

REPORT NUMBER: RAB03145

ISSUE DATE: 04/06/17

PAGE: 1 OF 9
DATE SAMPLE TESTED: 04/06/17

CATALOG NUMBER: RAIL225W/D10, RAILP225W/D10 (Standard Distribution)

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

LAMPS: SIX HUNDRED LIGHT EMITTING DIODES (LEDs).

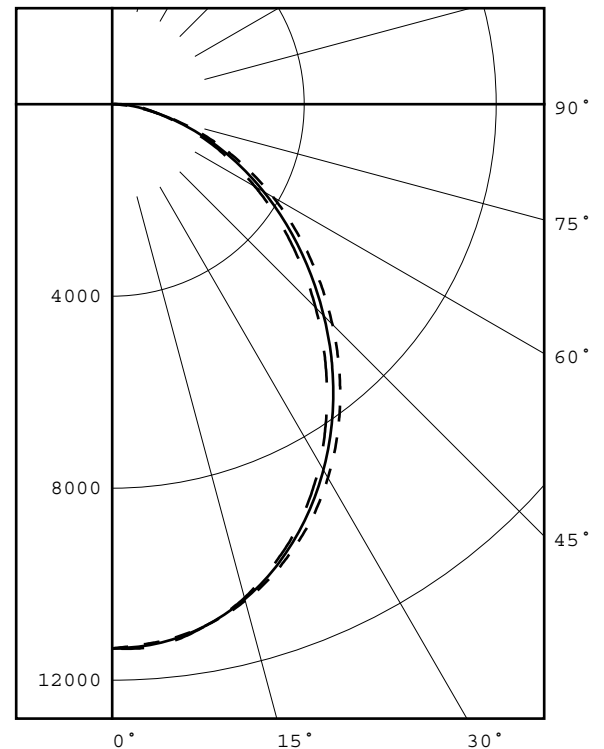
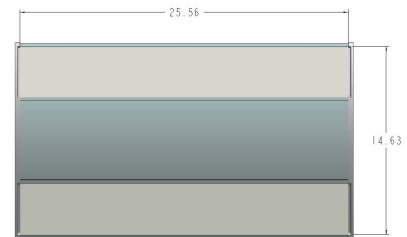
NOTE: THIS REPORT WITH THE USE OF THE NVLAP LOGO SHALL NOT BE USED BY THE CLIENT TO CLAIM PRODUCT CERTIFICATION, APPROVAL, OR ENDORSEMENT BY NVLAP, NIST, OR ANY AGENCY OF THE FEDERAL GOVERNMENT.

(SEE PAGE 2 FOR MORE INFORMATION)

CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0	
0	11338	11338	11338	11338	11338	
5	11240	11253	11265	11293	11305	1069
15	10710	10704	10673	10661	10645	3006
25	9675	9628	9533	9442	9426	4387
35	8216	8137	7999	7842	7790	4995
45	6487	6413	6235	6060	5992	4811
55	4727	4643	4480	4312	4249	4012
65	3036	2978	2845	2724	2669	2829
75	1475	1453	1410	1353	1332	1503
85	255	316	428	497	526	475
90	4	65	166	232	260	
95	1	1	20	52	70	49
105	2	2	3	3	3	3
115	2	2	2	3	3	2
125	3	3	3	3	3	3
135	4	4	4	4	4	3
145	5	5	5	5	5	3
155	6	6	6	6	7	3
165	7	7	7	8	8	2
175	8	8	8	9	10	1
180	9	9	9	9	9	

FLUX



LEGEND:
0-deg: - - - - -
45-deg: _____
90-deg: - - - - -

ZONAL LUMEN SUMMARY

ZONE	LUMENS	%FIXT
0- 30	8462	31.2
0- 40	13457	49.6
0- 60	22281	82.0
0- 90	27088	99.7
90-120	55	0.2
90-130	57	0.2
90-150	63	0.2
90-180	69	0.3
0-180	27156	100.0

TOTAL INPUT WATTS = 199.6

EFFICACY = 136.1 Lm/W

CIE TYPE - DIRECT

PLANE : 0-DEG 90-DEG

SPACING CRITERIA : 1.2 1.1

Checked P. ALBERS
Approved D. WANG-MUNSON

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ADDITIONAL INFORMATION

NOTE: DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED.

TOTAL INPUT WATTS = 199.61 W AT 120.0 VAC.

LED DRIVER: 2 x RDD-096-A2450

TEST PROCEDURE: IESNA LM-79-08

LM-80 DATA AVAILABLE FROM MANUFACTURER FOR SOLID STATE SOURCE

AMBIENT: 24.0

ACCREDITED LABORATORY CODE 201058-0

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PLANE : 0-DEG 90-DEG

BEAM ANGLE (50%) : 99.1 X 93.5 DEGREES

FIELD ANGLE (10%): 154.9 X 153.7 DEGREES

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PLANE : 0-DEG 90-DEG
LUMINOUS LENGTH :25.560 14.630

LUMINANCE DATA IN CANDELA/SQ METER

ANGLE IN DEG	AVERAGE 0-DEG	AVERAGE 45-DEG	AVERAGE 90-DEG
45	38013.	36536.	35112.
55	34148.	32364.	30695.
65	29766.	27894.	26168.
75	23614.	22573.	21324.
85	12123.	20348.	25007.

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CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0
0.0	11338	11338	11338	11338	11338
5.0	11240	11253	11265	11293	11305
10.0	11046	11045	11050	11053	11049
15.0	10710	10704	10673	10661	10645
20.0	10243	10224	10162	10105	10087
25.0	9675	9628	9533	9442	9426
30.0	8988	8927	8795	8673	8650
35.0	8216	8137	7999	7842	7790
40.0	7370	7288	7130	6961	6894
45.0	6487	6413	6235	6060	5992
50.0	5598	5515	5344	5168	5102
55.0	4727	4643	4480	4312	4249
60.0	3874	3813	3644	3498	3441
65.0	3036	2978	2845	2724	2669
70.0	2233	2190	2093	2000	1961
75.0	1475	1453	1410	1353	1332
80.0	796	801	820	841	851
85.0	255	316	428	497	526
90.0	4	65	166	232	260
95.0	1	1	20	52	70
100.0	2	2	2	3	3
105.0	2	2	3	3	3
110.0	2	2	2	3	3
115.0	2	2	2	3	3
120.0	2	2	3	3	3
125.0	3	3	3	3	3
130.0	3	3	3	3	4
135.0	4	4	4	4	4
140.0	4	4	4	5	5
145.0	5	5	5	5	5
150.0	5	5	5	6	6
155.0	6	6	6	6	7
160.0	7	7	7	7	7
165.0	7	7	7	8	8
170.0	7	8	8	9	9
175.0	8	8	8	9	10
180.0	9	9	9	9	9

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ZONAL LUMEN SUMMARY

0- 5	270.
5- 10	799.
10- 15	1289.
15- 20	1718.
20- 25	2066.
25- 30	2321.
30- 35	2473.
35- 40	2522.
40- 45	2473.
45- 50	2338.
50- 55	2134.
55- 60	1879.
60- 65	1578.
65- 70	1250.
70- 75	912.
75- 80	591.
80- 85	328.
85- 90	147.
90- 95	44.
95-100	5.
100-105	1.
105-110	1.
110-115	1.
115-120	1.
120-125	1.
125-130	1.
130-135	1.
135-140	2.
140-145	2.
145-150	2.
150-155	1.
155-160	1.
160-165	1.
165-170	1.
170-175	1.
175-180	0.

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5-DEGREE

ZONAL LUMEN SUMMARY

0- 5	270
5- 10	799
10- 15	1289
15- 20	1718
20- 25	2066
25- 30	2321
30- 35	2473
35- 40	2522
40- 45	2473
45- 50	2338
50- 55	2134
55- 60	1879
60- 65	1578
65- 70	1250
70- 75	912
75- 80	591
80- 85	328
85- 90	147
90- 95	44
95-100	5
100-105	1
105-110	1
110-115	1
115-120	1
120-125	1
125-130	1
130-135	1
135-140	2
140-145	2
145-150	2
150-155	1
155-160	1
160-165	1
165-170	1
170-175	1
175-180	0

10-DEGREE

ZONAL LUMEN SUMMARY

0- 10	1069
0- 20	4075
0- 30	8462
0- 40	13457
0- 50	18269
0- 60	22281
0- 70	25109
0- 80	26612
0- 90	27088
0-100	27137
0-110	27140
0-120	27142
0-130	27145
0-140	27148
0-150	27151
0-160	27154
0-170	27156
0-180	27156

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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	89	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	71	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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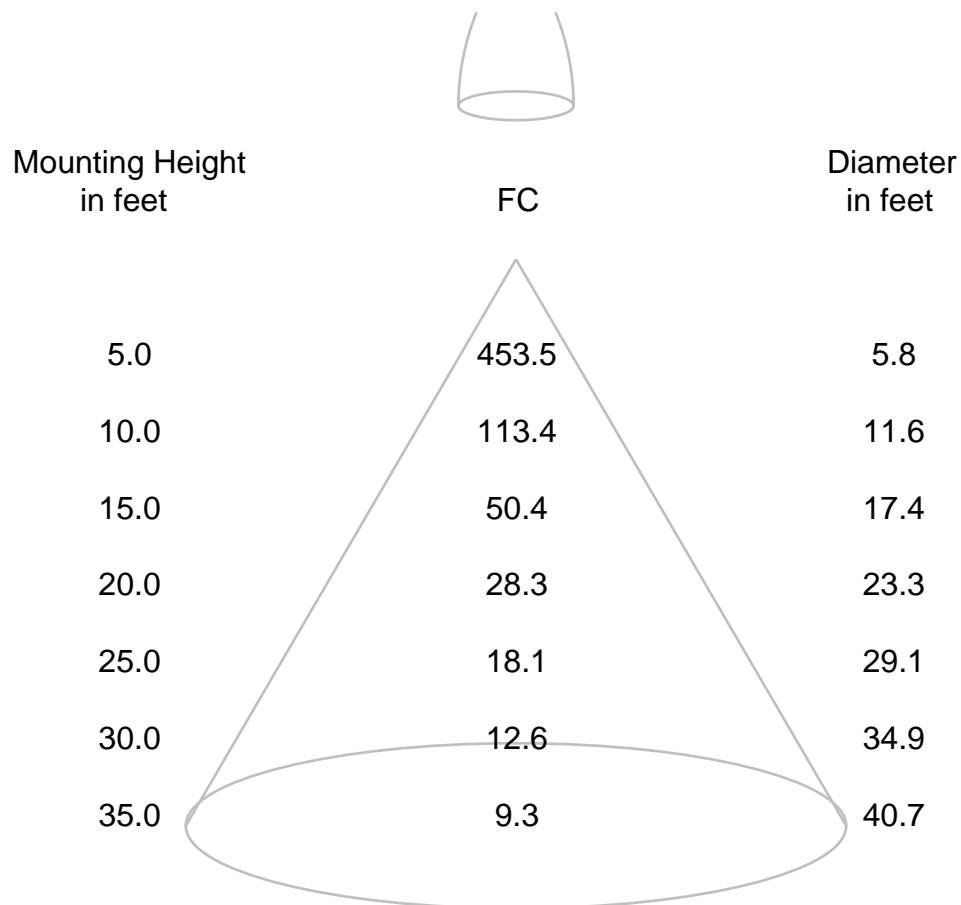
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CONE OF LIGHT DIAGRAM

(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.

REPORT NUMBER: RAB03146
 DATE: 04/03/2017
 PREPARED FOR: RAB LIGHTING INC.
 CATALOG NUMBER: RAIL225W/D10, RAILP225W/D10 (Standard Distribution)

ADDRESS: 170 LUDLOW AVE, NORTHVALE, NJ 07647

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

LAMP: SIX HUNDRED LIGHT EMITTING DIODES (LEDS).

DRIVER: 2 x RDD-096-A2450

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	3/01/18
	OCEAN OPTICS QE65PRO Spectroradiometer	03/07/18
	RAB 2.0 meter Diameter Integrating Sphere, 4PI Geometry	03/07/18

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)	27156 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.3433
Chromaticity Ordinate y	0.3549
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2089
Chromaticity Ordinate v'	0.4860
Correlated Color Temp CCT (K)	5079
ANSI C78.377-2008 Duv	0.002
Total Radiant Flux (milliWatts)	81330 *
ELECTRICAL	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	1.67
Input Power (Watts)	199.6
Input Power Factor (%)	99.9
Input Current THD (%)	2.7
Input Voltage THD (%)	0.2
EFFICACY (Lumens/Watt)	
	136.1
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.734
Input Power (Watts)	193.8
Input Power Factor (%)	95.3
Input Current THD (%)	6.8
Input Voltage THD (%)	0.2
Off-State Power (Watts)	
	0.0

COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	76
R1 Light greyish red	73
R2 Dark greyish yellow	82
R3 Strong yellowish green	88
R4 Moderate yellowish green	76
R5 Light bluish green	75
R6 Light blue	76
R7 Light violet	83
R8 Light reddish purple	58
R9 Strong red	-23
R10 Strong yellow	57
R11 Strong green	74
R12 Strong blue	52
R13 Light yellowish pink (skin)	75
R14 Moderate olive green (leaf)	94

*NOTE:

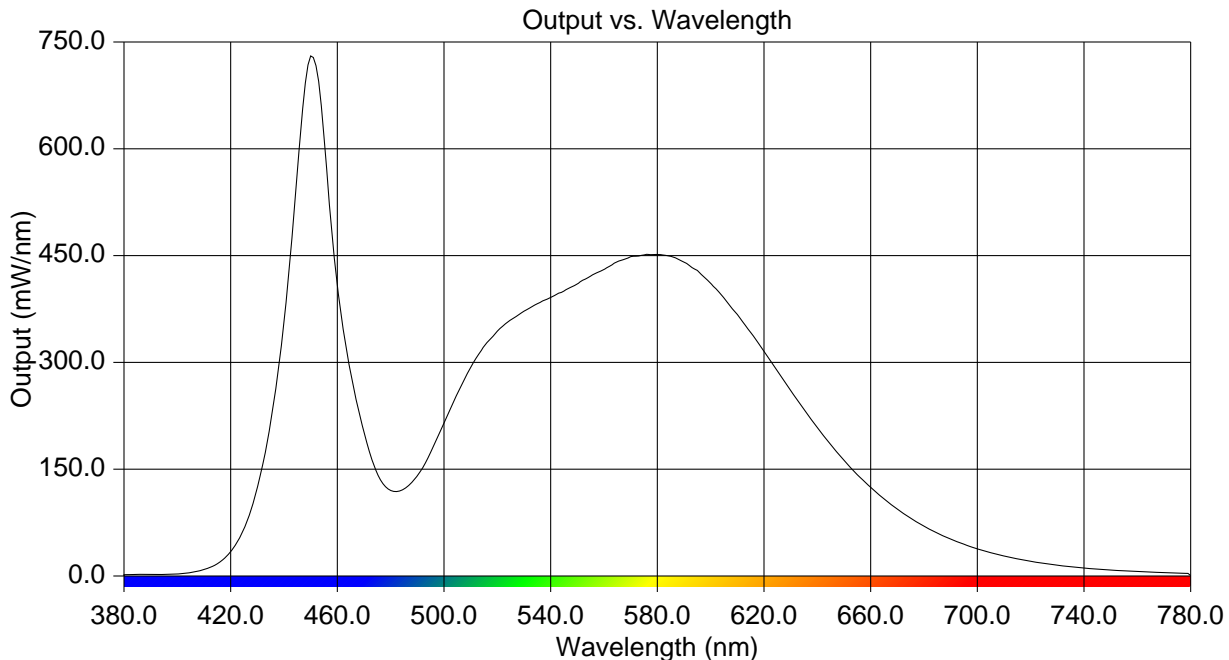
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RESULTS:

Wavelength	mW per nm	Wavelength	mW per nm	Wavelength	mW per nm
380	1.753	515	322.826	650	162.704
385	1.845	520	344.303	655	142.329
390	2.060	525	360.415	660	124.617
395	2.334	530	372.406	665	108.333
400	3.125	535	382.883	670	94.049
405	4.746	540	391.525	675	81.223
410	8.673	545	400.728	680	69.953
415	17.199	550	410.559	685	60.252
420	34.234	555	421.777	690	51.818
425	66.822	560	431.042	695	44.715
430	124.490	565	442.250	700	38.191
435	215.930	570	449.089	705	32.679
440	356.773	575	451.471	710	27.990
445	567.512	580	452.120	715	23.958
450	731.330	585	449.308	720	20.626
455	617.501	590	441.494	725	17.694
460	407.919	595	429.729	730	15.286
465	285.615	600	411.475	735	13.114
470	202.170	605	391.002	740	11.215
475	144.604	610	367.789	745	9.668
480	119.979	615	342.519	750	8.334
485	122.424	620	316.014	755	7.194
490	141.050	625	288.752	760	6.255
495	174.025	630	260.789	765	5.366
500	215.429	635	234.152	770	4.666
505	255.611	640	208.643	775	4.119
510	293.128	645	184.597	780	0.618



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CIE Chromaticity Diagram

