

REPORT NUMBER: RAB02463

ISSUE DATE: 09/14/16

PREPARED FOR: RAB LIGHTING INC.

CATALOG NUMBER: RAIL95YNW/480/D10 (ALSO APPLIES TO 347/RCL)

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.

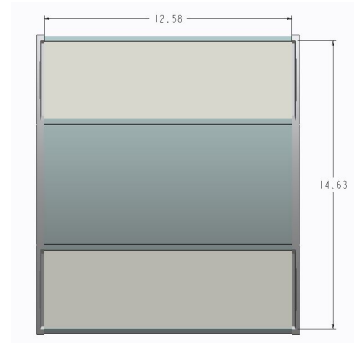
TOTAL INPUT WATTS = 93.56 W AT 347.0 VAC.

LED DRIVER: RDD-096-A3600-240C

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.



### CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0
0	4802	4802	4802	4802	4802
5	4792	4787	4780	4771	4768
15	4567	4555	4531	4506	4502
25	4102	4082	4032	3982	3967
35	3476	3441	3362	3294	3255
45	2736	2701	2601	2522	2482
55	1991	1953	1854	1782	1741
65	1273	1245	1171	1119	1087
75	608	607	572	553	537
85	111	131	166	198	203
90	3	27	61	89	96

### FLUX

453
1275
1855
2102
2012
1668
1169
618
191

### ZONAL LUMEN SUMMARY

ZONE	LUMENS	%FIXT
0- 30	3583	31.6
0- 40	5686	50.1
0- 60	9365	82.5
0- 90	11352	100.0
90-180	0	0.0
0-180	11352	100.0

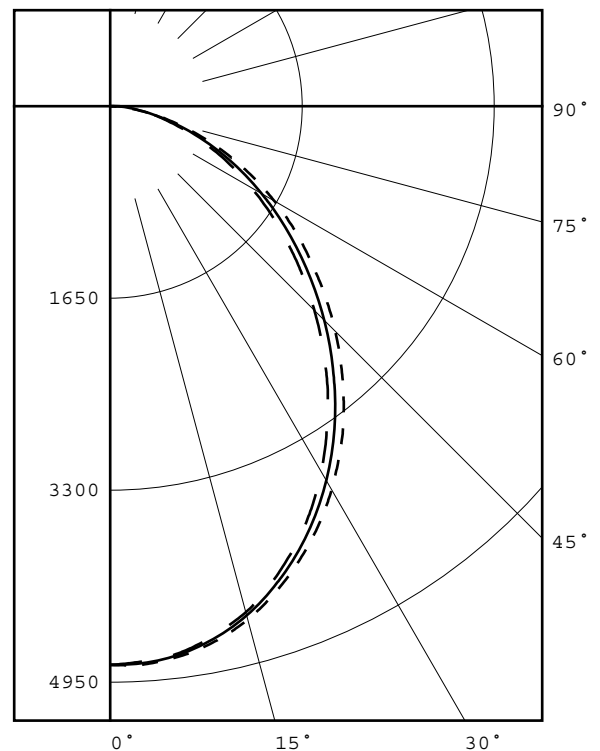
TOTAL INPUT WATTS = 93.6

EFFICACY = 121.3 Lm/W

CIE TYPE - DIRECT

PLANE : 0-DEG 90-DEG

SPACING CRITERIA : 1.2 1.1



#### LEGEND:

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

Checked X.CAO

Approved D.WANG-MUNSON

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PLANE : 0-DEG 90-DEG  
BEAM ANGLE (50%) : 98.7 X 92.0 DEGREES  
FIELD ANGLE (10%): 154.6 X 152.7 DEGREES

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### CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0
0.0	4802	4802	4802	4802	4802
2.5	4809	4804	4798	4789	4786
5.0	4792	4787	4780	4771	4768
7.5	4761	4754	4744	4734	4730
10.0	4713	4706	4689	4673	4667
12.5	4648	4639	4619	4595	4589
15.0	4567	4555	4531	4506	4502
17.5	4468	4456	4426	4395	4388
20.0	4356	4342	4305	4266	4256
22.5	4233	4216	4174	4129	4117
25.0	4102	4082	4032	3982	3967
27.5	3959	3934	3878	3826	3803
30.0	3805	3778	3713	3655	3628
32.5	3641	3616	3544	3476	3445
35.0	3476	3441	3362	3294	3255
37.5	3296	3259	3174	3102	3070
40.0	3112	3077	2984	2908	2873
42.5	2924	2892	2795	2712	2677
45.0	2736	2701	2601	2522	2482
47.5	2545	2508	2408	2333	2290
50.0	2354	2323	2220	2143	2102
52.5	2165	2135	2034	1958	1918
55.0	1991	1953	1854	1782	1741
57.5	1809	1772	1677	1609	1569
60.0	1628	1593	1504	1440	1403
62.5	1449	1417	1335	1276	1242
65.0	1273	1245	1171	1119	1087
67.5	1101	1076	1011	965	938
70.0	927	914	858	819	797
72.5	764	757	711	681	662
75.0	608	607	572	553	537
77.5	471	471	449	442	432
80.0	336	340	334	342	339
82.5	213	224	239	260	264
85.0	111	131	166	198	203
87.5	39	67	109	140	146
90.0	3	27	61	89	96

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ZONAL LUMEN SUMMARY

0- 5	115.
5- 10	339.
10- 15	547.
15- 20	728.
20- 25	874.
25- 30	980.
30- 35	1042.
35- 40	1060.
40- 45	1036.
45- 50	976.
50- 55	888.
55- 60	780.
60- 65	653.
65- 70	516.
70- 75	375.
75- 80	244.
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	728
20- 25	874
25- 30	980
30- 35	1042
35- 40	1060
40- 45	1036
45- 50	976
50- 55	888
55- 60	780
60- 65	653
65- 70	516
70- 75	375
75- 80	244
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	3583
0- 40	5686
0- 50	7698
0- 60	9365
0- 70	10535
0- 80	11153
0- 90	11344
0-100	11352
0-110	11352
0-120	11352
0-130	11352
0-140	11352
0-150	11352
0-160	11352
0-170	11352
0-180	11352

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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	36
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	41	34	29	41	34	29	40	33	29	39	33	29	27

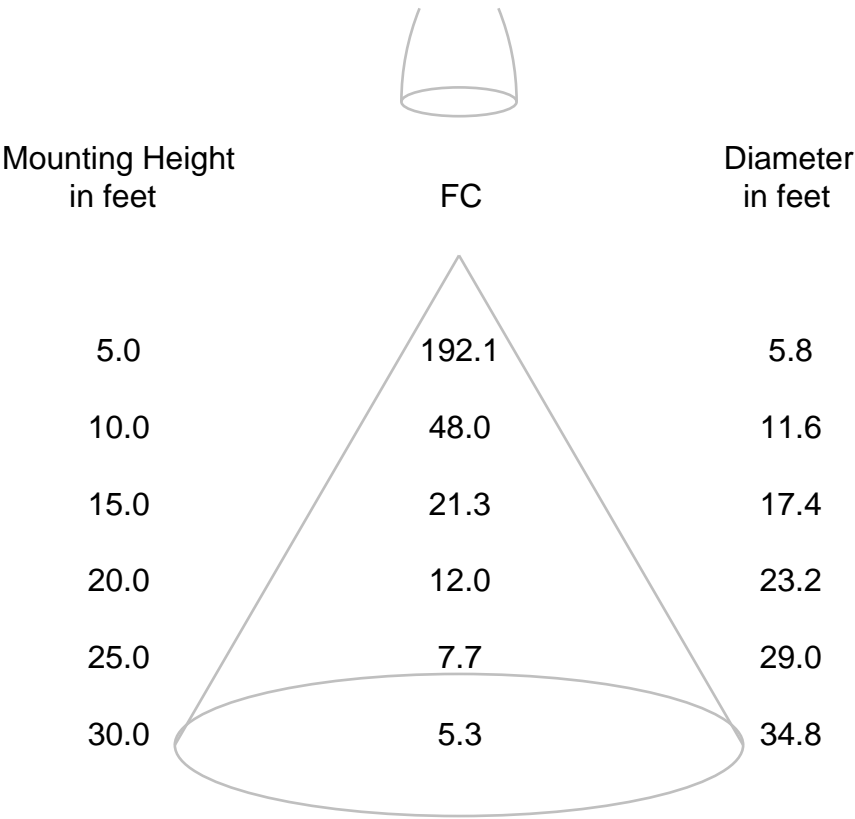
ALL CANDELA, LUMENS, LUMINANCE, AND VCP VALUES IN THIS REPORT ARE  
BASED ON ABSOLUTE PHOTOMETRY. THE COEFFICIENT OF UTILIZATION VALUES  
ARE BASED ON THE TOTAL ABSOLUTE LUMEN OUTPUT OF THIS LUMINAIRE SAMPLE.

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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/480/D10 (ALSO APPLIES TO 347/RCL)

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-096-A3600-240C

OBJECT OF TEST: DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED AT THE RATED INPUT VOLTAGES (347.0 AND 480.0 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 (480.0 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:

<b>PHOTOMETRIC</b>	
Total Integrated Flux (lumens)	11352 *
<b>SPECTRORADIOMETRIC</b>	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.4040
Chromaticity Ordinate y	0.3896
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2353
Chromaticity Ordinate v'	0.5106
Correlated Color Temp CCT (K)	3519
ANSI C78.377-2008 Duv	0.000
Total Radiant Flux (milliWatts)	34585 *
<b>ELECTRICAL</b>	
Input Voltage (Volts AC)	347.0
Input Current (Amps AC)	0.273
Input Power (Watts)	93.6
Input Power Factor (%)	98.8
Input Current THD (%)	12.1
Input Voltage THD (%)	0.2
<b>EFFICACY (Lumens/Watt)</b>	
	121.3
<b>ELECTRICAL AT MAX NONIMAL INPUT</b>	
Input Voltage (Volts AC)	480.0
Input Current (Amps AC)	0.203
Input Power (Watts)	93.4
Input Power Factor (%)	95.7
Input Current THD (%)	13.3
Input Voltage THD (%)	0.2
<b>Off-State Power (Watts)</b>	
	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	72
R11 Strong green	79
R12 Strong blue	62
R13 Light yellowish pink (skin)	82
R14 Moderate olive green (leaf)	97

### \*NOTE:

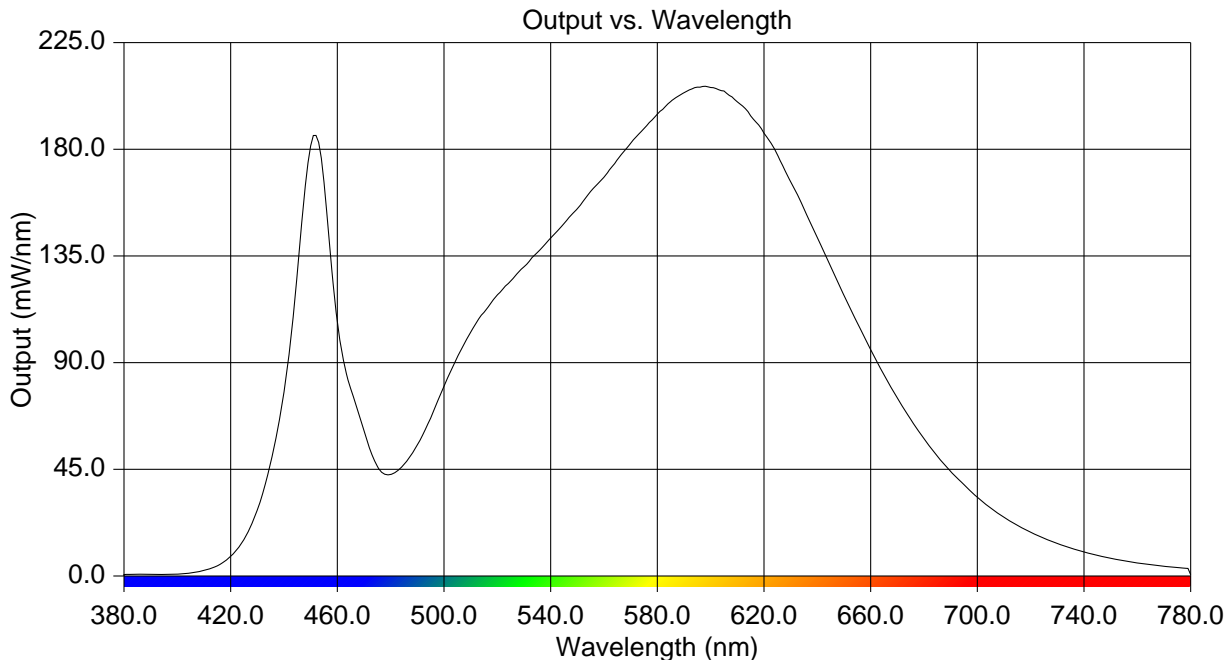
Proper calibration of integrating spheres for measuring total flux output of non-directional samples will produce reliable, repeatable results within the calibration tolerances of the equipment used. However, measurement of test samples with significant self absorption and/or directional output, even 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	0.605	515	111.212	650	118.541
385	0.633	520	118.529	655	106.761
390	0.651	525	124.428	660	95.600
395	0.745	530	130.441	665	84.875
400	0.870	535	136.462	670	75.115
405	1.248	540	142.576	675	66.133
410	2.246	545	148.683	680	57.919
415	4.283	550	154.860	685	50.626
420	8.328	555	162.260	690	44.008
425	15.479	560	168.311	695	38.542
430	27.829	565	175.555	700	33.275
435	47.931	570	182.438	705	28.777
440	77.595	575	188.760	710	24.814
445	127.857	580	194.839	715	21.360
450	181.484	585	200.143	720	18.449
455	166.154	590	203.899	725	15.894
460	107.275	595	206.232	730	13.698
465	79.054	600	206.082	735	11.746
470	61.308	605	204.609	740	10.077
475	46.290	610	200.027	745	8.690
480	42.819	615	194.116	750	7.491
485	47.106	620	186.798	755	6.410
490	55.055	625	177.703	760	5.553
495	66.596	630	166.320	765	4.762
500	80.042	635	154.907	770	4.110
505	92.200	640	142.715	775	3.584
510	102.850	645	130.401	780	0.541



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## CIE Chromaticity Diagram

