RAB LIGHTING

NVLAP LAB CODE: 201058-0

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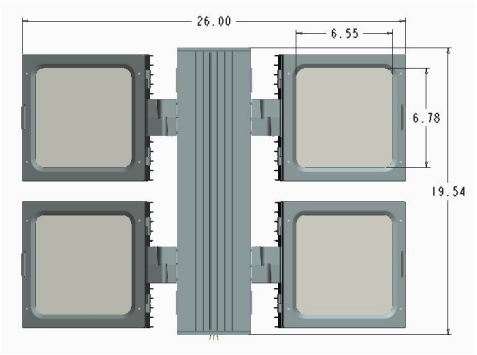
REPORT NUMBER: RAB00723 PAGE: 1 OF 9
ISSUE DATE: 03/03/15
PREPARED FOR: RAB LIGHTING INC.
CATALOG NUMBER: FALCORA230W
LUMINAIRE: ONE LUMINAIRE CONSISTING OF TWO PAIRS OF HEADS. EACH PAIR MOUNTED IN OPPOSING DIRECTIONS, EACH LIGHT HEAD CONSISTING OF: CAST FINNED METAL HOUSING,MOLDED PLASTIC REFLECTOR WITH SPECULAR FINISH, ONE CIRCUIT BOARD WITH 24 LEDS, CLEAR FLAT PRISMATIC GLASS LENS.
(SEE PAGE 2 FOR MORE INFORMATION)



CANDELA DISTRIBUTION

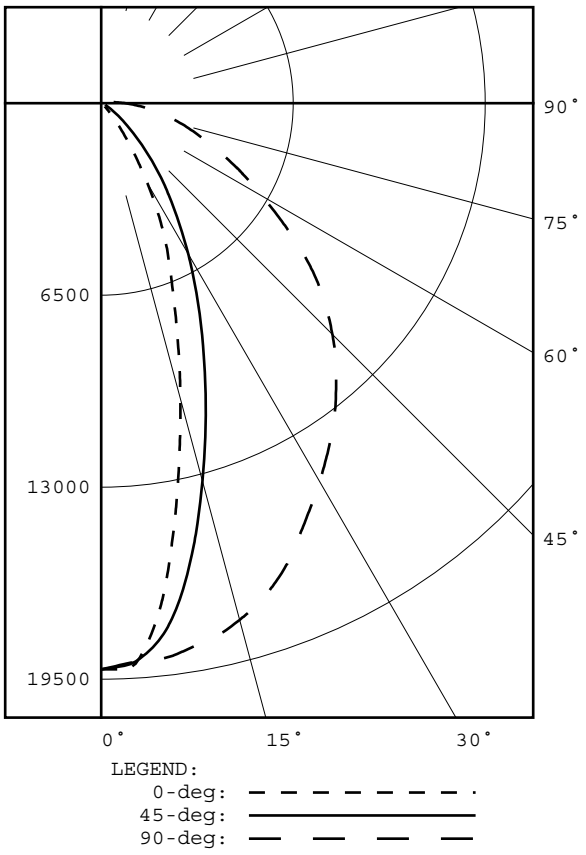
	0.0	22.5	45.0	67.5	90.0	FLUX
0	19166	19166	19166	19166	19166	
5	18287	18340	18612	18881	18953	1708
15	10362	11131	13241	16672	18109	3852
25	5141	5769	7893	12474	16008	4214
35	1581	2231	4229	8518	13625	3557
45	259	488	1829	5504	11069	2631
55	127	154	600	3244	7935	1806
65	79	95	180	1567	4969	1096
75	40	51	83	640	2912	605
85	10	18	42	286	1385	291
90	0	10	25	170	811	
95	0	3	10	77	382	82
105	0	3	0	0	0	3
115	0	3	0	0	0	1
125	0	3	0	0	0	1
135	0	4	2	0	0	1
145	2	6	5	1	0	2
155	4	8	5	0	0	2
165	6	10	5	0	0	1
175	8	12	7	0	0	1
180	6	6	6	6	6	

ZONAL LUMEN SUMMARY

ZONE	LUMENS	%FIXT
0- 30	9774	49.2
0- 40	13331	67.1
0- 60	17768	89.5
0- 90	19759	99.5
90-120	86	0.4
90-130	86	0.4
90-150	89	0.5
90-180	93	0.5
0-180	19852	100.0

TOTAL INPUT WATTS = 234.7
EFFICACY = 84.6 Lm/W
CIE TYPE - DIRECT

PLANE	: 0-DEG	90-DEG
SPACING CRITERIA	: 0.5	1.2



Checked	X.CAO
Approved	D.WANG-MUNSON

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ADDITIONAL INFORMATION

LAMP: NINTY-SIX WHITE MULTI-CHIP LIGHT EMITTING DIODES (LEDS), TILTED 15-DEGREES FROM VERTICAL BASE-UP POSITION.
NOTE: DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED.
TOTAL INPUT WATTS =234.72 AT 120.0 VAC.
LED DRIVER: RD-144-Q0700-R + RD-075-A1400
TEST PROCEDURE: IESNA LM-79-08
ACCREDITED LABORATORY CODE 201058-0

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PLANE	: 0-DEG	90-DEG
BEAM ANGLE (50%)	: 32.3 X	100.2 DEGREES
FIELD ANGLE (10%)	: 67.5 X	162.6 DEGREES

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PLANE	: 0-DEG	90-DEG
LUMINOUS LENGTH	:19.540	26.000

LUMINANCE DATA IN CANDELA/SQ METER

ANGLE IN DEG	AVERAGE 0-DEG	AVERAGE 45-DEG	AVERAGE 90-DEG
45	1117.	7889.	47742.
55	675.	3190.	42192.
65	570.	1299.	35859.
75	471.	978.	34314.
85	350.	1470.	48465.

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CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0
0.0	19166	19166	19166	19166	19166
5.0	18287	18340	18612	18881	18953
10.0	14339	14942	16429	18057	18630
15.0	10362	11131	13241	16672	18109
20.0	7251	8012	10332	14688	17258
25.0	5141	5769	7893	12474	16008
30.0	3118	3918	5888	10382	14792
35.0	1581	2231	4229	8518	13625
40.0	687	1137	2930	6936	12371
45.0	259	488	1829	5504	11069
50.0	163	228	1061	4261	9629
55.0	127	154	600	3244	7935
60.0	101	121	328	2328	6292
65.0	79	95	180	1567	4969
70.0	59	72	117	1002	3826
75.0	40	51	83	640	2912
80.0	23	33	58	436	2111
85.0	10	18	42	286	1385
90.0	0	10	25	170	811
95.0	0	3	10	77	382
100.0	0	3	0	11	87
105.0	0	3	0	0	0
110.0	0	3	0	0	0
115.0	0	3	0	0	0
120.0	0	3	0	0	0
125.0	0	3	0	0	0
130.0	0	3	1	0	0
135.0	0	4	2	0	0
140.0	1	5	4	1	0
145.0	2	6	5	1	0
150.0	2	7	5	0	0
155.0	4	8	5	0	0
160.0	5	9	5	0	0
165.0	6	10	5	0	0
170.0	8	11	6	0	0
175.0	8	12	7	0	0
180.0	6	6	6	6	6

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ZONAL LUMEN SUMMARY

0- 5	452.
5- 10	1256.
10- 15	1790.
15- 20	2062.
20- 25	2138.
25- 30	2075.
30- 35	1893.
35- 40	1664.
40- 45	1429.
45- 50	1203.
50- 55	1000.
55- 60	805.
60- 65	624.
65- 70	472.
70- 75	349.
75- 80	256.
80- 85	178.
85- 90	112.
90- 95	60.
95-100	22.
100-105	3.
105-110	0.
110-115	0.
115-120	0.
120-125	0.
125-130	0.
130-135	1.
135-140	1.
140-145	1.
145-150	1.
150-155	1.
155-160	1.
160-165	1.
165-170	1.
170-175	0.
175-180	0.

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5-DEGREE ZONAL LUMEN SUMMARY

0- 5	452
5- 10	1256
10- 15	1790
15- 20	2062
20- 25	2138
25- 30	2075
30- 35	1893
35- 40	1664
40- 45	1429
45- 50	1203
50- 55	1000
55- 60	805
60- 65	624
65- 70	472
70- 75	349
75- 80	256
80- 85	178
85- 90	112
90- 95	60
95-100	22
100-105	3
105-110	0
110-115	0
115-120	0
120-125	0
125-130	0
130-135	1
135-140	1
140-145	1
145-150	1
150-155	1
155-160	1
160-165	1
165-170	1
170-175	0
175-180	0

10-DEGREE ZONAL LUMEN SUMMARY

0- 10	1708
0- 20	5560
0- 30	9774
0- 40	13331
0- 50	15962
0- 60	17768
0- 70	18864
0- 80	19469
0- 90	19759
0-100	19841
0-110	19844
0-120	19845
0-130	19846
0-140	19847
0-150	19849
0-160	19850
0-170	19852
0-180	19852

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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	119	119	119	119	116	116	116	116	111	111	111	106	106	106	102	102	102	100
1	111	107	104	101	108	105	102	99	101	98	96	97	95	93	93	92	90	88
2	103	97	91	87	101	95	90	86	92	87	84	88	85	82	85	83	80	78
3	96	88	81	76	94	86	80	76	84	78	74	81	77	73	78	75	72	70
4	90	80	73	68	88	79	72	67	77	71	66	74	70	66	72	68	65	63
5	84	74	66	61	82	73	66	61	71	65	60	69	64	59	67	63	59	57
6	79	68	61	55	77	67	60	55	66	59	55	64	59	54	63	58	54	52
7	75	63	56	51	73	62	56	51	61	55	50	60	54	50	58	53	50	48
8	70	59	52	47	69	58	51	47	57	51	46	56	50	46	55	50	46	44
9	67	55	48	43	65	55	48	43	53	47	43	52	47	43	52	46	43	41
10	63	52	45	40	62	51	45	40	50	44	40	49	44	40	49	44	40	38

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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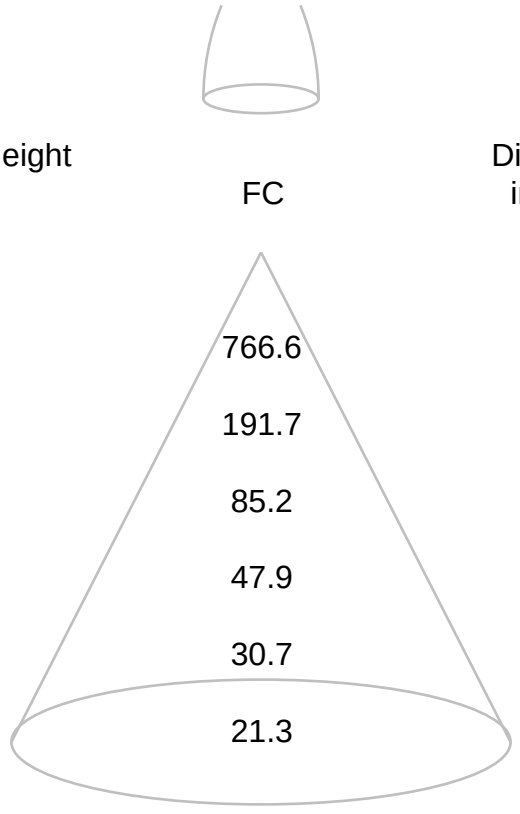
CONE OF LIGHT DIAGRAM

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



Mounting Height in feet	FC	Diameter in feet
5.0	766.6	3.6
10.0	191.7	7.2
15.0	85.2	10.7
20.0	47.9	14.3
25.0	30.7	17.9
30.0	21.3	21.5

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

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DATE: 3/6/2015
PREPARED FOR: RAB LIGHTING INC.
CATALOG NUMBER: FALCORA230W

ADDRESS: 170 LUDLOW AVE, NORTHVALE, NJ 07647

LUMINAIRE: ONE LUMINAIRE CONSISTING OF TWO PAIRS OF HEADS. EACH PAIR MOUNTED IN OPPOSING DIRECTIONS, EACH LIGHT HEAD CONSISTING OF: CAST FINNED METAL HOUSING,MOLDED PLASTIC REFLECTOR WITH SPECULAR FINISH, ONE CIRCUIT BOARD WITH 24 LEDS, CLEAR FLAT PRISMATIC GLASS LENS.

LAMP: NINTY-SIX WHITE MULTI-CHIP LIGHT EMITTING DIODES (LEDS), TILTED 15-DEGREES FROM VERTICAL BASE-UP POSITION.

DRIVER: RD-144-Q0700-R + RD-075-A1400

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	3/14/15
	OCEAN OPTICS QE65PRO Spectroradiometer	2/5/16
	RAB 2.0 meter Diameter Integrating Sphere, 4PI Geometry	2/5/16

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 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)	19852 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.3507
Chromaticity Ordinate y	0.3609
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2116
Chromaticity Ordinate v'	0.4900
Correlated Color Temp CCT (K)	4829
ANSI C78.377-2008 Duv	0.002
Total Radiant Flux (milliWatts)	59993 *
ELECTRICAL	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	1.96
Input Power (Watts)	235.0
Input Power Factor (%)	99.9
Input Current THD (%)	4.3
Input Voltage THD (%)	0.2
EFFICACY (Lumens/Watt)	84.5
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.874
Input Power (Watts)	230.3
Input Power Factor (%)	95.1
Input Current THD (%)	9.0
Input Voltage THD (%)	0.2
Off-State Power (Watts)	0.0

COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	70
R1 Light greyish red	69
R2 Dark greyish yellow	73
R3 Strong yellowish green	76
R4 Moderate yellowish green	72
R5 Light bluish green	70
R6 Light blue	65
R7 Light violet	78
R8 Light reddish purple	59
R9 Strong red	-22
R10 Strong yellow	37
R11 Strong green	71
R12 Strong blue	43
R13 Light yellowish pink (skin)	69
R14 Moderate olive green (leaf)	86

*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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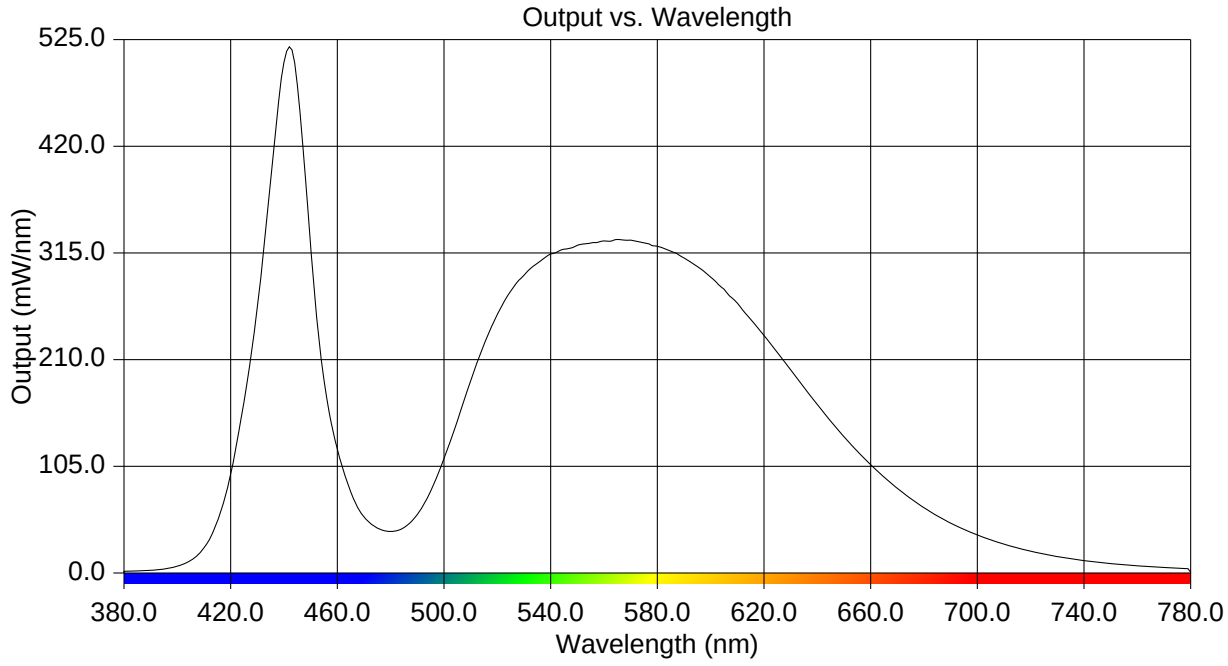
RESULTS:

Wavelength	mW per nm	Wavelength	mW per nm	Wavelength	mW per nm
380	1.587	515	224.723	650	134.262
385	1.973	520	254.859	655	119.734
390	2.615	525	277.397	660	106.712
395	3.995	530	293.108	665	94.519
400	6.591	535	304.804	670	83.325
405	12.315	540	314.043	675	73.212
410	24.848	545	318.739	680	64.255
415	50.660	550	322.558	685	56.273
420	97.346	555	325.021	690	49.109
425	168.432	560	326.888	695	42.926
430	260.229	565	328.331	700	37.480
435	387.067	570	327.685	705	32.597
440	502.937	575	324.885	710	28.286
445	480.430	580	321.643	715	24.713
450	321.890	585	316.885	720	21.469
455	189.835	590	310.113	725	18.630
460	121.935	595	301.572	730	16.167
465	80.028	600	291.236	735	14.040
470	55.027	605	279.447	740	12.242
475	44.287	610	265.666	745	10.650
480	40.888	615	249.845	750	9.327
485	44.718	620	234.230	755	8.074
490	57.679	625	216.944	760	7.041
495	80.605	630	199.761	765	6.150
500	112.730	635	182.389	770	5.384
505	149.589	640	165.827	775	4.744
510	189.463	645	149.745	780	0.720



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CIE Chromaticity Diagram