

REPORT NUMBER: RAB01689

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ISSUE DATE: 01/28/16

PREPARED FOR: RAB LIGHTING INC.

CATALOG NUMBER: RAIL185W/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 = 182.47 AT 480.0 VAC.

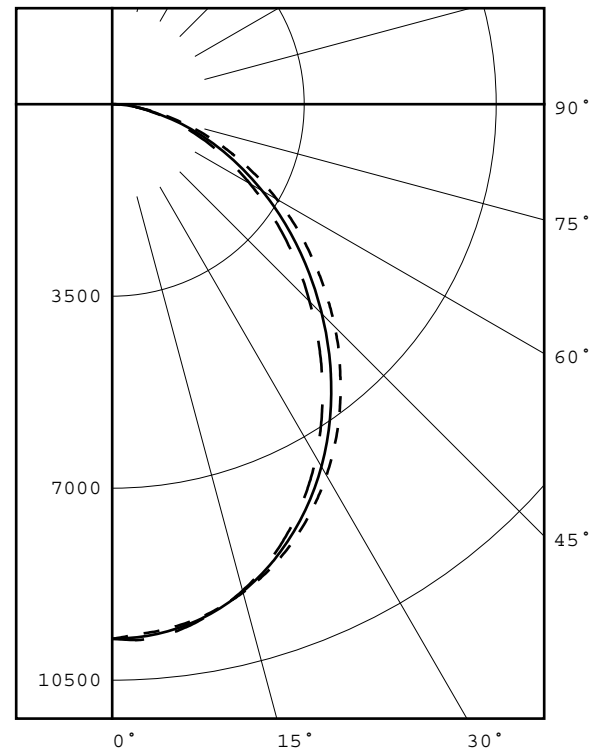
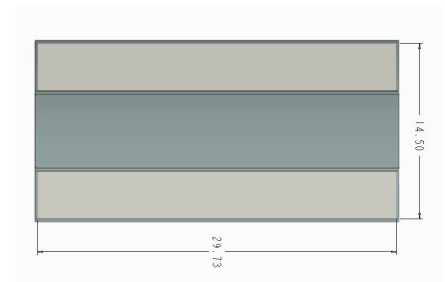
TEST PROCEDURE: IESNA LM-79-08

(SEE PAGE 2 FOR MORE INFORMATION)

CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0	
0	9747	9747	9747	9747	9747	
5	9639	9668	9687	9728	9738	919
15	9215	9227	9198	9200	9181	2592
25	8373	8353	8244	8167	8113	3796
35	7175	7118	6931	6767	6680	4334
45	5738	5655	5409	5191	5086	4180
55	4225	4125	3887	3682	3581	3489
65	2735	2662	2465	2312	2249	2463
75	1357	1322	1212	1137	1101	1307
85	251	280	320	354	362	376
90	6	46	100	140	150	
95	0	0	4	17	22	24
105	1	1	1	2	2	1
115	1	1	1	2	2	2
125	2	2	2	2	2	2
135	2	2	2	2	3	2
145	3	3	3	4	4	2
155	4	4	4	4	4	2
165	4	4	5	5	5	1
175	4	4	5	6	6	0
180	5	5	5	5	5	

FLUX



LEGEND:

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

ZONAL LUMEN SUMMARY

ZONE	LUMENS	%FIXT
0- 30	7308	31.1
0- 40	11641	49.6
0- 60	19311	82.2
0- 90	23457	99.8
90-120	27	0.1
90-130	29	0.1
90-150	33	0.1
90-180	37	0.2
0-180	23493	100.0

TOTAL INPUT WATTS = 182.5

EFFICACY = 128.7 Lm/W

CIE TYPE - DIRECT

PLANE : 0-DEG 90-DEG

SPACING CRITERIA : 1.2 1.1

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%) : 101.1 X 92.6 DEGREES
FIELD ANGLE (10%) : 156.1 X 152.6 DEGREES

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

LUMINANCE DATA IN CANDELA/SQ METER				
ANGLE	AVERAGE	AVERAGE	AVERAGE	
IN DEG	0-DEG	45-DEG	90-DEG	
45	29167.	27494.	25853.	
55	26476.	24358.	22440.	
65	23261.	20964.	19127.	
75	18845.	16831.	15290.	
85	10351.	13197.	14929.	

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CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0
0.0	9747	9747	9747	9747	9747
5.0	9639	9668	9687	9728	9738
10.0	9481	9504	9508	9531	9524
15.0	9215	9227	9198	9200	9181
20.0	8847	8842	8774	8732	8701
25.0	8373	8353	8244	8167	8113
30.0	7813	7775	7628	7500	7434
35.0	7175	7118	6931	6767	6680
40.0	6469	6403	6182	5988	5889
45.0	5738	5655	5409	5191	5086
50.0	4973	4883	4637	4424	4322
55.0	4225	4125	3887	3682	3581
60.0	3469	3383	3157	2974	2901
65.0	2735	2662	2465	2312	2249
70.0	2028	1973	1814	1695	1645
75.0	1357	1322	1212	1137	1101
80.0	744	738	691	669	657
85.0	251	280	320	354	362
90.0	6	46	100	140	150
95.0	0	0	4	17	22
100.0	1	1	1	1	1
105.0	1	1	1	2	2
110.0	1	1	1	2	2
115.0	1	1	1	2	2
120.0	1	2	2	2	2
125.0	2	2	2	2	2
130.0	2	2	2	2	2
135.0	2	2	2	2	3
140.0	3	3	3	3	3
145.0	3	3	3	4	4
150.0	4	4	4	4	4
155.0	4	4	4	4	4
160.0	4	4	4	4	5
165.0	4	4	5	5	5
170.0	4	4	5	5	5
175.0	4	4	5	6	6
180.0	5	5	5	5	5

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ZONAL LUMEN SUMMARY

0- 5	232.
5- 10	687.
10- 15	1110.
15- 20	1482.
20- 25	1786.
25- 30	2010.
30- 35	2144.
35- 40	2189.
40- 45	2148.
45- 50	2032.
50- 55	1856.
55- 60	1633.
60- 65	1373.
65- 70	1090.
70- 75	796.
75- 80	511.
80- 85	270.
85- 90	106.
90- 95	23.
95-100	2.
100-105	1.
105-110	1.
110-115	1.
115-120	1.
120-125	1.
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	1.
170-175	0.
175-180	0.

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5-DEGREE ZONAL LUMEN SUMMARY

0- 5	232
5- 10	687
10- 15	1110
15- 20	1482
20- 25	1786
25- 30	2010
30- 35	2144
35- 40	2189
40- 45	2148
45- 50	2032
50- 55	1856
55- 60	1633
60- 65	1373
65- 70	1090
70- 75	796
75- 80	511
80- 85	270
85- 90	106
90- 95	23
95-100	2
100-105	1
105-110	1
110-115	1
115-120	1
120-125	1
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	1
170-175	0
175-180	0

10-DEGREE ZONAL LUMEN SUMMARY

0- 10	919
0- 20	3512
0- 30	7308
0- 40	11641
0- 50	15821
0- 60	19311
0- 70	21774
0- 80	23081
0- 90	23457
0-100	23481
0-110	23482
0-120	23484
0-130	23486
0-140	23488
0-150	23490
0-160	23492
0-170	23493
0-180	23493

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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	95	98	95	92	94	92	90	91	89	87	85
2	100	92	86	80	97	90	84	79	87	82	77	83	79	76	80	77	74	72
3	92	81	74	67	89	80	73	67	77	71	66	74	69	64	72	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

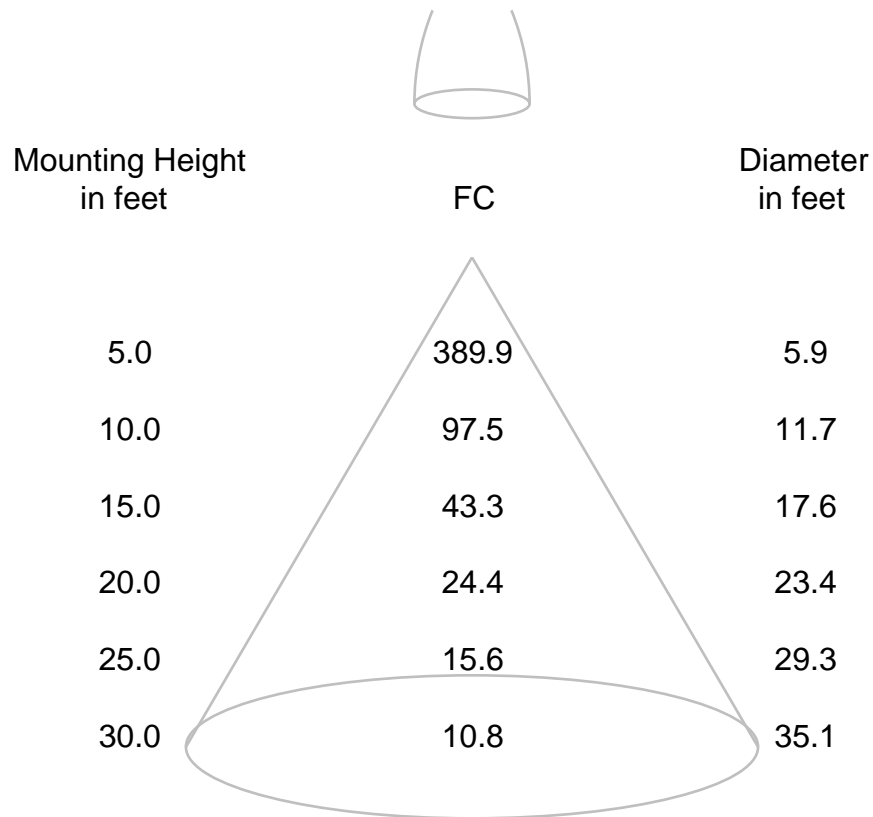
ALL CANDELA, LUMENS, LUMINANCE, AND VCP VALUES IN THIS REPORT ARE BASED ON ABSOLUTE PHOTOMETRY. THE COEFFICIENT OF UTILIZATION VALUES ARE BASED ON THE TOTAL ABSOLUTE LUMEN OUTPUT OF THIS LUMINAIRE SAMPLE.

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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: 1/28/2016
 PREPARED FOR: RAB LIGHTING INC.
 CATALOG NUMBER: RAIL185W/480

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: N/A
	CHROMA PROGRAMMABLE DIGITAL POWER METER MODEL 66202	3/9/16
	OCEAN OPTICS QE65PRO Spectroradiometer	1/25/17
	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)	23493 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.3456
Chromaticity Ordinate y	0.3549
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2105
Chromaticity Ordinate v'	0.4863
Correlated Color Temp CCT (K)	4992
ANSI C78.377-2008 Duv	0.001
Total Radiant Flux (milliWatts)	70745 *
ELECTRICAL	
Input Voltage (Volts AC)	480.0
Input Current (Amps AC)	0.413
Input Power (Watts)	182.5
Input Power Factor (%)	92.0
Input Current THD (%)	11.5
Input Voltage THD (%)	0.2
EFFICACY (Lumens/Watt)	
	128.7
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	347.0
Input Current (Amps AC)	0.531
Input Power (Watts)	179.7
Input Power Factor (%)	97.5
Input Current THD (%)	11.0
Input Voltage THD (%)	0.2
Off-State Power (Watts)	
	0.0

COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	75
R1 Light greyish red	72
R2 Dark greyish yellow	79
R3 Strong yellowish green	83
R4 Moderate yellowish green	75
R5 Light bluish green	73
R6 Light blue	71
R7 Light violet	83
R8 Light reddish purple	61
R9 Strong red	-18
R10 Strong yellow	49
R11 Strong green	72
R12 Strong blue	43
R13 Light yellowish pink (skin)	73
R14 Moderate olive green (leaf)	90

*NOTE:

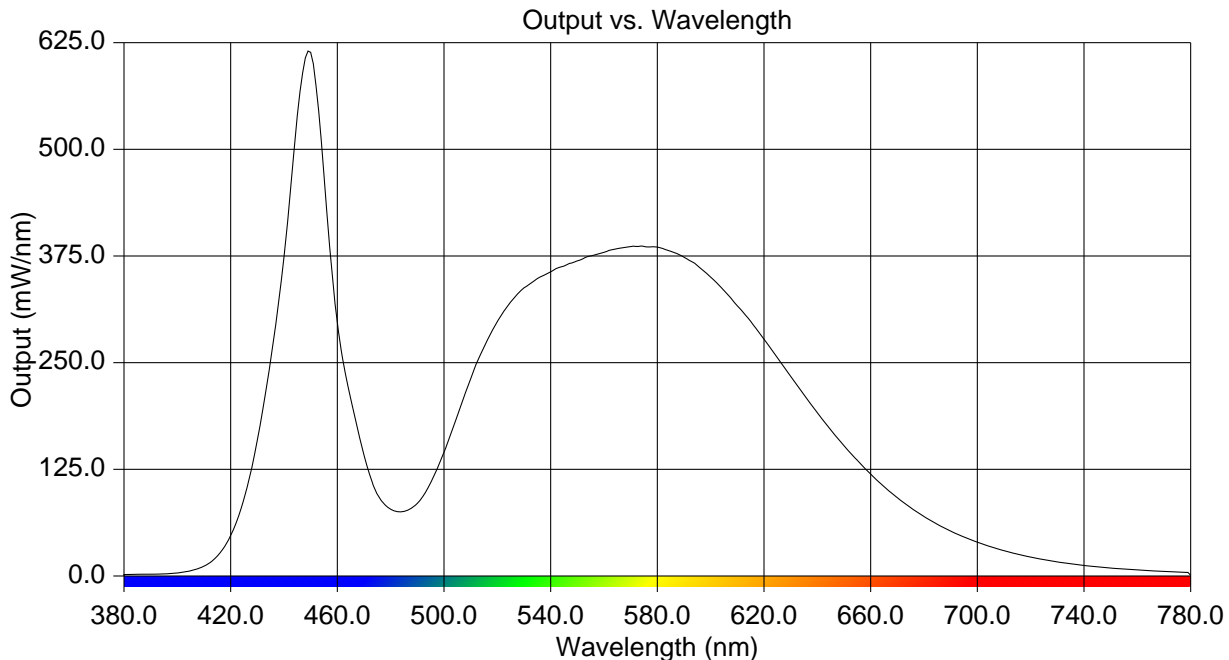
Proper calibration of integrating spheres for measuring total flux output of non-directional samples will produce reliable, repeatable results within the calibration tolerances of the equipment used. However, measurement of test samples with significant self absorption and/or directional output, even 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	1.603	515	268.289	650	152.744
385	1.821	520	298.387	655	135.608
390	2.037	525	321.024	660	119.315
395	2.530	530	337.680	665	104.741
400	3.671	535	348.555	670	91.857
405	5.935	540	356.430	675	80.039
410	11.524	545	363.172	680	69.602
415	23.384	550	369.283	685	60.493
420	47.373	555	375.074	690	52.600
425	90.524	560	379.292	695	45.693
430	159.341	565	383.706	700	39.532
435	252.614	570	386.021	705	34.233
440	373.870	575	386.214	710	29.608
445	539.911	580	385.318	715	25.480
450	613.690	585	380.613	720	22.142
455	469.414	590	373.565	725	19.107
460	296.857	595	363.955	730	16.556
465	208.123	600	350.228	735	14.378
470	141.660	605	334.492	740	12.418
475	96.229	610	316.583	745	10.720
480	78.224	615	298.464	750	9.309
485	75.725	620	277.644	755	8.071
490	85.104	625	256.242	760	7.012
495	109.132	630	233.651	765	6.093
500	145.336	635	212.117	770	5.283
505	187.765	640	191.169	775	4.661
510	231.001	645	171.518	780	0.703



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CIE Chromaticity Diagram

