

REPORT NUMBER: RAB02453

ISSUE DATE: 09/13/16

PREPARED FOR: RAB LIGHTING INC.

CATALOG NUMBER: RAIL95NW/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 = 91.168 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	5159	5159	5159	5159	5159	
5	5147	5142	5133	5126	5124	487
15	4906	4894	4864	4844	4833	1370
25	4401	4385	4325	4282	4257	1992
35	3727	3691	3604	3533	3493	2255
45	2939	2892	2793	2701	2656	2158
55	2130	2092	1991	1902	1870	1787
65	1355	1332	1257	1193	1164	1252
75	655	648	614	592	575	662
85	116	140	179	212	217	205
90	4	29	66	97	103	

FLUX

ZONAL LUMEN SUMMARY

ZONE	LUMENS	%FIXT
0- 30	3849	31.6
0- 40	6104	50.1
0- 60	10049	82.5
0- 90	12176	100.0
90-180	0	0.0
0-180	12176	100.0

TOTAL INPUT WATTS = 91.2

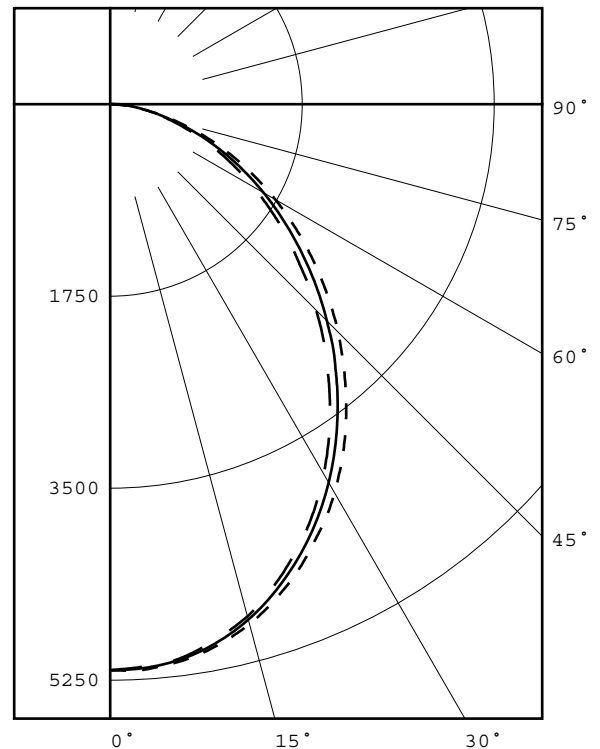
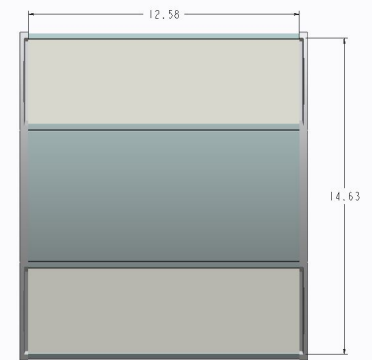
EFFICACY = 133.5 Lm/W

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	33791.	32022.	30367.
55	29753.	27703.	25917.
65	25081.	23133.	21299.
75	18810.	17466.	16204.
85	7968.	12013.	14235.



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%): 154.5 X 152.5 DEGREES

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CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0
0.0	5159	5159	5159	5159	5159
2.5	5166	5161	5154	5145	5142
5.0	5147	5142	5133	5126	5124
7.5	5113	5108	5096	5087	5084
10.0	5061	5055	5037	5021	5012
12.5	4990	4984	4959	4939	4928
15.0	4906	4894	4864	4844	4833
17.5	4801	4786	4750	4725	4709
20.0	4682	4665	4619	4588	4567
22.5	4551	4530	4477	4441	4417
25.0	4401	4385	4325	4282	4257
27.5	4255	4228	4160	4110	4081
30.0	4089	4060	3982	3927	3892
32.5	3912	3880	3795	3734	3696
35.0	3727	3691	3604	3533	3493
37.5	3533	3500	3407	3326	3282
40.0	3335	3300	3202	3116	3069
42.5	3134	3098	3006	2911	2868
45.0	2939	2892	2793	2701	2656
47.5	2733	2686	2591	2498	2459
50.0	2530	2487	2387	2294	2246
52.5	2328	2290	2186	2094	2059
55.0	2130	2092	1991	1902	1870
57.5	1933	1898	1801	1720	1685
60.0	1738	1707	1615	1538	1505
62.5	1544	1518	1433	1367	1331
65.0	1355	1332	1257	1193	1164
67.5	1173	1152	1086	1034	1005
70.0	995	978	921	878	852
72.5	823	810	764	730	709
75.0	655	648	614	592	575
77.5	500	498	480	471	460
80.0	356	362	359	367	363
82.5	224	239	257	280	283
85.0	116	140	179	212	217
87.5	41	71	118	151	157
90.0	4	29	66	97	103

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ZONAL LUMEN SUMMARY

0- 5	123.
5- 10	364.
10- 15	588.
15- 20	782.
20- 25	939.
25- 30	1053.
30- 35	1119.
35- 40	1136.
40- 45	1111.
45- 50	1047.
50- 55	952.
55- 60	835.
60- 65	699.
65- 70	552.
70- 75	402.
75- 80	260.
80- 85	143.
85- 90	62.

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5-DEGREE ZONAL LUMEN SUMMARY

0- 5	123
5- 10	364
10- 15	588
15- 20	782
20- 25	939
25- 30	1053
30- 35	1119
35- 40	1136
40- 45	1111
45- 50	1047
50- 55	952
55- 60	835
60- 65	699
65- 70	552
70- 75	402
75- 80	260
80- 85	143
85- 90	62
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	487
0- 20	1857
0- 30	3849
0- 40	6104
0- 50	8261
0- 60	10049
0- 70	11301
0- 80	11963
0- 90	12168
0-100	12176
0-110	12176
0-120	12176
0-130	12176
0-140	12176
0-150	12176
0-160	12176
0-170	12176
0-180	12176

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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	49	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

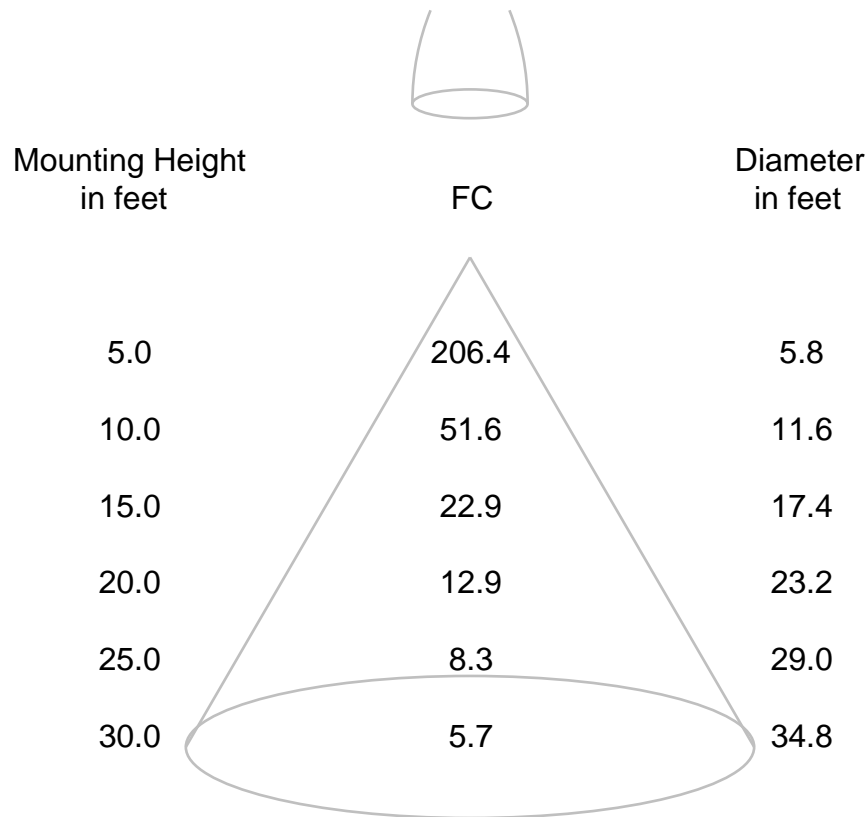
ALL CANDELA, LUMENS, LUMINANCE, AND VCP VALUES IN THIS REPORT ARE BASED ON ABSOLUTE PHOTOMETRY. THE COEFFICIENT OF UTILIZATION VALUES ARE BASED ON THE TOTAL ABSOLUTE LUMEN OUTPUT OF THIS LUMINAIRE SAMPLE.

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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: 9/12/2016
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CATALOG NUMBER: RAIL95NW/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 X.CAO

Approved D.WANG-MUNSON
Lighting Engineer

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RESULTS:

PHOTOMETRIC	
Total Integrated Flux (lumens)	12176 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.3780
Chromaticity Ordinate y	0.3702
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2261
Chromaticity Ordinate v'	0.4983
Correlated Color Temp CCT (K)	4018
ANSI C78.377-2008 Duv	-0.002
Total Radiant Flux (milliWatts)	35885 *
ELECTRICAL	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.761
Input Power (Watts)	91.2
Input Power Factor (%)	99.8
Input Current THD (%)	5.6
Input Voltage THD (%)	0.2
EFFICACY (Lumens/Watt)	
	133.5
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.346
Input Power (Watts)	89.1
Input Power Factor (%)	93.0
Input Current THD (%)	9.7
Input Voltage THD (%)	0.2
Off-State Power (Watts)	0.0

COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	77
R1 Light greyish red	74
R2 Dark greyish yellow	84
R3 Strong yellowish green	92
R4 Moderate yellowish green	75
R5 Light bluish green	75
R6 Light blue	78
R7 Light violet	82
R8 Light reddish purple	55
R9 Strong red	-18
R10 Strong yellow	63
R11 Strong green	72
R12 Strong blue	52
R13 Light yellowish pink (skin)	76
R14 Moderate olive green (leaf)	96

*NOTE:

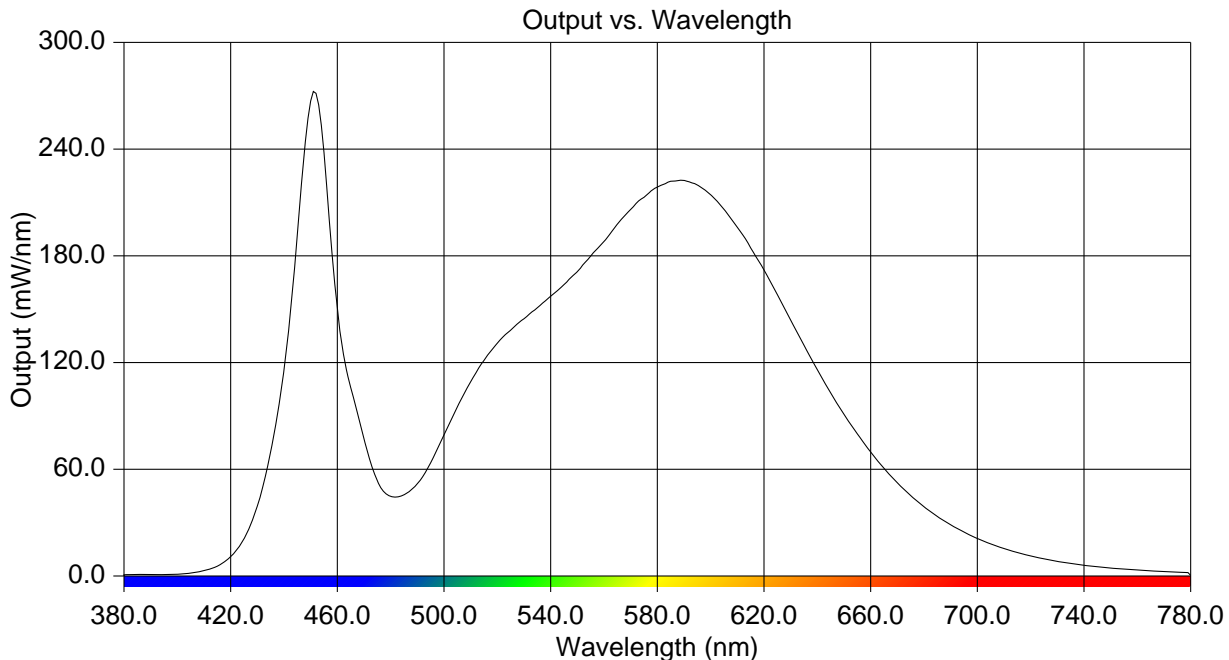
Proper calibration of integrating spheres for measuring total flux output of non-directional samples will produce reliable, repeatable results within the calibration tolerances of the equipment used. However, measurement of test samples with significant self absorption and/or directional output, even 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	0.659	515	121.263	650	91.044
385	0.743	520	131.016	655	79.954
390	0.750	525	138.300	660	69.747
395	0.860	530	144.693	665	60.528
400	1.094	535	150.886	670	52.403
405	1.593	540	157.359	675	45.221
410	2.863	545	163.906	680	39.022
415	5.515	550	171.103	685	33.547
420	10.864	555	179.955	690	28.715
425	20.904	560	188.228	695	24.738
430	39.250	565	197.856	700	21.121
435	69.863	570	206.082	705	18.058
440	115.997	575	213.005	710	15.425
445	192.120	580	218.904	715	13.149
450	267.179	585	222.042	720	11.251
455	238.184	590	222.497	725	9.601
460	150.294	595	220.113	730	8.290
465	106.106	600	214.631	735	7.079
470	77.183	605	206.378	740	6.049
475	53.644	610	196.253	745	5.202
480	44.834	615	184.550	750	4.494
485	45.779	620	172.071	755	3.826
490	51.842	625	158.237	760	3.322
495	63.676	630	143.727	765	2.854
500	79.606	635	129.812	770	2.471
505	94.930	640	115.978	775	2.140
510	109.437	645	102.794	780	0.324



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CIE Chromaticity Diagram

