

REPORT NUMBER: RAB01691

ISSUE DATE: 01/28/16

PREPARED FOR: RAB LIGHTING INC.

CATALOG NUMBER: RAIL185YNW/480

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

LAMPS: FIVE HUNDRED AND SEVENTY SIX LIGHT EMITTING DIODES (LEDs)

NOTE: DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED.

TOTAL INPUT WATTS = 183.07 AT 480.0 VAC.

TEST PROCEDURE: IESNA LM-79-08

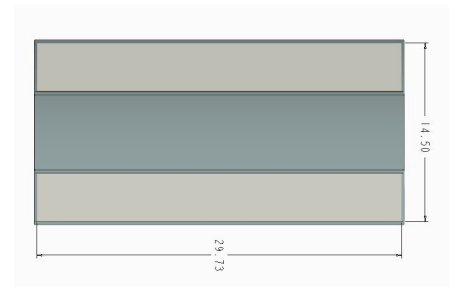
(SEE PAGE 2 FOR MORE INFORMATION)

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CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0	
0	8713	8713	8713	8713	8713	
5	8617	8641	8658	8694	8701	822
15	8229	8236	8212	8211	8192	2314
25	7465	7444	7349	7266	7217	3382
35	6395	6338	6177	5994	5934	3854
45	5097	5022	4805	4592	4522	3709
55	3747	3662	3429	3233	3164	3084
65	2421	2353	2172	2023	1968	2168
75	1194	1165	1062	980	955	1142
85	223	237	249	263	268	305
90	6	31	64	89	95	
95	0	0	0	4	7	13
105	1	1	1	1	1	1
115	1	1	1	1	1	1
125	1	1	1	1	1	1
135	2	2	2	2	2	2
145	2	2	2	3	3	2
155	3	3	3	3	3	1
165	3	3	3	4	4	1
175	3	4	4	5	5	0
180	4	4	4	4	4	

FLUX



ZONAL LUMEN SUMMARY

ZONE	LUMENS	%FIXT
0- 30	6518	31.3
0- 40	10372	49.9
0- 60	17164	82.5
0- 90	20779	99.9
90-120	15	0.1
90-130	16	0.1
90-150	19	0.1
90-180	22	0.1
0-180	20801	100.0

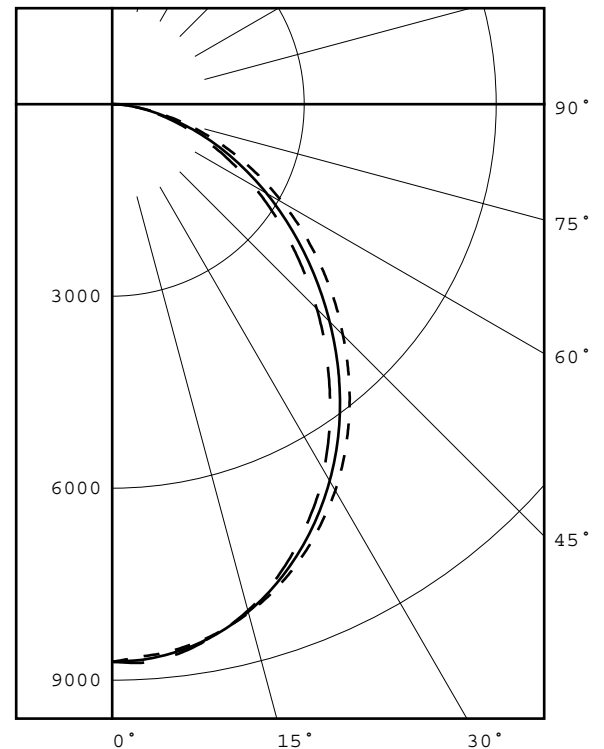
TOTAL INPUT WATTS = 183.1

EFFICACY = 113.6 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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ADDITIONAL INFORMATION

TEST DISTANCE: 28.25 FEET
DRIVER: 2 x RD-H100-A2000-480
ACCREDITED LABORATORY CODE 201058-0
LM-80 DATA AVAILABLE FROM MANUFACTURER FOR SOLID STATE SOURCE

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PLANE : 0-DEG 90-DEG
BEAM ANGLE (50%) : 100.9 X 92.2 DEGREES
FIELD ANGLE (10%) : 155.8 X 151.9 DEGREES

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PLANE : 0-DEG 90-DEG
LUMINOUS LENGTH :29.730 14.500

LUMINANCE DATA IN CANDELA/SQ METER

ANGLE IN DEG	AVERAGE 0-DEG	AVERAGE 45-DEG	AVERAGE 90-DEG
45	25908.	24424.	22986.
55	23480.	21488.	19827.
65	20590.	18472.	16737.
75	16581.	14748.	13262.
85	9196.	10269.	11052.

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CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0
0.0	8713	8713	8713	8713	8713
5.0	8617	8641	8658	8694	8701
10.0	8473	8489	8494	8514	8505
15.0	8229	8236	8212	8211	8192
20.0	7893	7894	7824	7782	7754
25.0	7465	7444	7349	7266	7217
30.0	6971	6929	6796	6659	6613
35.0	6395	6338	6177	5994	5934
40.0	5766	5704	5504	5294	5222
45.0	5097	5022	4805	4592	4522
50.0	4430	4333	4106	3892	3823
55.0	3747	3662	3429	3233	3164
60.0	3072	2995	2784	2607	2546
65.0	2421	2353	2172	2023	1968
70.0	1792	1740	1597	1478	1437
75.0	1194	1165	1062	980	955
80.0	655	647	594	566	545
85.0	223	237	249	263	268
90.0	6	31	64	89	95
95.0	0	0	0	4	7
100.0	0	0	0	1	1
105.0	1	1	1	1	1
110.0	1	1	1	1	1
115.0	1	1	1	1	1
120.0	1	1	1	1	1
125.0	1	1	1	1	1
130.0	1	1	2	2	2
135.0	2	2	2	2	2
140.0	2	2	2	2	2
145.0	2	2	2	3	3
150.0	2	3	3	3	3
155.0	3	3	3	3	3
160.0	3	3	3	3	4
165.0	3	3	3	4	4
170.0	3	3	4	4	4
175.0	3	4	4	5	5
180.0	4	4	4	4	4

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ZONAL LUMEN SUMMARY

0- 5	208.
5- 10	614.
10- 15	991.
15- 20	1323.
20- 25	1592.
25- 30	1790.
30- 35	1908.
35- 40	1946.
40- 45	1907.
45- 50	1801.
50- 55	1642.
55- 60	1441.
60- 65	1210.
65- 70	959.
70- 75	698.
75- 80	445.
80- 85	226.
85- 90	79.
90- 95	13.
95-100	0.
100-105	0.
105-110	1.
110-115	1.
115-120	0.
120-125	0.
125-130	1.
130-135	1.
135-140	1.
140-145	1.
145-150	1.
150-155	1.
155-160	1.
160-165	1.
165-170	0.
170-175	0.
175-180	0.

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5-DEGREE ZONAL LUMEN SUMMARY

0- 5	208
5- 10	614
10- 15	991
15- 20	1323
20- 25	1592
25- 30	1790
30- 35	1908
35- 40	1946
40- 45	1907
45- 50	1801
50- 55	1642
55- 60	1441
60- 65	1210
65- 70	959
70- 75	698
75- 80	445
80- 85	226
85- 90	79
90- 95	13
95-100	0
100-105	0
105-110	1
110-115	1
115-120	0
120-125	0
125-130	1
130-135	1
135-140	1
140-145	1
145-150	1
150-155	1
155-160	1
160-165	1
165-170	0
170-175	0
175-180	0

10-DEGREE ZONAL LUMEN SUMMARY

0- 10	822
0- 20	3136
0- 30	6518
0- 40	10372
0- 50	14080
0- 60	17164
0- 70	19332
0- 80	20475
0- 90	20779
0-100	20793
0-110	20794
0-120	20795
0-130	20796
0-140	20797
0-150	20799
0-160	20800
0-170	20801
0-180	20801

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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	95	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	57	69	62	57	67	61	56	64	59	55	53
5	78	65	57	50	76	64	56	50	62	55	49	60	54	49	58	53	48	46
6	72	59	50	44	70	58	50	44	56	49	44	55	48	43	53	47	43	41
7	67	54	45	39	65	53	45	39	51	44	39	50	43	39	49	43	38	36
8	62	49	41	35	61	49	41	35	47	40	35	46	39	35	45	39	35	33
9	58	45	37	32	57	45	37	32	44	37	32	42	36	31	41	36	31	30
10	55	42	34	29	54	41	34	29	40	34	29	39	33	29	39	33	29	27

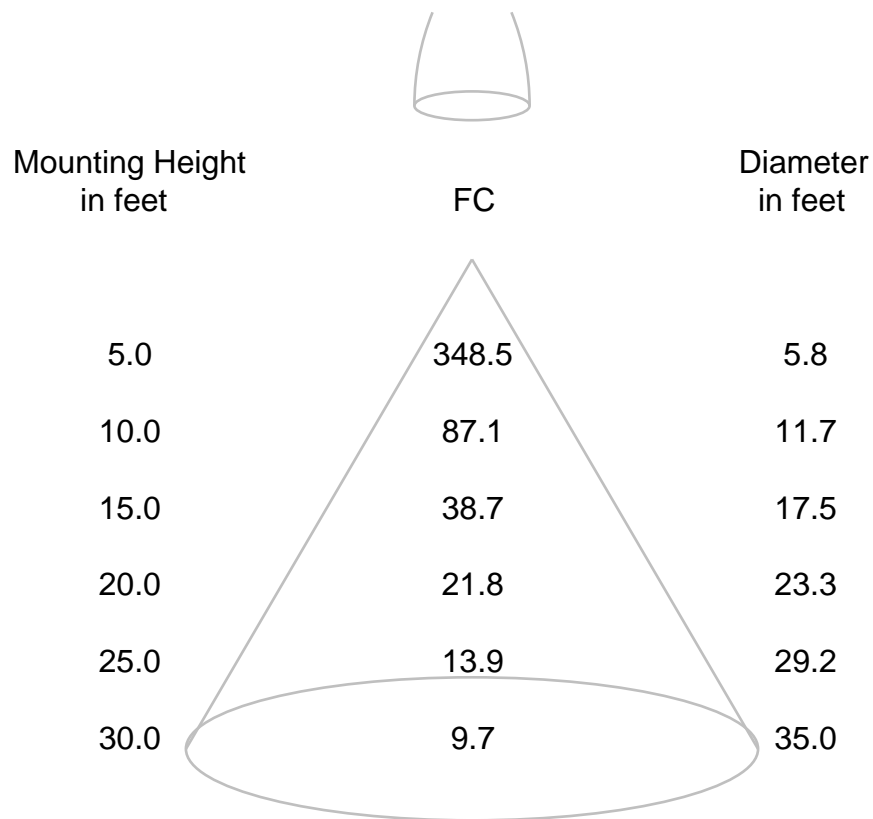
ALL CANDELA, LUMENS, LUMINANCE, AND VCP VALUES IN THIS REPORT ARE
BASED ON ABSOLUTE PHOTOMETRY. THE COEFFICIENT OF UTILIZATION VALUES
ARE BASED ON THE TOTAL ABSOLUTE LUMEN OUTPUT OF THIS LUMINAIRE SAMPLE.

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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: RAIL185YNW/480

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ADDRESS: 170 LUDLOW AVE, NORTHVALE, NJ 07647

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

LAMP: FIVE HUNDRED AND SEVENTY SIX LIGHT EMITTING DIODES (LEDS)

DRIVER: 2 x RD-H100-A2000-480

OBJECT OF TEST: DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED AT THE RATED INPUT VOLTAGES (480.0 AND 347.0 VAC, 60Hz) TO THE TEST SAMPLE.

INSTRUMENTS:	GWINSTEK PROGRAMMABLE AC POWER SOURCE APS-7100	Calibration Due:
	CHROMA PROGRAMMABLE DIGITAL POWER METER MODEL 66202	N/A
	OCEAN OPTICS QE65PRO Spectroradiometer	3/9/16
	RAB 2.0 meter Diameter Integrating Sphere, 4PI Geometry	1/25/17

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 (347.0 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)	20801 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.4061
Chromaticity Ordinate y	0.3882
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2373
Chromaticity Ordinate v'	0.5103
Correlated Color Temp CCT (K)	3462
ANSI C78.377-2008 Duv	-0.001
Total Radiant Flux (milliWatts)	65081 *
ELECTRICAL	
Input Voltage (Volts AC)	480.0
Input Current (Amps AC)	0.415
Input Power (Watts)	183.1
Input Power Factor (%)	91.8
Input Current THD (%)	11.4
Input Voltage THD (%)	0.2
EFFICACY (Lumens/Watt)	
	113.6
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	347.0
Input Current (Amps AC)	0.533
Input Power (Watts)	180.3
Input Power Factor (%)	97.5
Input Current THD (%)	10.6
Input Voltage THD (%)	0.2
Off-State Power (Watts)	
	0.0

COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	82
R1 Light greyish red	81
R2 Dark greyish yellow	87
R3 Strong yellowish green	92
R4 Moderate yellowish green	82
R5 Light bluish green	81
R6 Light blue	83
R7 Light violet	86
R8 Light reddish purple	67
R9 Strong red	17
R10 Strong yellow	70
R11 Strong green	80
R12 Strong blue	63
R13 Light yellowish pink (skin)	82
R14 Moderate olive green (leaf)	95

*NOTE:

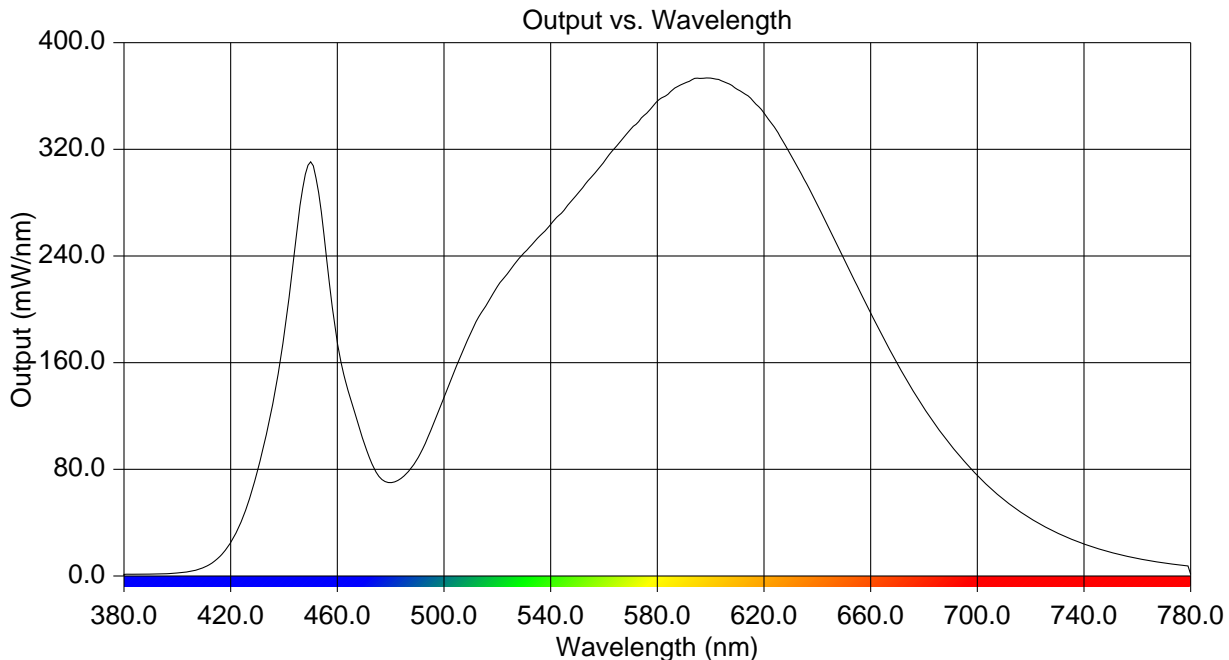
Proper calibration of integrating spheres for measuring total flux output of non-directional samples will produce reliable, repeatable results within the calibration tolerances of the equipment used. However, measurement of test samples with significant self absorption and/or directional output, even 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	1.205	515	200.633	650	237.710
385	1.324	520	217.058	655	217.437
390	1.471	525	230.093	660	197.243
395	1.618	530	242.309	665	178.009
400	2.328	535	253.173	670	159.353
405	3.499	540	263.510	675	141.965
410	6.505	545	274.249	680	125.842
415	12.896	550	286.679	685	111.326
420	25.159	555	298.599	690	98.199
425	46.147	560	310.524	695	86.316
430	78.483	565	323.284	700	75.669
435	121.382	570	335.083	705	65.884
440	179.453	575	345.391	710	57.304
445	262.801	580	356.155	715	49.641
450	310.650	585	363.207	720	42.927
455	255.834	590	369.479	725	37.276
460	175.279	595	373.382	730	32.204
465	132.611	600	373.291	735	27.845
470	100.095	605	370.640	740	24.000
475	76.675	610	364.946	745	20.719
480	69.911	615	358.375	750	17.802
485	74.948	620	347.243	755	15.280
490	87.906	625	333.162	760	13.225
495	108.934	630	316.054	765	11.365
500	134.138	635	297.703	770	9.812
505	158.993	640	278.481	775	8.460
510	181.933	645	258.229	780	1.277



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CIE Chromaticity Diagram

