RAB LIGHTING

NVLAP LAB CODE: 201058-0

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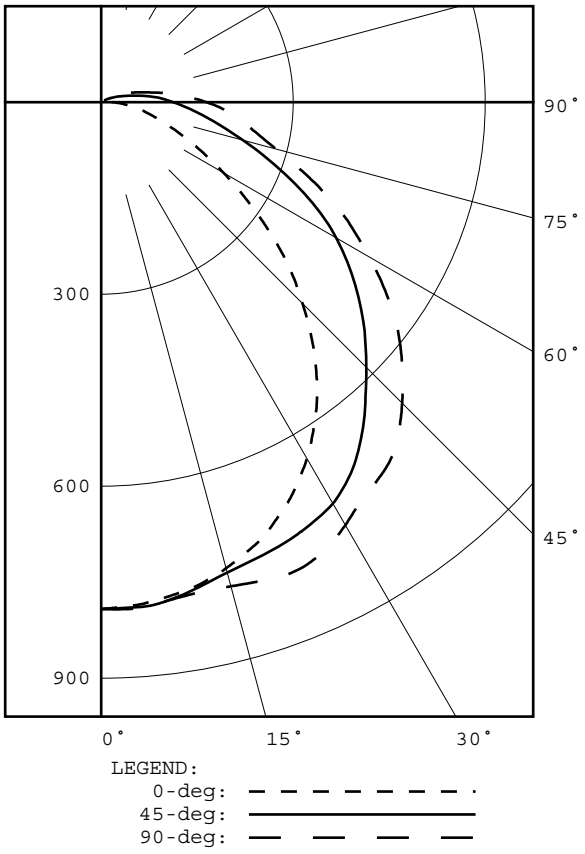
REPORT NUMBER: RAB01126 PAGE: 1 OF 8
ISSUE DATE: 09/08/15 DATE SAMPLE TESTED: 09/08/15
PREPARED FOR: RAB LIGHTING INC.
CATALOG NUMBER: SHARK2-25NW/D10 (STANDARD DISTRIBUTION)
LUMINAIRE: FABRICATED WHITE PLASTIC HOUSING, PERFORATED WHITE METAL HEAT SINK, 2 WHITE CIRCUIT BOARDS EACH WITH 32 LEDS, FROSTED POLYCARBONATE LENS ENCLOSURE.
LAMPS: SIXTY FOUR WHITE LIGHT EMITTING DIODES (LEDS), TILTED 15-DEGREE FROM VERTICAL BASE-UP POSITION.
TOTAL INPUT WATTS = 25.781 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	792	792	792	792	792	
5	786	787	791	793	792	75
15	754	756	761	775	783	217
25	690	696	740	776	788	340
35	586	616	690	718	736	420
45	445	507	586	652	665	443
55	291	366	481	540	552	404
65	163	229	359	405	418	318
75	84	128	229	274	283	218
85	36	68	143	190	203	143
90	17	48	114	154	165	
95	14	35	87	117	124	84
105	9	13	38	54	59	38
115	7	6	14	24	28	16
125	4	4	3	6	9	5
135	2	2	2	1	1	1
145	1	1	1	1	1	1
155	1	1	1	1	1	0
165	1	1	1	0	0	0
175	1	1	0	0	0	0
180	1	1	1	1	1	



ZONAL LUMEN SUMMARY

ZONE	LUMENS	%FIXT
0- 30	632	23.2
0- 40	1052	38.6
0- 60	1899	69.8
0- 90	2577	94.7
90-120	138	5.1
90-130	143	5.2
90-150	145	5.3
90-180	145	5.3
0-180	2722	100.0

TOTAL INPUT WATTS = 25.8
EFFICACY = 105.5 Lm/W
CIE TYPE - DIRECT

PLANE	: 0-DEG	90-DEG
SPACING CRITERIA	: 1.2	1.4

Checked	*X.CAO*
Approved	*D.WANG-MUNSON*

REPORT NUMBER: RAB01126 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%)	: 96.6	X 132.9 DEGREES
FIELD ANGLE (10%)	: 151.8	X 202.2 DEGREES

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CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0
0.0	792	792	792	792	792
5.0	786	787	791	793	792
10.0	774	776	778	782	782
15.0	754	756	761	775	783
20.0	728	729	751	779	792
25.0	690	696	740	776	788
30.0	643	659	724	755	763
35.0	586	616	690	718	736
40.0	519	566	640	691	712
45.0	445	507	586	652	665
50.0	371	437	535	599	612
55.0	291	366	481	540	552
60.0	221	294	424	469	484
65.0	163	229	359	405	418
70.0	118	173	290	336	347
75.0	84	128	229	274	283
80.0	58	94	181	225	238
85.0	36	68	143	190	203
90.0	17	48	114	154	165
95.0	14	35	87	117	124
100.0	11	23	59	81	86
105.0	9	13	38	54	59
110.0	8	8	24	37	42
115.0	7	6	14	24	28
120.0	5	5	5	15	18
125.0	4	4	3	6	9
130.0	3	3	2	2	2
135.0	2	2	2	1	1
140.0	2	1	1	1	1
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	1	1	1
165.0	1	1	1	0	0
170.0	1	1	0	0	0
175.0	1	1	0	0	0
180.0	1	1	1	1	1

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ZONAL LUMEN SUMMARY

0- 5	19.
5- 10	56.
10- 15	92.
15- 20	125.
20- 25	157.
25- 30	183.
30- 35	203.
35- 40	217.
40- 45	223.
45- 50	220.
50- 55	211.
55- 60	193.
60- 65	171.
65- 70	146.
70- 75	120.
75- 80	97.
80- 85	79.
85- 90	63.
90- 95	49.
95-100	35.
100-105	23.
105-110	15.
110-115	10.
115-120	6.
120-125	3.
125-130	1.
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	19
5- 10	56
10- 15	92
15- 20	125
20- 25	157
25- 30	183
30- 35	203
35- 40	217
40- 45	223
45- 50	220
50- 55	211
55- 60	193
60- 65	171
65- 70	146
70- 75	120
75- 80	97
80- 85	79
85- 90	63
90- 95	49
95-100	35
100-105	23
105-110	15
110-115	10
115-120	6
120-125	3
125-130	1
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	75
0- 20	292
0- 30	632
0- 40	1052
0- 50	1495
0- 60	1899
0- 70	2217
0- 80	2434
0- 90	2577
0-100	2661
0-110	2699
0-120	2715
0-130	2720
0-140	2721
0-150	2722
0-160	2722
0-170	2722
0-180	2722

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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	102	102	102	97	97	97	95
1	106	100	96	91	103	98	93	89	92	89	85	87	85	82	83	81	78	76
2	96	87	79	73	93	84	78	72	80	74	69	76	71	67	72	68	65	62
3	87	76	67	60	84	74	66	59	70	63	58	67	61	56	63	58	54	52
4	80	67	58	51	77	65	57	50	62	55	49	59	53	48	56	51	46	44
5	73	60	50	43	70	58	49	43	55	48	42	53	46	41	50	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	39	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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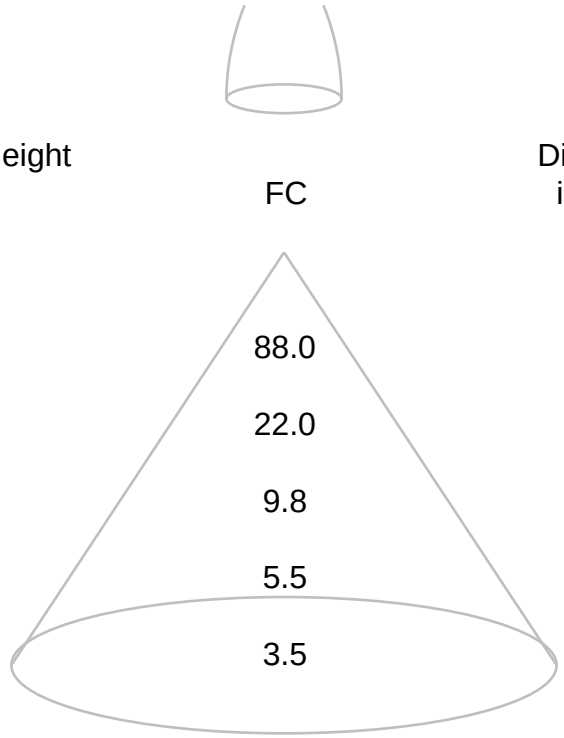
DATE SAMPLE TESTED: 09/08/15

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	88.0	4.0
6.0	22.0	7.9
9.0	9.8	11.9
12.0	5.5	15.9
15.0	3.5	19.9

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

RAB LIGHTING

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REPORT NUMBER: RAB01125
DATE: 9/8/2015
PREPARED FOR: RAB LIGHTING INC.
CATALOG NUMBER: SHARK2-25NW/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

RAB LIGHTING

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REPORT NUMBER: RAB01125
DATE: 9/8/2015
PREPARED FOR: RAB LIGHTING INC.
CATALOG NUMBER: SHARK2-25NW/D10 (STANDARD DISTRIBUTION)

RESULTS:

PHOTOMETRIC	
Total Integrated Flux (lumens)	2722 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.3849
Chromaticity Ordinate y	0.3827
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2256
Chromaticity Ordinate v'	0.5048
Correlated Color Temp CCT (K)	3926
ANSI C78.377-2008 Duv	0.001
Total Radiant Flux (milliWatts)	7956 *
ELECTRICAL	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.214
Input Power (Watts)	25.3
Input Power Factor (%)	98.5
Input Current THD (%)	8.7
Input Voltage THD (%)	0.2
EFFICACY (Lumens/Watt)	107.6
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.099
Input Power (Watts)	25.8
Input Power Factor (%)	94.1
Input Current THD (%)	12.2
Input Voltage THD (%)	0.2
Off-State Power (Watts)	0.0

COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	73
R1 Light greyish red	70
R2 Dark greyish yellow	78
R3 Strong yellowish green	83
R4 Moderate yellowish green	72
R5 Light bluish green	69
R6 Light blue	69
R7 Light violet	83
R8 Light reddish purple	56
R9 Strong red	-20
R10 Strong yellow	47
R11 Strong green	67
R12 Strong blue	39
R13 Light yellowish pink (skin)	71
R14 Moderate olive green (leaf)	90

*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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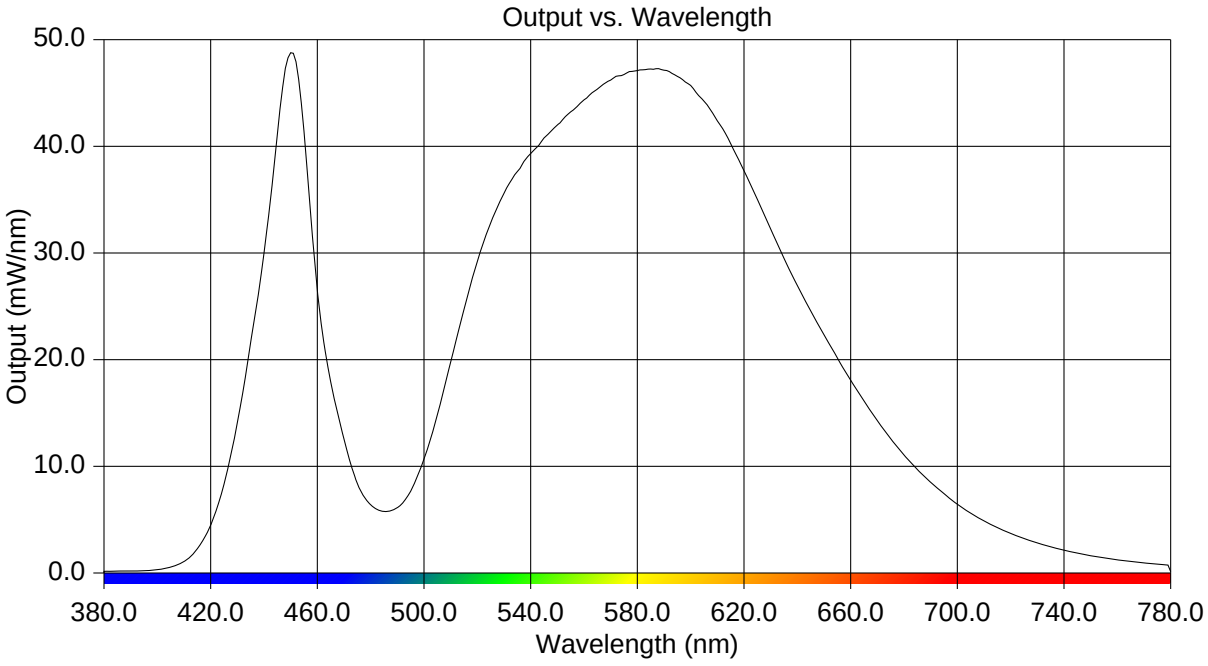
PREPARED FOR: RAB LIGHTING INC.
CATALOG NUMBER: SHARK2-25NW/D10 (STANDARD DISTRIBUTION)

RESULTS:

Wavelength	mW per nm	Wavelength	mW per nm	Wavelength	mW per nm
380	0.153	515	24.744	650	22.327
385	0.171	520	29.192	655	20.168
390	0.184	525	32.840	660	18.082
395	0.218	530	35.595	665	16.116
400	0.316	535	37.635	670	14.292
405	0.540	540	39.316	675	12.579
410	1.080	545	40.782	680	11.066
415	2.274	550	42.013	685	9.694
420	4.489	555	43.230	690	8.507
425	8.317	560	44.335	695	7.443
430	14.099	565	45.377	700	6.437
435	21.601	570	46.209	705	5.598
440	29.983	575	46.731	710	4.869
445	41.150	580	47.102	715	4.256
450	48.776	585	47.249	720	3.715
455	41.404	590	47.137	725	3.252
460	26.550	595	46.561	730	2.816
465	17.936	600	45.710	735	2.446
470	12.547	605	44.236	740	2.127
475	8.430	610	42.388	745	1.857
480	6.372	615	40.254	750	1.625
485	5.779	620	37.719	755	1.420
490	6.129	625	35.063	760	1.242
495	7.663	630	32.254	765	1.087
500	10.673	635	29.503	770	0.947
505	14.837	640	26.982	775	0.835
510	19.740	645	24.541	780	0.126



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CIE Chromaticity Diagram