RAB LIGHTING

NVLAP LAB CODE: 201058-0

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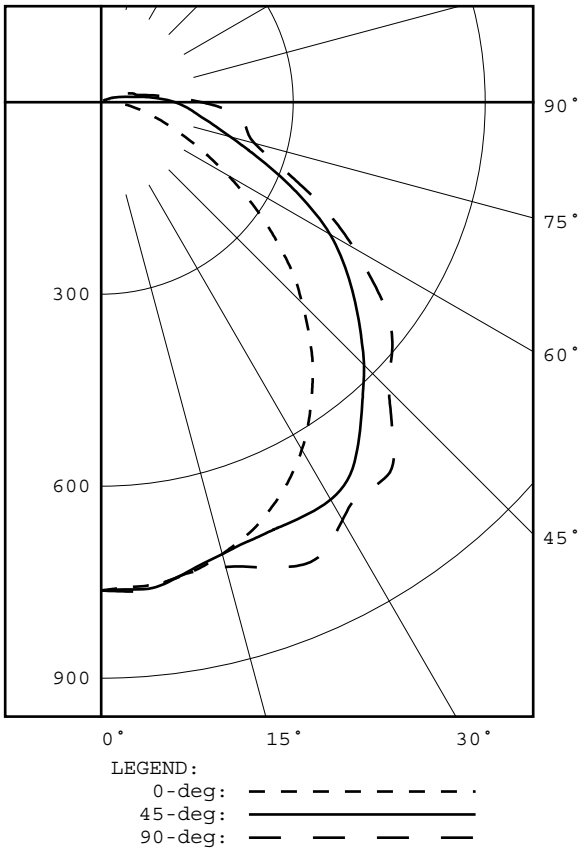
REPORT NUMBER: RAB01132 PAGE: 1 OF 8
ISSUE DATE: 09/08/15 DATE SAMPLE TESTED: 09/08/15
PREPARED FOR: RAB LIGHTING INC.
CATALOG NUMBER: SHARK2-25YNW/D10 (STANDARD DISTRIBUTION)
LUMINAIRE: FABRICATED WHITE PLASTIC HOUSING, PERFORATED WHITE METAL HEAT SINK, 2 WHITE CIRCUIT BOARDS EACH WITH 32 LEDS, FROSTED POLYCARBONATE LENS ENCLOSURE.
LAMPS: SIXTY FOUR WHITE LIGHT EMITTING DIODES (LEDS), TILTED 15-DEGREE FROM VERTICAL BASE-UP POSITION.
TOTAL INPUT WATTS = 25.286 AT 277.0 VOLTS
LED DRIVERS: RD-026-A0450-C
(SEE PAGE 2 FOR MORE INFORMATION)

CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0	FLUX
0	763	763	763	763	763	
5	759	760	764	765	766	72
15	731	730	731	745	752	209
25	671	670	720	773	789	333
35	572	602	689	713	737	416
45	444	505	581	637	636	437
55	300	366	470	526	534	396
65	168	228	340	370	379	301
75	84	123	209	243	248	200
85	36	65	141	197	212	142
90	20	47	116	156	160	
95	14	33	81	101	102	76
105	9	12	32	45	52	32
115	6	6	12	23	27	15
125	4	4	4	6	9	5
135	2	2	2	2	2	2
145	1	1	1	1	1	1
155	1	1	1	1	1	0
165	1	1	1	1	1	0
175	1	1	0	0	0	0
180	1	1	1	1	1	



ZONAL LUMEN SUMMARY

ZONE	LUMENS	%FIXT
0- 30	614	23.3
0- 40	1030	39.1
0- 60	1863	70.7
0- 90	2505	95.0
90-120	123	4.7
90-130	128	4.9
90-150	130	4.9
90-180	131	5.0
0-180	2636	100.0

TOTAL INPUT WATTS = 25.3
EFFICACY = 104.2 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: RAB01132 PAGE: 2 OF 8
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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%)	: 97.4	X 128.0 DEGREES
FIELD ANGLE (10%)	: 151.8	X 195.9 DEGREES

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CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0
0.0	763	763	763	763	763
5.0	759	760	764	765	766
10.0	750	751	748	748	749
15.0	731	730	731	745	752
20.0	706	702	722	759	774
25.0	671	670	720	773	789
30.0	627	638	717	752	754
35.0	572	602	689	713	737
40.0	512	559	633	696	712
45.0	444	505	581	637	636
50.0	375	437	525	579	594
55.0	300	366	470	526	534
60.0	229	294	413	444	456
65.0	168	228	340	370	379
70.0	120	170	267	297	300
75.0	84	123	209	243	248
80.0	57	89	169	214	230
85.0	36	65	141	197	212
90.0	20	47	116	156	160
95.0	14	33	81	101	102
100.0	11	21	49	62	64
105.0	9	12	32	45	52
110.0	7	8	21	34	38
115.0	6	6	12	23	27
120.0	5	5	6	14	17
125.0	4	4	4	6	9
130.0	3	3	3	3	3
135.0	2	2	2	2	2
140.0	1	2	2	1	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	0	0	1
165.0	1	1	1	1	1
170.0	1	1	1	1	0
175.0	1	1	0	0	0
180.0	1	1	1	1	1

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ZONAL LUMEN SUMMARY

0- 5	18.
5- 10	54.
10- 15	88.
15- 20	121.
20- 25	153.
25- 30	180.
30- 35	201.
35- 40	215.
40- 45	221.
45- 50	216.
50- 55	207.
55- 60	189.
60- 65	164.
65- 70	136.
70- 75	109.
75- 80	90.
80- 85	78.
85- 90	64.
90- 95	46.
95-100	30.
100-105	19.
105-110	14.
110-115	9.
115-120	6.
120-125	3.
125-130	2.
130-135	1.
135-140	1.
140-145	0.
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	54
10- 15	88
15- 20	121
20- 25	153
25- 30	180
30- 35	201
35- 40	215
40- 45	221
45- 50	216
50- 55	207
55- 60	189
60- 65	164
65- 70	136
70- 75	109
75- 80	90
80- 85	78
85- 90	64
90- 95	46
95-100	30
100-105	19
105-110	14
110-115	9
115-120	6
120-125	3
125-130	2
130-135	1
135-140	1
140-145	0
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	72
0- 20	281
0- 30	614
0- 40	1030
0- 50	1467
0- 60	1863
0- 70	2164
0- 80	2363
0- 90	2505
0-100	2581
0-110	2614
0-120	2628
0-130	2633
0-140	2635
0-150	2635
0-160	2636
0-170	2636
0-180	2636

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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	101	96	91	103	98	93	89	93	89	86	88	85	82	83	81	79	76
2	96	87	80	74	93	85	78	72	80	75	70	76	72	67	72	69	65	63
3	87	76	68	61	84	74	66	60	70	64	58	67	61	56	64	59	55	52
4	80	67	58	51	77	66	57	50	62	55	49	59	53	48	57	51	47	44
5	73	60	51	44	71	58	50	43	56	48	42	53	47	41	51	45	40	38
6	67	54	45	38	65	53	44	38	50	43	37	48	41	36	46	40	35	33
7	62	49	40	33	60	48	39	33	46	38	32	44	37	32	42	36	31	29
8	58	44	36	30	56	43	35	29	42	34	29	40	33	28	38	32	28	26
9	54	41	32	27	53	40	32	26	38	31	26	37	30	26	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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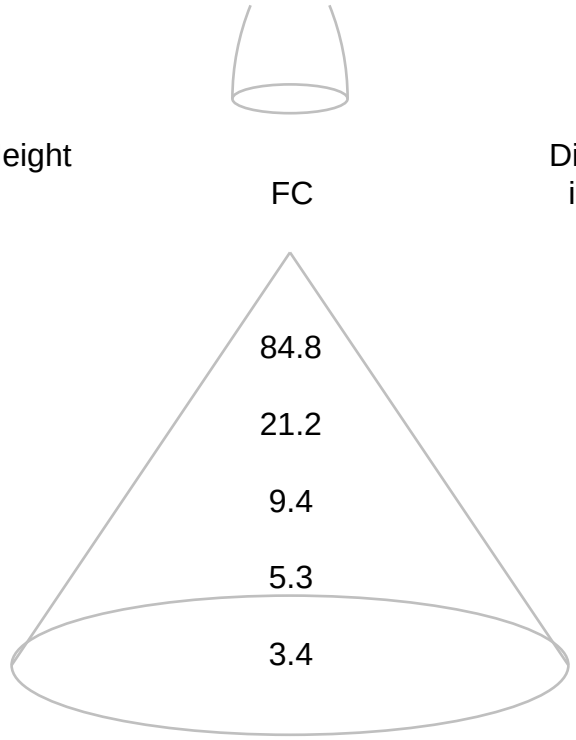
CONE OF LIGHT DIAGRAM

(diameter shown is where fc value is half the fc at nadir)



Mounting Height in feet	FC	Diameter in feet
3.0	84.8	4.1
6.0	21.2	8.1
9.0	9.4	12.2
12.0	5.3	16.2
15.0	3.4	20.3

Note: The candela values used to generate this diagram were obtained by averaging the photometric data into a single plane.

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REPORT NUMBER: RAB01131
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PREPARED FOR: RAB LIGHTING INC.
CATALOG NUMBER: SHARK2-25YNW/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:	Calibration Due:
CHROMA PROGRAMMABLE AC POWER SOURCE MODEL 61602	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 X.CAO

Approved D.WANG-MUNSON
Lighting Engineer

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RESULTS:

PHOTOMETRIC	
Total Integrated Flux (lumens)	2636 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.4039
Chromaticity Ordinate y	0.3891
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2355
Chromaticity Ordinate v'	0.5104
Correlated Color Temp CCT (K)	3517
ANSI C78.377-2008 Duv	0.000
Total Radiant Flux (milliWatts)	7774 *
ELECTRICAL	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.210
Input Power (Watts)	24.8
Input Power Factor (%)	98.4
Input Current THD (%)	8.7
Input Voltage THD (%)	0.2
EFFICACY (Lumens/Watt)	106.3
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.098
Input Power (Watts)	25.3
Input Power Factor (%)	93.2
Input Current THD (%)	11.5
Input Voltage THD (%)	0.2
Off-State Power (Watts)	0.0

COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	75
R1 Light greyish red	73
R2 Dark greyish yellow	83
R3 Strong yellowish green	90
R4 Moderate yellowish green	72
R5 Light bluish green	71
R6 Light blue	75
R7 Light violet	83
R8 Light reddish purple	55
R9 Strong red	-13
R10 Strong yellow	58
R11 Strong green	66
R12 Strong blue	46
R13 Light yellowish pink (skin)	75
R14 Moderate olive green (leaf)	94

*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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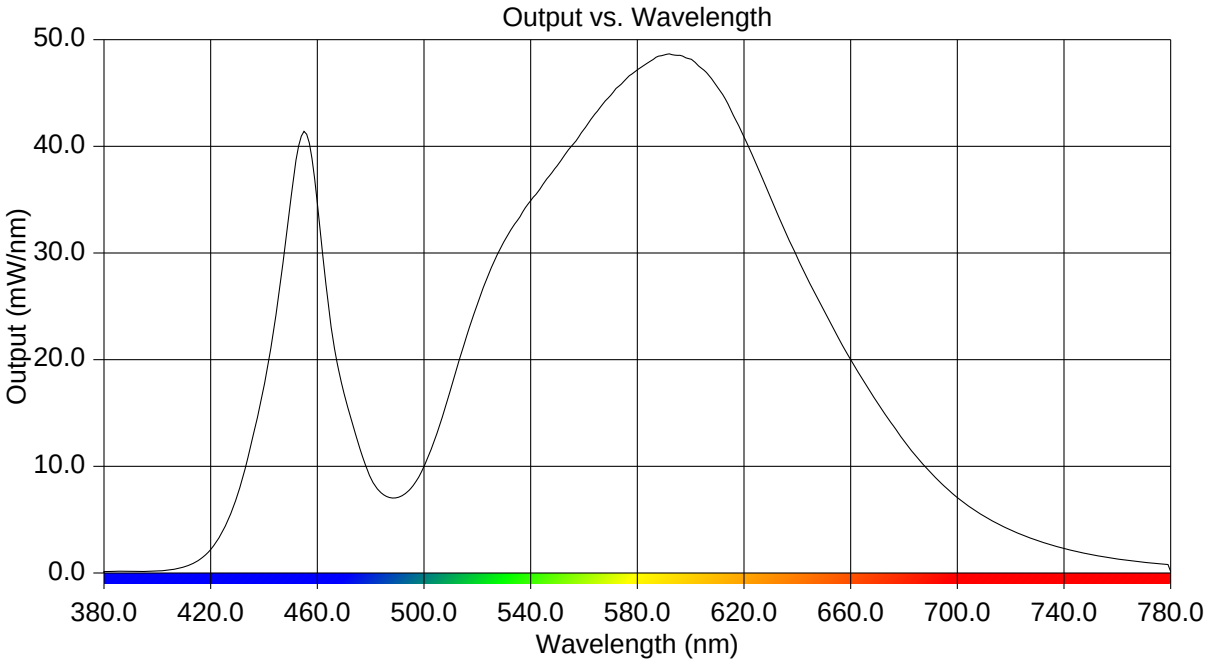
RESULTS:

Wavelength	mW per nm	Wavelength	mW per nm	Wavelength	mW per nm
380	0.127	515	21.397	650	24.600
385	0.143	520	25.205	655	22.229
390	0.149	525	28.502	660	20.012
395	0.155	530	31.041	665	17.931
400	0.199	535	33.039	670	15.978
405	0.306	540	34.908	675	14.133
410	0.542	545	36.593	680	12.372
415	1.115	550	38.218	685	10.806
420	2.198	555	39.930	690	9.415
425	4.162	560	41.601	695	8.164
430	7.281	565	43.288	700	7.075
435	11.908	570	44.777	705	6.128
440	17.587	575	46.104	710	5.327
445	25.042	580	47.159	715	4.635
450	34.937	585	48.000	720	4.042
455	41.404	590	48.559	725	3.516
460	34.679	595	48.528	730	3.035
465	23.397	600	48.184	735	2.638
470	16.847	605	47.138	740	2.285
475	12.440	610	45.580	745	1.985
480	8.938	615	43.439	750	1.738
485	7.288	620	40.882	755	1.513
490	7.092	625	38.134	760	1.323
495	7.910	630	35.184	765	1.156
500	9.986	635	32.246	770	1.005
505	13.224	640	29.585	775	0.882
510	17.239	645	26.952	780	0.134



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CIE Chromaticity Diagram