RAB LIGHTING

NVLAP LAB CODE: 201058-0

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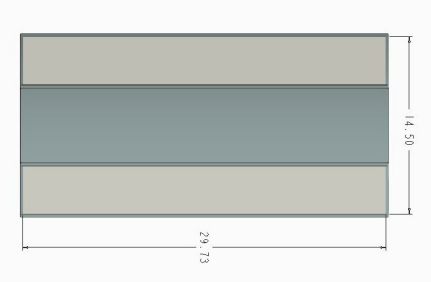
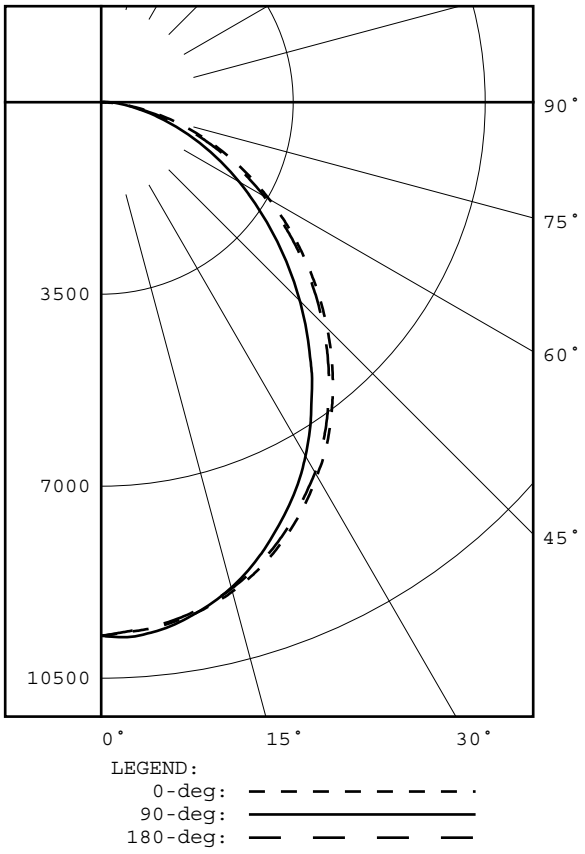
REPORT NUMBER: RAB00833 PAGE: 1 OF 8
ISSUE DATE: 05/05/15 DATE SAMPLE TESTED: 05/05/15
PREPARED FOR: RAB LIGHTING INC.
CATALOG NUMBER: RAIL185W
LUMINAIRE: EXTRUDED METAL HOUSING WITH HEAT SINK FINS, SIX WHITE CIRCUIT BOARD WITH NINETY SIX LEDS ON EACH BOARD, METAL REFLECTOR WITH SPECULAR FINISH, FLAT TRANSLUCENT LENS WITH FROSTED SIDE IN.
LAMPS: FIVE HUNDRED AND SEVENTY SIX LEDS
NOTE: DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED.
TOTAL INPUT WATTS = 183.41 AT 120.0 VAC.
TEST PROCEDURE: IESNA LM-79-08
(SEE PAGE 2 FOR MORE INFORMATION)



CANDELA DISTRIBUTION

	0.0	45.0	90.0	135.0	180.0	FLUX
0	9728	9728	9728	9728	9728	
5	9642	9679	9722	9667	9622	918
15	9237	9200	9162	9168	9181	2587
25	8413	8276	8107	8204	8334	3791
35	7261	6972	6682	6913	7155	4336
45	5826	5449	5120	5391	5718	4185
55	4297	3931	3596	3847	4187	3486
65	2800	2507	2253	2435	2698	2460
75	1425	1256	1108	1188	1327	1311
85	297	340	367	307	233	379
90	17	113	151	94	2	
95	0	4	23	2	1	25
105	2	2	3	3	3	3
115	3	3	3	3	3	3
125	3	3	4	4	3	3
135	5	5	5	5	5	4
145	6	6	7	7	7	4
155	7	7	8	8	8	4
165	7	8	9	8	8	2
175	8	9	10	9	8	1
180	9	9	9	9	9	



ZONAL LUMEN SUMMARY

ZONE	LUMENS	%FIXT
0- 30	7296	31.0
0- 40	11632	49.5
0- 60	19303	82.1
0- 90	23454	99.8
90-120	31	0.1
90-130	34	0.1
90-150	42	0.2
90-180	49	0.2
0-180	23503	100.0

TOTAL INPUT WATTS = 183.4
EFFICACY = 128.2 Lm/W
CIE TYPE - DIRECT

PLANE	0-DEG	90-DEG	180-DEG
SPACING CRITERIA	1.2	1.1	1.2

Checked	X.CAO
Approved	D.WANG-MUNSON

REPORT NUMBER: RAB00833 PAGE: 2 OF 8
ISSUE DATE: 05/05/15 DATE SAMPLE TESTED: 05/05/15
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ADDITIONAL INFORMATION

TEST DISTANCE: 28.25 FEET
DRIVER:2 X RD-085-A1750
LM-80 DATA AVAILABLE FROM MANUFACTURER FOR SOLID STATE SOURCE
ACCREDITED LABORATORY CODE 201058-0

REPORT NUMBER: RAB00833 PAGE: 3 OF 8
ISSUE DATE: 05/05/15 DATE SAMPLE TESTED: 05/05/15
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PLANE	: 0-DEG	90-DEG
BEAM ANGLE (50%)	: 101.7 X	93.0 DEGREES
FIELD ANGLE (10%)	: 156.4 X	152.8 DEGREES

REPORT NUMBER: RAB00833 PAGE: 4 OF 8
ISSUE DATE: 05/05/15 DATE SAMPLE TESTED: 05/05/15
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CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0	112.5	135.0	157.5	180.0
0.0	9728	9728	9728	9728	9728	9728	9728	9728	9728
5.0	9642	9662	9679	9708	9722	9705	9667	9642	9622
10.0	9491	9498	9505	9512	9504	9498	9482	9463	9454
15.0	9237	9226	9200	9182	9162	9158	9168	9175	9181
20.0	8875	8865	8784	8717	8679	8693	8737	8790	8807
25.0	8413	8384	8276	8156	8107	8125	8204	8294	8334
30.0	7864	7816	7663	7506	7448	7460	7582	7713	7797
35.0	7261	7163	6972	6770	6682	6737	6913	7072	7155
40.0	6568	6452	6226	6002	5897	5959	6167	6355	6454
45.0	5826	5701	5449	5214	5120	5166	5391	5598	5718
50.0	5061	4932	4671	4430	4340	4380	4609	4826	4956
55.0	4297	4164	3931	3677	3596	3630	3847	4061	4187
60.0	3538	3430	3202	2970	2903	2926	3121	3310	3430
65.0	2800	2713	2507	2312	2253	2271	2435	2595	2698
70.0	2097	2027	1857	1713	1647	1660	1789	1914	1994
75.0	1425	1374	1256	1142	1108	1106	1188	1270	1327
80.0	804	782	728	684	663	657	669	692	716
85.0	297	311	340	363	367	348	307	248	233
90.0	17	58	113	146	151	134	94	36	2
95.0	0	1	4	19	23	14	2	1	1
100.0	1	1	2	2	3	3	2	2	2
105.0	2	2	2	3	3	3	3	3	3
110.0	2	2	3	3	3	3	3	3	3
115.0	3	2	3	3	3	3	3	3	3
120.0	3	3	3	3	3	3	3	3	3
125.0	3	3	3	3	4	3	4	4	3
130.0	4	4	4	4	5	5	4	4	5
135.0	5	5	5	5	5	5	5	5	5
140.0	5	5	6	6	6	6	6	6	6
145.0	6	6	6	7	7	7	7	7	7
150.0	6	7	7	7	7	7	7	7	7
155.0	7	7	7	8	8	8	8	8	8
160.0	7	7	8	8	8	8	8	8	8
165.0	7	7	8	8	9	9	8	8	8
170.0	8	8	8	9	9	9	9	8	8
175.0	8	8	9	10	10	10	9	9	8
180.0	9	9	9	9	9	9	9	9	9

REPORT NUMBER: RAB00833 PAGE: 5 OF 8
ISSUE DATE: 05/05/15 DATE SAMPLE TESTED: 05/05/15
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ZONAL LUMEN SUMMARY

0- 5	232.
5- 10	686.
10- 15	1108.
15- 20	1479.
20- 25	1783.
25- 30	2008.
30- 35	2145.
35- 40	2191.
40- 45	2151.
45- 50	2034.
50- 55	1856.
55- 60	1630.
60- 65	1371.
65- 70	1090.
70- 75	798.
75- 80	514.
80- 85	272.
85- 90	107.
90- 95	23.
95-100	2.
100-105	1.
105-110	1.
110-115	1.
115-120	1.
120-125	1.
125-130	2.
130-135	2.
135-140	2.
140-145	2.
145-150	2.
150-155	2.
155-160	2.
160-165	1.
165-170	1.
170-175	1.
175-180	0.

REPORT NUMBER: RAB00833 PAGE: 6 OF 8
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5-DEGREE ZONAL LUMEN SUMMARY

0- 5	232
5- 10	686
10- 15	1108
15- 20	1479
20- 25	1783
25- 30	2008
30- 35	2145
35- 40	2191
40- 45	2151
45- 50	2034
50- 55	1856
55- 60	1630
60- 65	1371
65- 70	1090
70- 75	798
75- 80	514
80- 85	272
85- 90	107
90- 95	23
95-100	2
100-105	1
105-110	1
110-115	1
115-120	1
120-125	1
125-130	2
130-135	2
135-140	2
140-145	2
145-150	2
150-155	2
155-160	2
160-165	1
165-170	1
170-175	1
175-180	0

10-DEGREE ZONAL LUMEN SUMMARY

0- 10	918
0- 20	3505
0- 30	7296
0- 40	11632
0- 50	15817
0- 60	19303
0- 70	21764
0- 80	23075
0- 90	23454
0-100	23479
0-110	23482
0-120	23485
0-130	23488
0-140	23492
0-150	23496
0-160	23500
0-170	23502
0-180	23503

REPORT NUMBER: RAB00833 PAGE: 7 OF 8
ISSUE DATE: 05/05/15 DATE SAMPLE TESTED: 05/05/15

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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	109	105	101	97	107	102	99	95	98	95	92	94	92	90	91	89	87	85
2	100	92	86	80	97	90	84	79	87	82	77	83	79	75	80	77	74	72
3	91	81	74	67	89	80	73	67	77	71	66	74	69	64	72	67	63	61
4	84	73	64	58	82	71	63	57	69	62	56	66	60	56	64	59	55	53
5	78	65	56	50	75	64	56	50	62	55	49	60	54	49	58	53	48	46
6	72	59	50	44	70	58	50	44	56	49	43	54	48	43	53	47	43	41
7	67	54	45	39	65	53	45	39	51	44	39	50	43	38	48	43	38	36
8	62	49	41	35	61	48	40	35	47	40	35	46	39	35	45	39	34	32
9	58	45	37	32	57	45	37	32	43	36	31	42	36	31	41	35	31	29
10	55	42	34	29	53	41	34	29	40	33	29	39	33	29	38	33	28	27

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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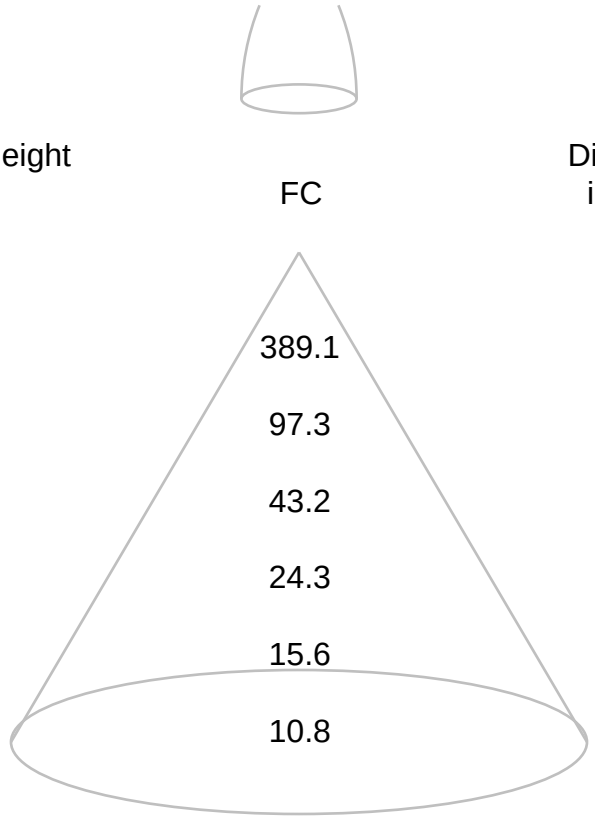
DATE SAMPLE TESTED: 05/05/15

CONE OF LIGHT DIAGRAM

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



Mounting Height in feet	FC	Diameter in feet
5.0	389.1	5.9
10.0	97.3	11.7
15.0	43.2	17.6
20.0	24.3	23.5
25.0	15.6	29.3
30.0	10.8	35.2

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: RAB00836
DATE: 5/18/2015
PREPARED FOR: RAB LIGHTING INC.
CATALOG NUMBER: RAIL185W

ADDRESS: 170 LUDLOW AVE, NORTHVALE, NJ 07647

LUMINAIRE: EXTRUDED METAL HOUSING WITH HEAT SINK FINS, SIX WHITE CIRCUIT BOARD WITH NINETY SIX LEDS ON EACH BOARD, METAL REFLECTOR WITH SPECULAR FINISH, FLAT TRANSLUCENT LENS WITH FROSTED SIDE IN.

LAMP: FIVE HUNDRED AND SEVENTY SIX LIGHT EMITTING DIODES (LEDS)

DRIVER: 2 X RD-085-A1750

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	5/15/16
RAB 2.0 meter Diameter Integrating Sphere, 4PI Geometry	5/15/16

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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RESULTS:

PHOTOMETRIC	
Total Integrated Flux (lumens)	23503 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.3455
Chromaticity Ordinate y	0.3544
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2106
Chromaticity Ordinate v'	0.4861
Correlated Color Temp CCT (K)	4995
ANSI C78.377-2008 Duv	0.001
Total Radiant Flux (milliWatts)	70850 *
ELECTRICAL	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	1.53
Input Power (Watts)	183.4
Input Power Factor (%)	99.6
Input Current THD (%)	4.8
Input Voltage THD (%)	0.2
EFFICACY (Lumens/Watt)	128.2
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.679
Input Power (Watts)	178.9
Input Power Factor (%)	95.1
Input Current THD (%)	11.3
Input Voltage THD (%)	0.2
Off-State Power (Watts)	0.0

COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	75
R1 Light greyish red	72
R2 Dark greyish yellow	79
R3 Strong yellowish green	83
R4 Moderate yellowish green	75
R5 Light bluish green	73
R6 Light blue	71
R7 Light violet	83
R8 Light reddish purple	61
R9 Strong red	-17
R10 Strong yellow	49
R11 Strong green	72
R12 Strong blue	43
R13 Light yellowish pink (skin)	73
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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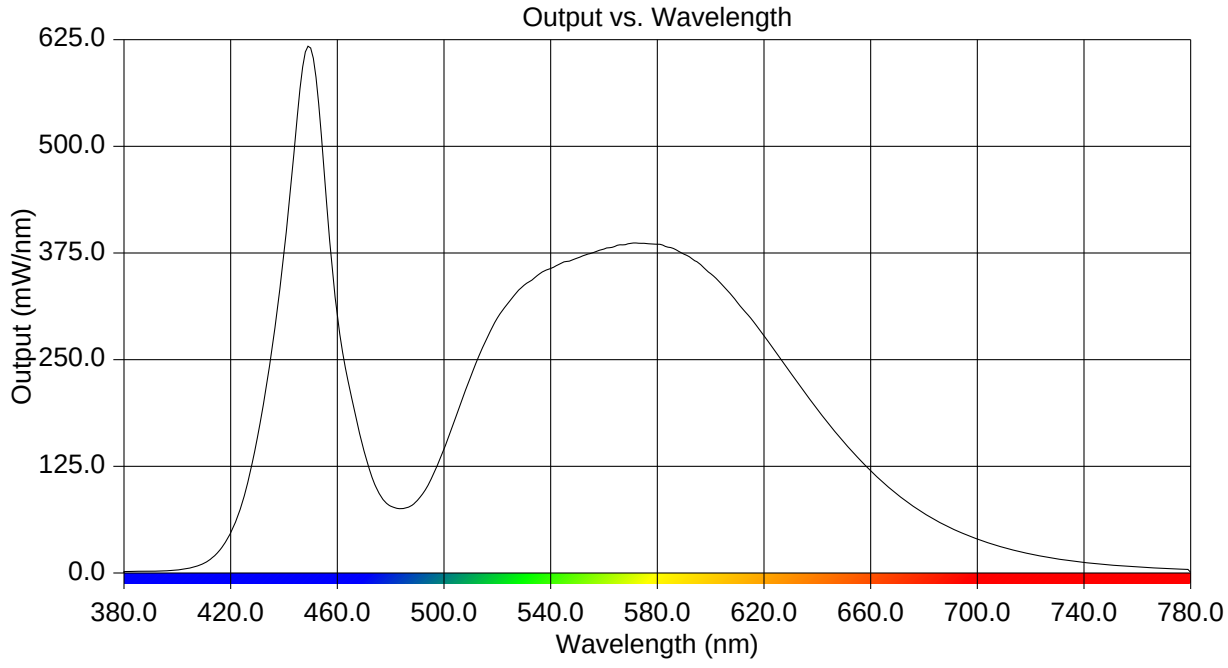
RESULTS:

Wavelength	mW per nm	Wavelength	mW per nm	Wavelength	mW per nm
380	1.562	515	267.836	650	153.256
385	1.837	520	298.793	655	135.863
390	2.039	525	319.946	660	119.962
395	2.539	530	337.164	665	105.206
400	3.621	535	348.634	670	92.019
405	5.907	540	356.777	675	80.305
410	11.362	545	364.618	680	69.900
415	23.471	550	369.083	685	60.728
420	47.066	555	374.365	690	52.818
425	89.134	560	379.631	695	45.897
430	158.340	565	384.049	700	39.751
435	252.896	570	386.277	705	34.312
440	375.799	575	386.372	710	29.731
445	535.609	580	385.371	715	25.616
450	615.245	585	381.381	720	22.181
455	472.888	590	373.615	725	19.149
460	301.608	595	364.467	730	16.558
465	210.753	600	350.788	735	14.356
470	143.099	605	335.650	740	12.423
475	97.355	610	317.080	745	10.777
480	78.334	615	298.775	750	9.409
485	75.790	620	277.890	755	8.089
490	85.009	625	256.659	760	6.998
495	108.914	630	234.420	765	6.111
500	145.815	635	212.658	770	5.332
505	187.595	640	191.920	775	4.638
510	229.943	645	171.879	780	0.709



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CIE Chromaticity Diagram