293
465	33.844	600	69.580	735	3.734
470	24.256	605	67.592	740	3.223
475	16.653	610	65.010	745	2.825
480	11.918	615	61.858	750	2.466
485	10.384	620	58.055	755	2.148
490	10.541	625	53.863	760	1.885
495	12.534	630	49.521	765	1.656
500	16.858	635	45.465	770	1.440
505	23.093	640	41.579	775	1.271
510	30.525	645	37.908	780	0.192



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CIE Chromaticity Diagram

