

REPORT NUMBER: RAB01693

ISSUE DATE: 02/01/16

PREPARED FOR: RAB LIGHTING INC.

CATALOG NUMBER: RAIL225W/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 = 221.76 AT 480.0 VAC.

TEST PROCEDURE: IESNA LM-79-08

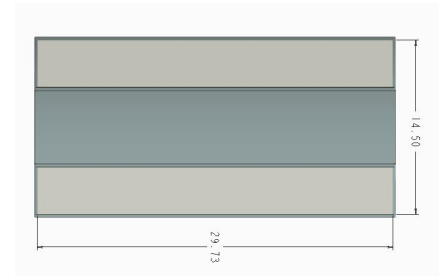
\*(SEE PAGE 2 FOR MORE INFORMATION)\*

PAGE: 1 OF 9  
DATE SAMPLE TESTED: 02/01/16

### CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0	
0	11295	11295	11295	11295	11295	
5	11171	11203	11224	11271	11279	1065
15	10688	10690	10663	10656	10647	3005
25	9718	9674	9570	9463	9418	4401
35	8334	8263	8042	7839	7756	5027
45	6648	6556	6270	6010	5911	4845
55	4876	4773	4487	4256	4146	4034
65	3150	3067	2855	2666	2616	2847
75	1557	1517	1408	1307	1273	1508
85	294	324	376	404	415	435
90	10	51	120	157	171	
95	0	0	2	16	23	27
105	1	1	1	2	2	1
115	2	2	2	2	2	2
125	2	2	2	2	2	2
135	3	3	3	3	3	2
145	4	4	4	4	4	3
155	4	5	5	5	5	2
165	5	5	5	6	6	1
175	4	5	6	6	7	1
180	6	6	6	6	6	

### FLUX



### ZONAL LUMEN SUMMARY

ZONE	LUMENS	%FIXT
0- 30	8471	31.1
0- 40	13499	49.6
0- 60	22378	82.2
0- 90	27168	99.8
90-120	30	0.1
90-130	32	0.1
90-150	37	0.1
90-180	41	0.2
0-180	27209	100.0

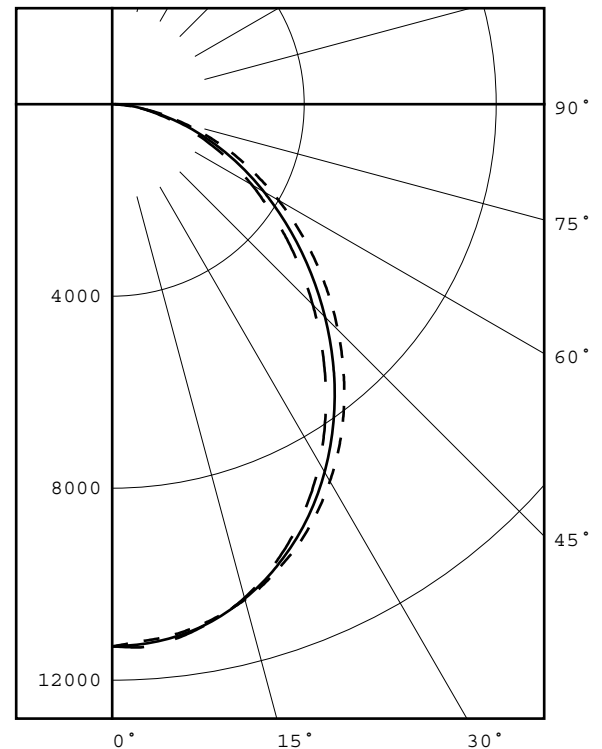
TOTAL INPUT WATTS = 221.8

EFFICACY = 122.7 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

REPORT NUMBER: RAB01693  
ISSUE DATE: 02/01/16  
PREPARED FOR: RAB LIGHTING INC.

PAGE: 2 OF 9  
DATE SAMPLE TESTED: 02/01/16

ADDITIONAL INFORMATION

TEST DISTANCE: 28.25 FEET  
DRIVER: 3 x RD-S075-A1400/480  
ACCREDITED LABORATORY CODE 201058-0  
LM-80 DATA AVAILABLE FROM MANUFACTURER FOR SOLID STATE SOURCE

REPORT NUMBER: RAB01693  
ISSUE DATE: 02/01/16  
PREPARED FOR: RAB LIGHTING INC.

PAGE: 3 OF 9  
DATE SAMPLE TESTED: 02/01/16

PLANE : 0-DEG 90-DEG  
BEAM ANGLE (50%) : 101.1 X 92.7 DEGREES  
FIELD ANGLE (10%) : 156.1 X 152.5 DEGREES

REPORT NUMBER: RAB01693  
ISSUE DATE: 02/01/16  
PREPARED FOR: RAB LIGHTING INC.

PAGE: 4 OF 9  
DATE SAMPLE TESTED: 02/01/16

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	33792.	31871.	30046.
55	30555.	28118.	25981.
65	26790.	24281.	22249.
75	21622.	19553.	17678.
85	12125.	15506.	17115.

REPORT NUMBER: RAB01693  
 ISSUE DATE: 02/01/16  
 PREPARED FOR: RAB LIGHTING INC.

PAGE: 5 OF 9  
 DATE SAMPLE TESTED: 02/01/16

### CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0
0.0	11295	11295	11295	11295	11295
5.0	11171	11203	11224	11271	11279
10.0	10987	11009	11024	11037	11034
15.0	10688	10690	10663	10656	10647
20.0	10249	10242	10173	10111	10094
25.0	9718	9674	9570	9463	9418
30.0	9072	9013	8849	8689	8633
35.0	8334	8263	8042	7839	7756
40.0	7514	7434	7174	6934	6837
45.0	6648	6556	6270	6010	5911
50.0	5766	5662	5369	5114	5005
55.0	4876	4773	4487	4256	4146
60.0	4003	3905	3651	3437	3359
65.0	3150	3067	2855	2666	2616
70.0	2334	2278	2103	1952	1918
75.0	1557	1517	1408	1307	1273
80.0	868	842	810	769	760
85.0	294	324	376	404	415
90.0	10	51	120	157	171
95.0	0	0	2	16	23
100.0	0	1	1	1	1
105.0	1	1	1	2	2
110.0	1	1	1	2	2
115.0	2	2	2	2	2
120.0	2	2	2	2	2
125.0	2	2	2	2	2
130.0	2	2	2	2	3
135.0	3	3	3	3	3
140.0	3	3	3	4	4
145.0	4	4	4	4	4
150.0	4	4	4	5	5
155.0	4	5	5	5	5
160.0	5	5	5	5	6
165.0	5	5	5	6	6
170.0	5	5	6	6	7
175.0	4	5	6	6	7
180.0	6	6	6	6	6

REPORT NUMBER: RAB01693  
ISSUE DATE: 02/01/16  
PREPARED FOR: RAB LIGHTING INC.

PAGE: 6 OF 9  
DATE SAMPLE TESTED: 02/01/16

## ZONAL LUMEN SUMMARY

0- 5	269.
5- 10	796.
10- 15	1287.
15- 20	1718.
20- 25	2071.
25- 30	2331.
30- 35	2488.
35- 40	2539.
40- 45	2490.
45- 50	2355.
50- 55	2147.
55- 60	1887.
60- 65	1587.
65- 70	1261.
70- 75	919.
75- 80	589.
80- 85	312.
85- 90	123.
90- 95	26.
95-100	1.
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.

REPORT NUMBER: RAB01693  
 ISSUE DATE: 02/01/16  
 PREPARED FOR: RAB LIGHTING INC.

PAGE: 7 OF 9  
 DATE SAMPLE TESTED: 02/01/16

### 5-DEGREE ZONAL LUMEN SUMMARY

0- 5	269
5- 10	796
10- 15	1287
15- 20	1718
20- 25	2071
25- 30	2331
30- 35	2488
35- 40	2539
40- 45	2490
45- 50	2355
50- 55	2147
55- 60	1887
60- 65	1587
65- 70	1261
70- 75	919
75- 80	589
80- 85	312
85- 90	123
90- 95	26
95-100	1
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	1065
0- 20	4070
0- 30	8471
0- 40	13499
0- 50	18343
0- 60	22378
0- 70	25225
0- 80	26733
0- 90	27168
0-100	27195
0-110	27197
0-120	27198
0-130	27200
0-140	27202
0-150	27205
0-160	27207
0-170	27209
0-180	27209

REPORT NUMBER: RAB01693  
ISSUE DATE: 02/01/16

PAGE: 8 OF 9  
DATE SAMPLE TESTED: 02/01/16

PREPARED FOR: RAB LIGHTING INC.

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	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	61	56	64	59	55	53
5	78	65	56	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	43	55	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	41	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.

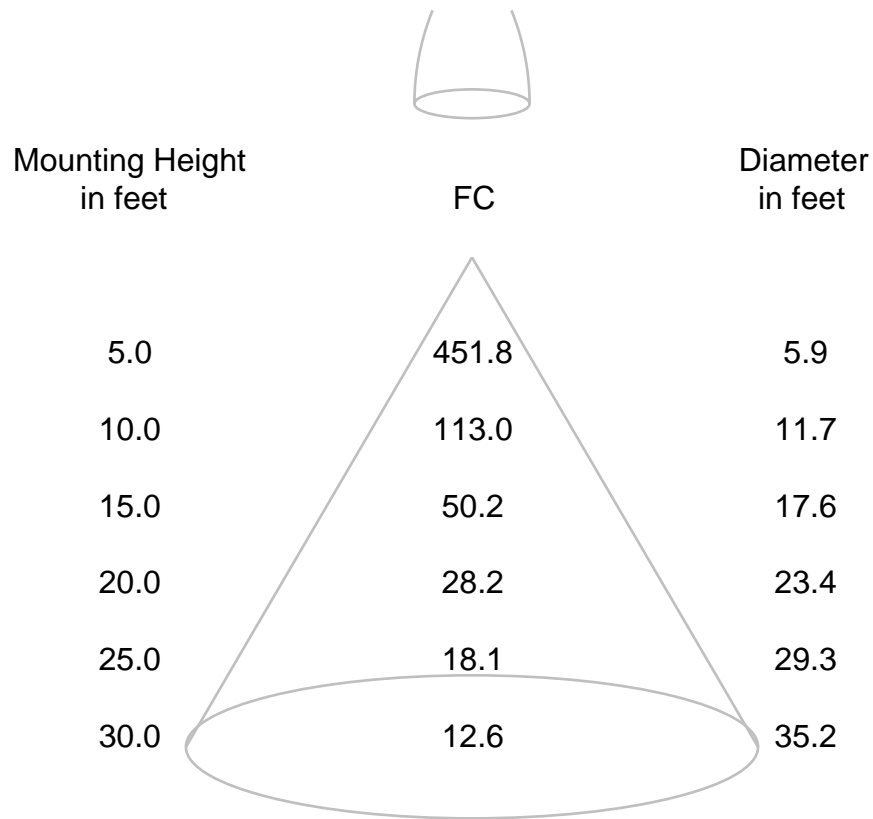


REPORT NUMBER: RAB01693  
ISSUE DATE: 02/01/16  
PREPARED FOR: RAB LIGHTING INC.

PAGE: 9 OF 9  
DATE SAMPLE TESTED: 02/01/16

## 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: RAB01694  
DATE: 2/1/2016  
PREPARED FOR: RAB LIGHTING INC.  
CATALOG NUMBER: RAIL225W/480

Page 1 of 4

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: 3 x RD-S075-A1400/480

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

REPORT NUMBER: RAB01694  
 DATE: 2/1/2016  
 PREPARED FOR: RAB LIGHTING INC.  
 CATALOG NUMBER: RAIL225W/480

Page 2 of 4

### RESULTS:

PHOTOMETRIC	
Total Integrated Flux (lumens)	27209 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.3451
Chromaticity Ordinate y	0.3539
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2105
Chromaticity Ordinate v'	0.4858
Correlated Color Temp CCT (K)	5008
ANSI C78.377-2008 Duv	0.001
Total Radiant Flux (milliWatts)	82251 *
ELECTRICAL	
Input Voltage (Volts AC)	480.0
Input Current (Amps AC)	0.501
Input Power (Watts)	221.8
Input Power Factor (%)	92.3
Input Current THD (%)	14.2
Input Voltage THD (%)	0.2
EFFICACY (Lumens/Watt)	
	122.7
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	347.0
Input Current (Amps AC)	0.641
Input Power (Watts)	220.6
Input Power Factor (%)	99.2
Input Current THD (%)	10.9
Input Voltage THD (%)	0.2
Off-State Power (Watts)	0.0

COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	74
R1 Light greyish red	73
R2 Dark greyish yellow	79
R3 Strong yellowish green	82
R4 Moderate yellowish green	76
R5 Light bluish green	74
R6 Light blue	71
R7 Light violet	82
R8 Light reddish purple	60
R9 Strong red	-18
R10 Strong yellow	49
R11 Strong green	73
R12 Strong blue	48
R13 Light yellowish pink (skin)	73
R14 Moderate olive green (leaf)	90

### \*NOTE:

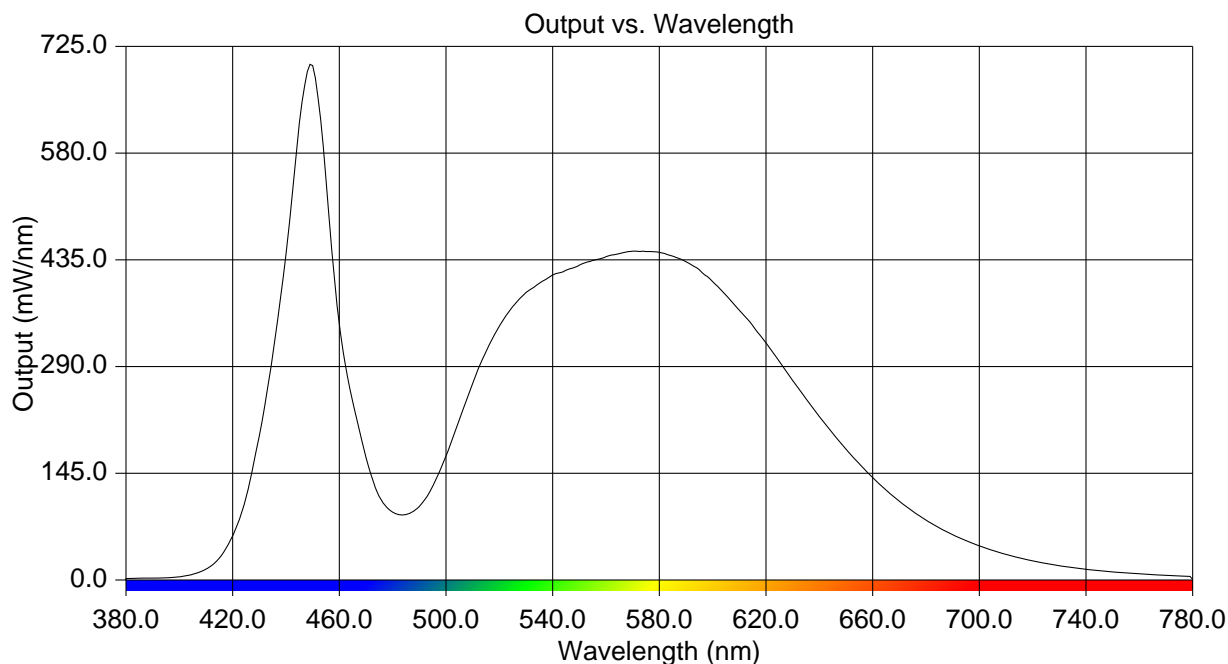
Proper calibration of integrating spheres for measuring total flux output of non-directional samples will produce reliable, repeatable results within the calibration tolerances of the equipment used. However, measurement of test samples with significant self absorption and/or directional output, even 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.

REPORT NUMBER: RAB01694  
 DATE: 2/1/2016  
 PREPARED FOR: RAB LIGHTING INC.  
 CATALOG NUMBER: RAIL225W/480

Page 3 of 4

### RESULTS:

Wavelength	mW per nm	Wavelength	mW per nm	Wavelength	mW per nm
380	1.859	515	310.938	650	177.678
385	2.100	520	345.273	655	158.009
390	2.469	525	371.586	660	139.184
395	3.011	530	390.808	665	122.394
400	4.552	535	403.347	670	107.134
405	7.508	540	414.799	675	93.421
410	14.676	545	421.088	680	81.323
415	29.711	550	427.964	685	70.702
420	59.396	555	434.217	690	61.518
425	112.780	560	439.469	695	53.565
430	195.941	565	443.624	700	46.438
435	304.793	570	446.984	705	40.132
440	442.869	575	446.458	710	34.754
445	620.993	580	445.347	715	29.902
450	699.240	585	440.471	720	25.909
455	544.380	590	432.609	725	22.431
460	347.191	595	421.723	730	19.444
465	242.564	600	405.595	735	16.928
470	166.546	605	387.034	740	14.610
475	113.939	610	366.659	745	12.680
480	91.949	615	345.951	750	10.963
485	88.997	620	321.910	755	9.505
490	99.958	625	297.166	760	8.267
495	127.166	630	271.160	765	7.208
500	168.504	635	246.403	770	6.260
505	217.713	640	222.083	775	5.458
510	267.170	645	199.271	780	0.828



REPORT NUMBER: RAB01694  
DATE: 2/1/2016  
PREPARED FOR: RAB LIGHTING INC.  
CATALOG NUMBER: RAIL225W/480

Page 4 of 4

## CIE Chromaticity Diagram

