

REPORT NUMBER: RAB02454

ISSUE DATE: 09/13/16

PREPARED FOR: RAB LIGHTING INC.

CATALOG NUMBER: RAIL95YNW/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 = 92.109 W AT 120.0 VAC.

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

PAGE: 1 OF 8  
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### CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0	
0	4804	4804	4804	4804	4804	
5	4791	4786	4780	4770	4770	453
15	4569	4555	4532	4511	4501	1276
25	4110	4081	4033	3986	3971	1856
35	3476	3437	3364	3288	3260	2102
45	2736	2687	2600	2508	2477	2006
55	1981	1934	1854	1764	1743	1659
65	1270	1232	1171	1111	1083	1163
75	618	597	575	546	537	615
85	112	128	166	197	204	191
90	5	27	62	88	98	

### FLUX

### ZONAL LUMEN SUMMARY

ZONE	LUMENS	%FIXT
0- 30	3585	31.6
0- 40	5687	50.2
0- 60	9353	82.5
0- 90	11330	100.0
90-180	0	0.0
0-180	11330	100.0

TOTAL INPUT WATTS = 92.1

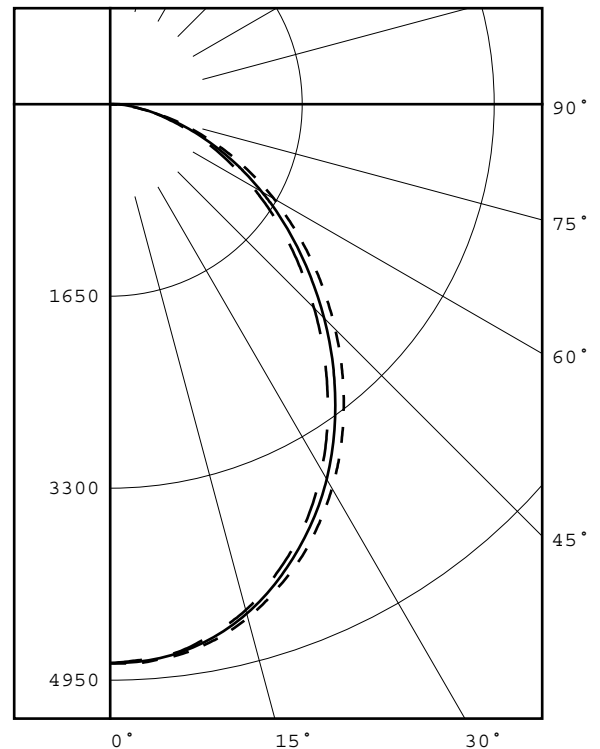
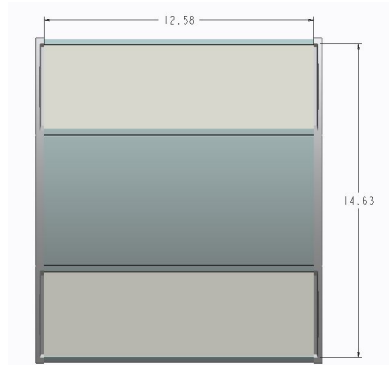
EFFICACY = 123.0 Lm/W

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	31457.	29810.	28320.
55	27672.	25796.	24157.
65	23507.	21551.	19817.
75	17748.	16357.	15133.
85	7693.	11140.	13383.



#### 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%) : 98.7 X 91.9 DEGREES  
FIELD ANGLE (10%): 154.7 X 152.6 DEGREES

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### CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0
0.0	4804	4804	4804	4804	4804
2.5	4809	4804	4799	4789	4787
5.0	4791	4786	4780	4770	4770
7.5	4763	4754	4745	4734	4734
10.0	4715	4705	4692	4676	4668
12.5	4651	4640	4620	4599	4590
15.0	4569	4555	4532	4511	4501
17.5	4471	4457	4429	4400	4385
20.0	4360	4342	4307	4272	4253
22.5	4245	4217	4176	4135	4121
25.0	4110	4081	4033	3986	3971
27.5	3966	3936	3885	3827	3808
30.0	3813	3780	3720	3656	3633
32.5	3649	3613	3547	3476	3451
35.0	3476	3437	3364	3288	3260
37.5	3296	3254	3176	3095	3065
40.0	3113	3067	2986	2900	2868
42.5	2925	2879	2795	2704	2673
45.0	2736	2687	2600	2508	2477
47.5	2545	2495	2407	2316	2283
50.0	2356	2305	2217	2128	2102
52.5	2167	2118	2034	1943	1918
55.0	1981	1934	1854	1764	1743
57.5	1797	1755	1678	1590	1572
60.0	1624	1576	1504	1420	1402
62.5	1444	1405	1335	1273	1237
65.0	1270	1232	1171	1111	1083
67.5	1099	1064	1011	959	936
70.0	925	902	858	810	794
72.5	765	745	711	676	660
75.0	618	597	575	546	537
77.5	472	462	452	439	431
80.0	337	337	335	337	338
82.5	214	222	239	260	265
85.0	112	128	166	197	204
87.5	40	66	110	140	148
90.0	5	27	62	88	98

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ZONAL LUMEN SUMMARY

0- 5	115.
5- 10	339.
10- 15	547.
15- 20	729.
20- 25	875.
25- 30	981.
30- 35	1043.
35- 40	1059.
40- 45	1034.
45- 50	973.
50- 55	885.
55- 60	775.
60- 65	650.
65- 70	513.
70- 75	373.
75- 80	242.
80- 85	133.
85- 90	58.

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### 5-DEGREE ZONAL LUMEN SUMMARY

0- 5	115
5- 10	339
10- 15	547
15- 20	729
20- 25	875
25- 30	981
30- 35	1043
35- 40	1059
40- 45	1034
45- 50	973
50- 55	885
55- 60	775
60- 65	650
65- 70	513
70- 75	373
75- 80	242
80- 85	133
85- 90	58
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	453
0- 20	1729
0- 30	3585
0- 40	5687
0- 50	7694
0- 60	9353
0- 70	10516
0- 80	11131
0- 90	11323
0-100	11330
0-110	11330
0-120	11330
0-130	11330
0-140	11330
0-150	11330
0-160	11330
0-170	11330
0-180	11330

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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	78	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	49	46
6	72	59	51	44	70	58	50	44	56	49	44	55	48	43	53	48	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

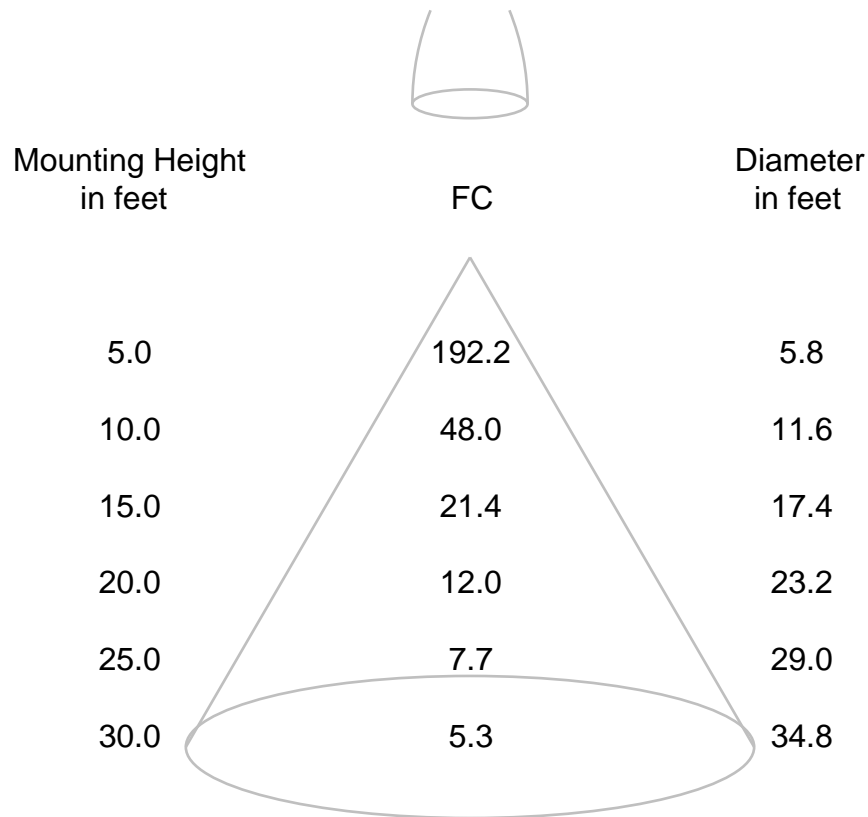
ALL CANDELA, LUMENS, LUMINANCE, AND VCP VALUES IN THIS REPORT ARE BASED ON ABSOLUTE PHOTOMETRY. THE COEFFICIENT OF UTILIZATION VALUES ARE BASED ON THE TOTAL ABSOLUTE LUMEN OUTPUT OF THIS LUMINAIRE SAMPLE.

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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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 CATALOG NUMBER: RAIL95YNW/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)	11330 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.4042
Chromaticity Ordinate y	0.3895
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2355
Chromaticity Ordinate v'	0.5106
Correlated Color Temp CCT (K)	3514
ANSI C78.377-2008 Duv	0.000
Total Radiant Flux (milliWatts)	34540 *
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 (%)	5.4
Input Voltage THD (%)	0.2
EFFICACY (Lumens/Watt)	
	123.0
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.349
Input Power (Watts)	90.1
Input Power Factor (%)	93.1
Input Current THD (%)	9.4
Input Voltage THD (%)	0.2
Off-State Power (Watts)	
	0.0

COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	82
R1 Light greyish red	80
R2 Dark greyish yellow	88
R3 Strong yellowish green	94
R4 Moderate yellowish green	81
R5 Light bluish green	80
R6 Light blue	84
R7 Light violet	85
R8 Light reddish purple	63
R9 Strong red	10
R10 Strong yellow	73
R11 Strong green	79
R12 Strong blue	62
R13 Light yellowish pink (skin)	82
R14 Moderate olive green (leaf)	97

### \*NOTE:

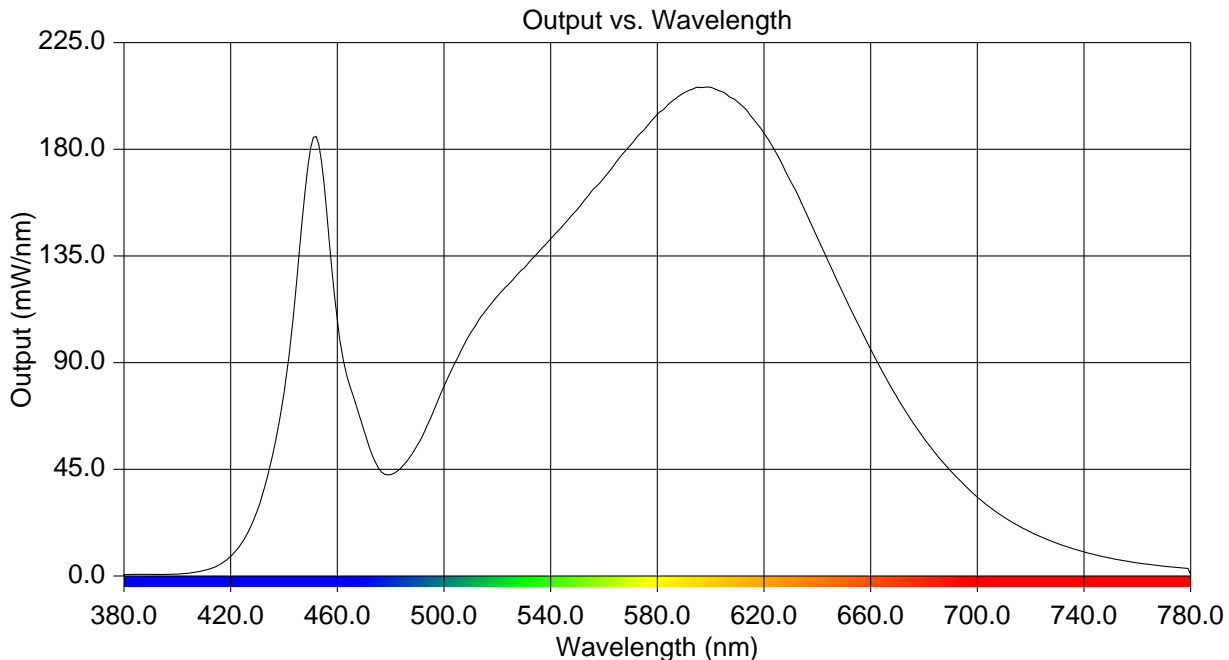
Proper calibration of integrating spheres for measuring total flux output of non-directional samples will produce reliable, repeatable results within the calibration tolerances of the equipment used. However, measurement of test samples with significant self absorption and/or directional output, even 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	0.595	515	110.970	650	118.503
385	0.609	520	118.060	655	106.864
390	0.649	525	123.897	660	95.696
395	0.703	530	129.863	665	84.995
400	0.887	535	136.090	670	75.086
405	1.270	540	142.153	675	66.186
410	2.223	545	148.365	680	58.157
415	4.254	550	154.588	685	50.880
420	8.264	555	161.816	690	44.214
425	15.383	560	167.989	695	38.576
430	27.590	565	175.216	700	33.331
435	47.384	570	181.758	705	28.853
440	77.113	575	188.141	710	24.847
445	127.327	580	194.758	715	21.406
450	180.632	585	199.894	720	18.472
455	165.874	590	203.865	725	15.897
460	107.731	595	206.238	730	13.749
465	79.139	600	206.137	735	11.783
470	61.350	605	203.941	740	10.099
475	46.464	610	200.097	745	8.734
480	42.765	615	194.075	750	7.514
485	47.066	620	186.818	755	6.444
490	55.087	625	177.575	760	5.558
495	66.627	630	166.413	765	4.775
500	80.160	635	155.042	770	4.132
505	91.762	640	142.723	775	3.593
510	102.526	645	130.383	780	0.540



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## CIE Chromaticity Diagram

