

REPORT NUMBER: RAB02436

ISSUE DATE: 09/07/16

PREPARED FOR: RAB LIGHTING INC.

CATALOG NUMBER: RAIL95W/D10

LUMINAIRE: EXTRUDED METAL HOUSING WITH HEAT SINK FINS, TWO WHITE CIRCUIT BOARD WITH ONE HUNDRED AND FORTY FOUR LEDS ON EACH BOARD, METAL REFLECTOR WITH SPECULAR FINISH, FLAT TRANSLUCENT LENS WITH FROSTED SIDE IN.

LAMPS: TWO HUNDRED AND EIGHTY EIGHT LIGHT EMITTING DIODES (LEDs).

NOTE: DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED.

TOTAL INPUT WATTS = 92.119 W AT 120.0 VAC.

\*(SEE PAGE 2 FOR MORE INFORMATION)\*

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### CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0	FLUX
0	5350	5350	5350	5350	5350	
5	5341	5334	5327	5316	5317	505
15	5093	5075	5054	5022	5022	1422
25	4577	4549	4499	4438	4428	2068
35	3871	3832	3749	3662	3635	2342
45	3045	2997	2899	2800	2763	2237
55	2218	2162	2071	1975	1937	1856
65	1425	1385	1315	1240	1222	1305
75	691	672	648	609	605	690
85	128	143	185	212	223	211
90	7	29	68	94	105	

### ZONAL LUMEN SUMMARY

ZONE	LUMENS	%FIXT
0- 30	3995	31.6
0- 40	6338	50.1
0- 60	10430	82.5
0- 90	12645	100.0
90-180	0	0.0
0-180	12645	100.0

TOTAL INPUT WATTS = 92.1

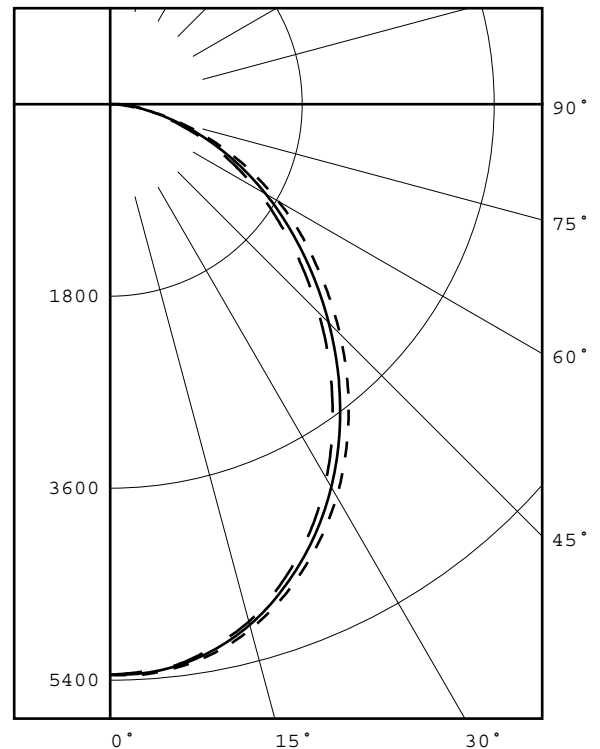
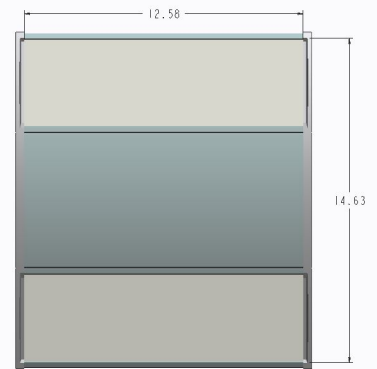
EFFICACY = 137.3 Lm/W

CIE TYPE - DIRECT

PLANE	: 0-DEG	90-DEG
SPACING CRITERIA	: 1.2	1.1
PLANE	: 0-DEG	90-DEG
LUMINOUS LENGTH	: 14.630	12.580
HEIGHT OF SIDE	: 0.520	0.520

### LUMINANCE DATA IN CANDELA/SQ METER

ANGLE IN DEG	AVERAGE 0-DEG	AVERAGE 45-DEG	AVERAGE 90-DEG
45	35009.	33238.	31590.
55	30982.	28816.	26846.
65	26376.	24201.	22361.
75	19844.	18434.	17049.
85	8792.	12415.	14629.



LEGEND:  
0-deg: - - - - -  
45-deg: \_\_\_\_\_  
90-deg: - - - - -

Checked X.CAO  
Approved D.WANG-MUNSON

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ADDITIONAL INFORMATION

LED DRIVER: RDD-U85-A1750  
ACCREDITED LABORATORY CODE 201058-0  
TEST PROCEDURE: IESNA LM-79-08  
TEST DISTANCE : 28.25 FEET

NOTE: THIS REPORT WITH THE USE OF THE NVLAP LOGO SHALL NOT BE USED BY  
THE CLIENT TO CLAIM PRODUCT CERTIFICATION, APPROVAL, OR  
ENDORSEMENT BY NVLAP, NIST, OR ANY AGENCY OF THE FEDERAL  
GOVERNMENT.

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PLANE : 0-DEG 90-DEG  
BEAM ANGLE (50%) : 98.6 X 92.0 DEGREES  
FIELD ANGLE (10%): 154.8 X 152.8 DEGREES

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### CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0
0.0	5350	5350	5350	5350	5350
2.5	5358	5353	5347	5336	5334
5.0	5341	5334	5327	5316	5317
7.5	5307	5298	5290	5276	5277
10.0	5256	5245	5230	5207	5206
12.5	5184	5171	5151	5121	5120
15.0	5093	5075	5054	5022	5022
17.5	4984	4963	4937	4898	4894
20.0	4862	4840	4802	4755	4749
22.5	4725	4700	4656	4602	4595
25.0	4577	4549	4499	4438	4428
27.5	4418	4387	4329	4259	4247
30.0	4247	4213	4145	4068	4053
32.5	4064	4027	3952	3872	3849
35.0	3871	3832	3749	3662	3635
37.5	3672	3629	3541	3448	3417
40.0	3467	3422	3329	3231	3199
42.5	3257	3211	3115	3013	2981
45.0	3045	2997	2899	2800	2763
47.5	2832	2782	2683	2584	2548
50.0	2622	2571	2471	2374	2337
52.5	2413	2362	2268	2174	2142
55.0	2218	2162	2071	1975	1937
57.5	2023	1967	1879	1785	1756
60.0	1820	1773	1685	1597	1577
62.5	1620	1577	1498	1414	1395
65.0	1425	1385	1315	1240	1222
67.5	1233	1197	1140	1069	1056
70.0	1045	1015	968	906	896
72.5	865	840	803	752	738
75.0	691	672	648	609	605
77.5	529	515	505	482	483
80.0	381	374	378	374	378
82.5	242	246	270	283	291
85.0	128	143	185	212	223
87.5	47	72	121	148	160
90.0	7	29	68	94	105

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## ZONAL LUMEN SUMMARY

0- 5	128.
5- 10	378.
10- 15	610.
15- 20	812.
20- 25	975.
25- 30	1093.
30- 35	1162.
35- 40	1180.
40- 45	1152.
45- 50	1085.
50- 55	987.
55- 60	868.
60- 65	729.
65- 70	576.
70- 75	419.
75- 80	271.
80- 85	148.
85- 90	63.

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### 5-DEGREE ZONAL LUMEN SUMMARY

0- 5	128
5- 10	378
10- 15	610
15- 20	812
20- 25	975
25- 30	1093
30- 35	1162
35- 40	1180
40- 45	1152
45- 50	1085
50- 55	987
55- 60	868
60- 65	729
65- 70	576
70- 75	419
75- 80	271
80- 85	148
85- 90	63
90- 95	8
95-100	0
100-105	0
105-110	0
110-115	0
115-120	0
120-125	0
125-130	0
130-135	0
135-140	0
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	505
0- 20	1927
0- 30	3995
0- 40	6338
0- 50	8575
0- 60	10430
0- 70	11736
0- 80	12425
0- 90	12636
0-100	12645
0-110	12645
0-120	12645
0-130	12645
0-140	12645
0-150	12645
0-160	12645
0-170	12645
0-180	12645

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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	103	99	96	98	95	93	94	92	90	91	89	87	85
2	100	92	86	80	97	90	84	79	87	82	77	84	79	76	81	77	74	72
3	92	82	74	68	89	80	73	67	77	71	66	74	69	65	72	67	64	61
4	84	73	64	58	82	71	64	58	69	62	57	67	61	56	65	59	55	53
5	78	65	57	50	76	64	56	50	62	55	50	60	54	49	58	53	48	46
6	72	59	51	44	70	58	50	44	56	49	44	55	48	43	53	47	43	41
7	67	54	45	39	65	53	45	39	52	44	39	50	44	39	49	43	38	37
8	62	49	41	35	61	49	41	35	47	40	35	46	40	35	45	39	35	33
9	58	45	37	32	57	45	37	32	44	37	32	43	36	32	42	36	31	30
10	55	42	34	29	54	42	34	29	41	34	29	40	33	29	39	33	29	27

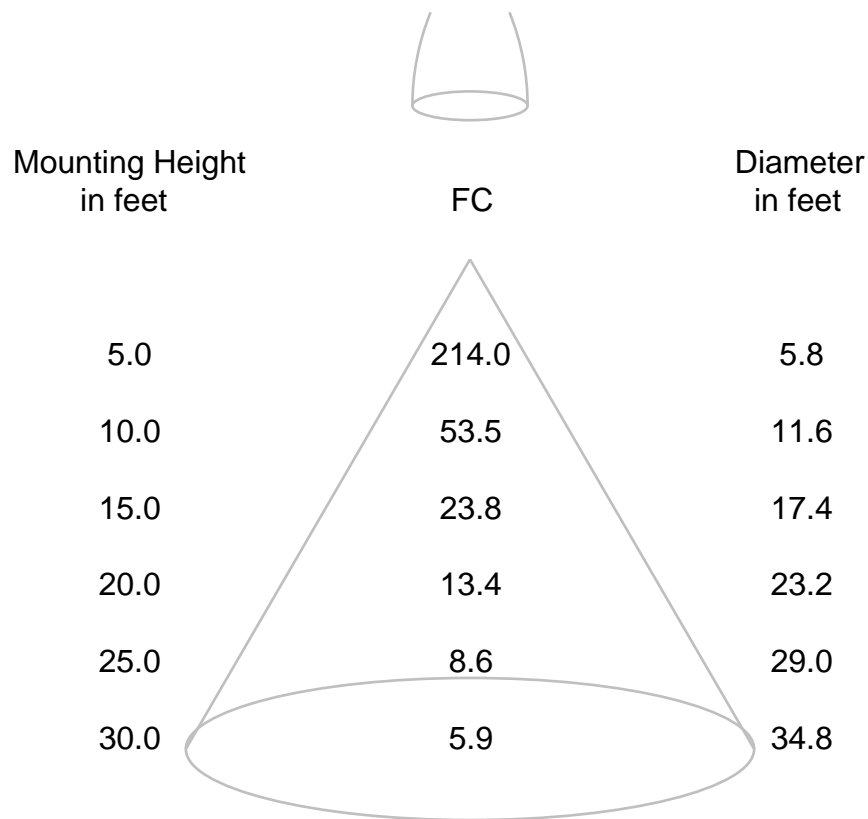
ALL CANDELA, LUMENS, LUMINANCE, AND VCP VALUES IN THIS REPORT ARE BASED ON ABSOLUTE PHOTOMETRY. THE COEFFICIENT OF UTILIZATION VALUES ARE BASED ON THE TOTAL ABSOLUTE LUMEN OUTPUT OF THIS LUMINAIRE SAMPLE.

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## 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.



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 DATE: 9/13/2016  
 PREPARED FOR: RAB LIGHTING INC.  
 CATALOG NUMBER: RAIL95W/D10

ADDRESS: 170 LUDLOW AVE, NORTHVALE, NJ 07647

LUMINAIRE: EXTRUDED METAL HOUSING WITH HEAT SINK FINS, TWO WHITE CIRCUIT BOARD WITH ONE HUNDRED AND FORTY FOUR LEDS ON EACH BOARD, METAL REFLECTOR WITH SPECULAR FINISH, FLAT TRANSLUCENT LENS WITH FROSTED SIDE IN.

LAMP: TWO HUNDRED AND EIGHTY EIGHT LIGHT EMITTING DIODES (LEDs).

DRIVER: RDD-U85-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:	GWINSTEK PROGRAMMABLE AC POWER SOURCE APS-7100	Calibration Due: N/A
	CHROMA PROGRAMMABLE DIGITAL POWER METER MODEL 66202	2/26/17
	OCEAN OPTICS QE65PRO Spectroradiometer	8/11/17
	RAB 2.0 meter Diameter Integrating Sphere, 4PI Geometry	8/11/17

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	<u>X.CAO</u>
Approved	<u>D.WANG-MUNSON</u> Lighting Engineer

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### RESULTS:

PHOTOMETRIC	
Total Integrated Flux (lumens)	12645 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.3400
Chromaticity Ordinate y	0.3467
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2099
Chromaticity Ordinate v'	0.4815
Correlated Color Temp CCT (K)	5187
ANSI C78.377-2008 Duv	0.000
Total Radiant Flux (milliWatts)	38483 *
ELECTRICAL	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.769
Input Power (Watts)	92.1
Input Power Factor (%)	99.8
Input Current THD (%)	5.6
Input Voltage THD (%)	0.2
EFFICACY (Lumens/Watt)	
	137.3
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.351
Input Power (Watts)	90.1
Input Power Factor (%)	92.6
Input Current THD (%)	9.8
Input Voltage THD (%)	0.2
Off-State Power (Watts)	0.0

COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	78
R1 Light greyish red	75
R2 Dark greyish yellow	84
R3 Strong yellowish green	89
R4 Moderate yellowish green	77
R5 Light bluish green	77
R6 Light blue	77
R7 Light violet	83
R8 Light reddish purple	60
R9 Strong red	-17
R10 Strong yellow	61
R11 Strong green	76
R12 Strong blue	53
R13 Light yellowish pink (skin)	77
R14 Moderate olive green (leaf)	94

### \*NOTE:

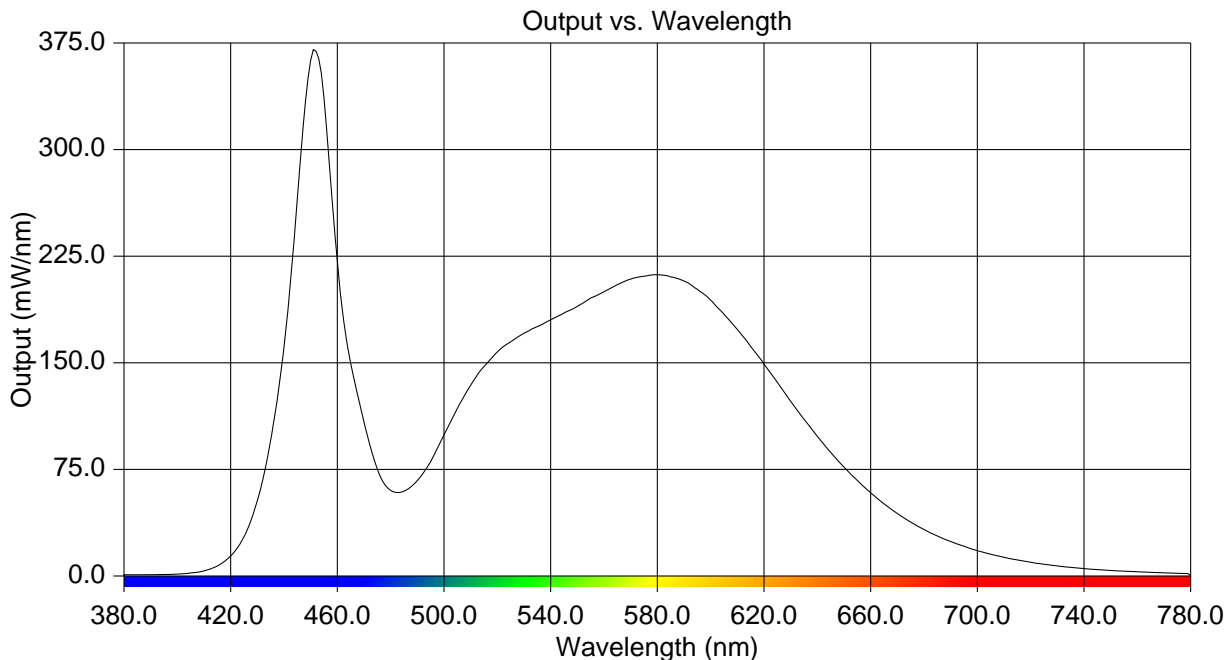
Proper calibration of integrating spheres for measuring total flux output of non-directional samples will produce reliable, repeatable results within the calibration tolerances of the equipment used. However, measurement of test samples with significant self absorption and/or directional output, even 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	0.820	515	147.226	650	76.646
385	0.878	520	157.685	655	67.165
390	0.896	525	164.708	660	58.635
395	1.028	530	170.682	665	50.674
400	1.333	535	175.373	670	44.023
405	2.043	540	180.076	675	37.964
410	3.548	545	184.872	680	32.634
415	7.021	550	189.606	685	28.160
420	14.137	555	195.452	690	24.198
425	27.511	560	199.871	695	20.946
430	52.779	565	204.919	700	17.881
435	95.378	570	208.683	705	15.242
440	161.044	575	210.792	710	13.045
445	265.458	580	211.916	715	11.174
450	362.643	585	210.294	720	9.593
455	336.143	590	207.463	725	8.248
460	220.779	595	201.607	730	7.094
465	149.575	600	194.010	735	6.083
470	108.155	605	184.165	740	5.216
475	75.227	610	173.434	745	4.529
480	60.191	615	161.384	750	3.888
485	59.762	620	148.989	755	3.331
490	66.866	625	136.073	760	2.886
495	80.438	630	122.809	765	2.479
500	99.312	635	110.230	770	2.147
505	117.421	640	98.102	775	1.884
510	134.337	645	86.732	780	0.286



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## CIE Chromaticity Diagram

