

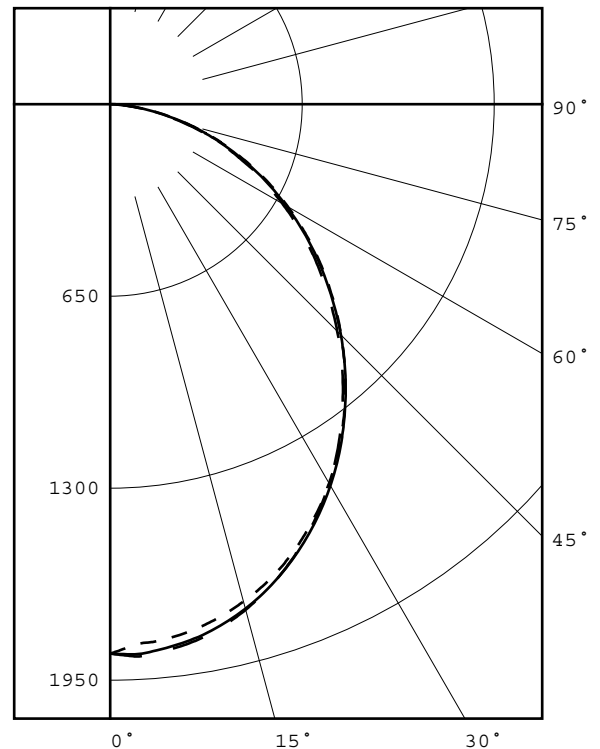
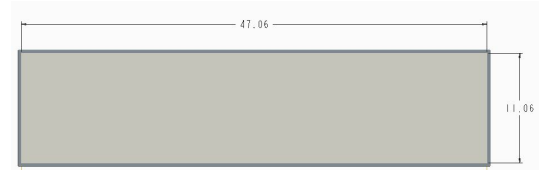
REPORT NUMBER: RAB01249
 ISSUE DATE: 10/14/15
 PREPARED FOR: RAB LIGHTING INC.
 CATALOG NUMBER: PANEL1X4-41YN (Standard Distribution)
 LUMINAIRE: FABRICATED WHITE PAINTED METAL HOUSING, 2 WHITE CIRCUIT
 BOARDS EACH WITH 120 LEDS, FROSTED HOLOGRAPHIC PLASTIC LENS. LENS
 FROSTED SIDE UP.
 LAMPS: TWO HUNDRED FORTY WHITE LIGHT EMITTING DIODES (LEDS), VERTICAL
 BASE-UP POSITION.
 NOTE: DATA SHOWN IS ABSOLUTE FOR THE
 SAMPLE PROVIDED.
 TOTAL INPUT WATTS = 38.436 W AT 277.0 VAC.
 LED DRIVER: RD-052-A1050-R-080C
 TEST PROCEDURE: IESNA LM-79-08
 ACCREDITED LABORATORY CODE 201058-0

PAGE: 1 OF 5
 DATE SAMPLE TESTED: 10/14/15

CANDELA DISTRIBUTION						FLUX
0.0	22.5	45.0	67.5	90.0		
0	1860	1860	1860	1860	1860	
5	1825	1837	1855	1863	1863	176
15	1743	1754	1768	1773	1772	497
25	1586	1594	1599	1599	1594	734
35	1365	1371	1370	1364	1358	854
45	1106	1109	1104	1095	1087	850
55	834	835	828	818	812	739
65	560	561	552	544	541	546
75	290	291	285	282	278	302
85	56	59	58	60	57	74
90	2	4	5	7	6	

ZONAL LUMEN SUMMARY		
ZONE	LUMENS	%FIXT
0- 30	1407	29.5
0- 40	2261	47.4
0- 60	3850	80.7
0- 90	4772	100.0
90-180	0	0.0
0-180	4772	100.0

TOTAL INPUT WATTS = 38.4
 EFFICACY = 124.3 Lm/W
 CIE TYPE - DIRECT
 PLANE : 0-DEG 90-DEG
 SPACING CRITERIA : 1.2 1.2



LEGEND:
 0-deg: - - - - -
 45-deg: = = = = =
 90-deg: - . - . - .

Checked XCAO
 Approved D.WANG-MUNSON

REPORT NUMBER: RAB01249
 ISSUE DATE: 10/14/15
 PREPARED FOR: RAB LIGHTING INC.

PAGE: 2 OF 5
 DATE SAMPLE TESTED: 10/14/15

CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0
0.0	1860	1860	1860	1860	1860
2.5	1833	1845	1864	1871	1871
5.0	1825	1837	1855	1863	1863
7.5	1812	1825	1841	1849	1850
10.0	1794	1807	1823	1831	1831
12.5	1771	1783	1798	1805	1804
15.0	1743	1754	1768	1773	1772
17.5	1712	1722	1733	1737	1734
20.0	1675	1684	1692	1695	1692
22.5	1633	1642	1648	1650	1645
25.0	1586	1594	1599	1599	1594
27.5	1536	1543	1546	1545	1540
30.0	1482	1488	1491	1487	1482
32.5	1425	1431	1433	1428	1422
35.0	1365	1371	1370	1364	1358
37.5	1303	1308	1306	1299	1292
40.0	1239	1243	1240	1233	1225
42.5	1173	1176	1173	1164	1157
45.0	1106	1109	1104	1095	1087
47.5	1038	1041	1035	1025	1017
50.0	970	973	965	957	947
52.5	902	904	896	887	880
55.0	834	835	828	818	812
57.5	764	770	758	748	742
60.0	695	700	689	680	673
62.5	628	630	620	611	604
65.0	560	561	552	544	541
67.5	490	491	482	477	471
70.0	421	423	415	410	408
72.5	357	358	351	345	343
75.0	290	291	285	282	278
77.5	224	226	221	220	215
80.0	162	164	160	160	157
82.5	105	108	105	106	103
85.0	56	59	58	60	57
87.5	20	23	24	26	25
90.0	2	4	5	7	6

REPORT NUMBER: RAB01249
ISSUE DATE: 10/14/15
PREPARED FOR: RAB LIGHTING INC.

PAGE: 3 OF 5
DATE SAMPLE TESTED: 10/14/15

ZONAL LUMEN SUMMARY

0- 5	44.
5- 10	131.
10- 15	212.
15- 20	284.
20- 25	344.
25- 30	390.
30- 35	420.
35- 40	434.
40- 45	433.
45- 50	417.
50- 55	389.
55- 60	350.
60- 65	301.
65- 70	245.
70- 75	183.
75- 80	119.
80- 85	58.
85- 90	15.

REPORT NUMBER: RAB01249
ISSUE DATE: 10/14/15
PREPARED FOR: RAB LIGHTING INC.

PAGE: 4 OF 5
DATE SAMPLE TESTED: 10/14/15

5-DEGREE
ZONAL LUMEN SUMMARY

0- 5	44
5- 10	131
10- 15	212
15- 20	284
20- 25	344
25- 30	390
30- 35	420
35- 40	434
40- 45	433
45- 50	417
50- 55	389
55- 60	350
60- 65	301
65- 70	245
70- 75	183
75- 80	119
80- 85	58
85- 90	15
90- 95	1
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	176
0- 20	673
0- 30	1407
0- 40	2261
0- 50	3111
0- 60	3850
0- 70	4395
0- 80	4697
0- 90	4771
0-100	4772
0-110	4772
0-120	4772
0-130	4772
0-140	4772
0-150	4772
0-160	4772
0-170	4772
0-180	4772

REPORT NUMBER: RAB01249
ISSUE DATE: 10/14/15

PAGE: 5 OF 5
DATE SAMPLE TESTED: 10/14/15

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	104	100	97	106	102	98	95	98	95	92	94	92	89	90	88	87	84
2	99	91	85	79	97	90	83	78	86	81	76	83	78	75	80	76	73	71
3	91	81	73	66	88	79	72	66	76	70	64	73	68	63	71	66	62	60
4	83	72	63	56	81	70	62	56	68	61	55	65	59	54	63	58	54	52
5	77	64	55	49	75	63	55	48	61	54	48	59	52	47	57	51	47	45
6	71	58	49	43	69	57	49	42	55	48	42	53	47	42	52	46	41	39
7	66	53	44	38	64	52	44	38	50	43	37	49	42	37	47	41	37	35
8	61	48	40	34	60	47	39	34	46	39	34	45	38	33	44	38	33	31
9	57	44	36	31	56	44	36	30	42	35	30	41	35	30	40	34	30	28
10	54	41	33	28	53	40	33	28	39	32	28	38	32	27	37	32	27	26

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: RAB01250
DATE: 10/13/2015
PREPARED FOR: RAB LIGHTING INC.
CATALOG NUMBER: PANEL1X4-41YN (Standard Distribution)

ADDRESS: 170 LUDLOW AVE, NORTHVALE, NJ 07647

LUMINAIRE: FABRICATED WHITE PAINTED METAL HOUSING, 2 WHITE CIRCUIT BOARDS EACH WITH 120 LEDS, FROSTED HOLOGRAPHIC PLASTIC LENS. LENS FROSTED SIDE UP.

LAMP: TWO HUNDRED FORTY WHITE LIGHT EMITTING DIODES (LEDS), VERTICAL BASE-UP POSITION.

DRIVER: RD-052-A1050-R-080C

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:	CHROMA PROGRAMMABLE AC POWER SOURCE MODEL 61602	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	10/07/16

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

REPORT NUMBER: RAB01250
 DATE: 10/13/2015
 PREPARED FOR: RAB LIGHTING INC.
 CATALOG NUMBER: PANEL1X4-41YN (Standard Distribution)

RESULTS:

PHOTOMETRIC	
Total Integrated Flux (lumens)	4772 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.4099
Chromaticity Ordinate y	0.3933
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2377
Chromaticity Ordinate v'	0.5130
Correlated Color Temp CCT (K)	3421
ANSI C78.377-2008 Duv	0.000
Total Radiant Flux (milliWatts)	14589 *
ELECTRICAL	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.315
Input Power (Watts)	37.6
Input Power Factor (%)	99.5
Input Current THD (%)	6.6
Input Voltage THD (%)	0.2
EFFICACY (Lumens/Watt)	
126.9	
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.151
Input Power (Watts)	38.4
Input Power Factor (%)	92.1
Input Current THD (%)	9.9
Input Voltage THD (%)	0.2
Off-State Power (Watts)	
0.0	

COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	83
R1 Light greyish red	81
R2 Dark greyish yellow	89
R3 Strong yellowish green	94
R4 Moderate yellowish green	82
R5 Light bluish green	81
R6 Light blue	85
R7 Light violet	86
R8 Light reddish purple	65
R9 Strong red	15
R10 Strong yellow	73
R11 Strong green	80
R12 Strong blue	62
R13 Light yellowish pink (skin)	83
R14 Moderate olive green (leaf)	97

*NOTE:

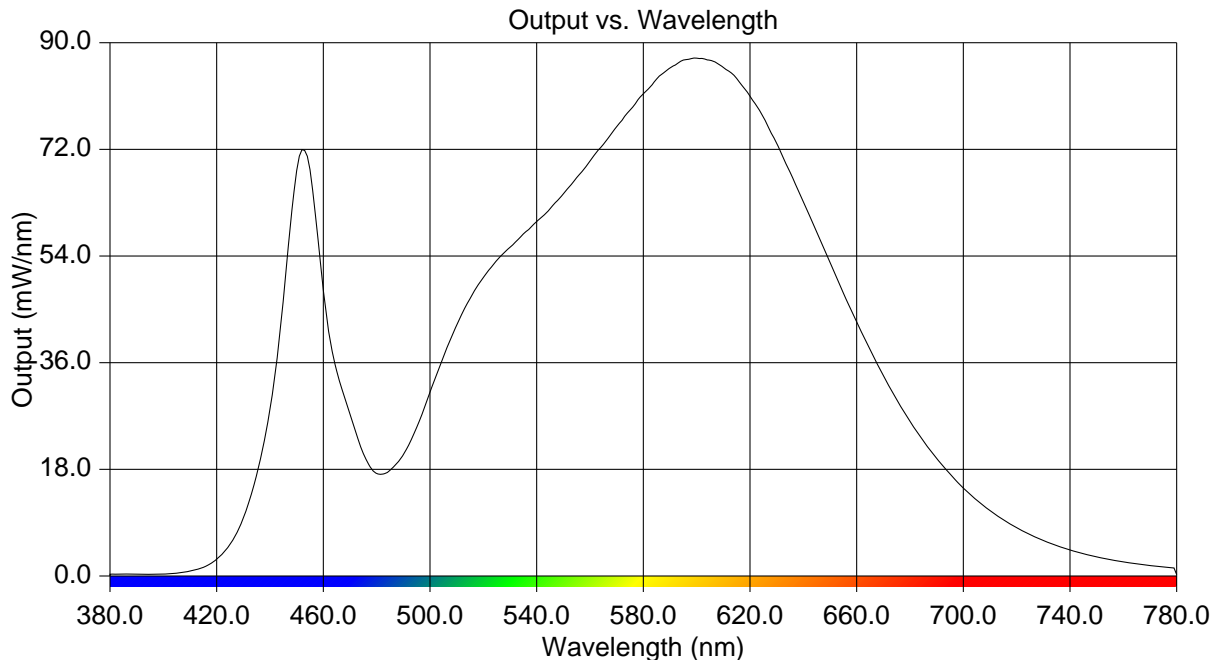
Proper calibration of integrating spheres for measuring total flux output of non-directional samples will produce reliable, repeatable results within the calibration tolerances of the equipment used. However, measurement of test samples with significant self absorption and/or directional output, even 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: RAB01250
 DATE: 10/13/2015
 PREPARED FOR: RAB LIGHTING INC.
 CATALOG NUMBER: PANEL1X4-41YN (Standard Distribution)

Page 3 of 4

RESULTS:

Wavelength	mW per nm	Wavelength	mW per nm	Wavelength	mW per nm
380	0.300	515	46.787	650	52.889
385	0.292	520	50.368	655	47.757
390	0.292	525	53.267	660	42.920
395	0.292	530	55.455	665	38.171
400	0.352	535	57.721	670	33.828
405	0.486	540	59.835	675	29.766
410	0.790	545	61.961	680	26.070
415	1.457	550	64.508	685	22.782
420	2.830	555	67.222	690	19.807
425	5.321	560	70.090	695	17.233
430	9.764	565	72.830	700	14.850
435	17.088	570	75.800	705	12.816
440	28.070	575	78.612	710	11.066
445	46.662	580	81.379	715	9.502
450	68.395	585	83.871	720	8.149
455	68.586	590	85.778	725	6.968
460	48.316	595	87.067	730	5.966
465	34.619	600	87.387	735	5.104
470	27.279	605	87.044	740	4.394
475	20.662	610	85.774	745	3.769
480	17.295	615	83.965	750	3.236
485	17.839	620	80.968	755	2.775
490	20.502	625	77.442	760	2.390
495	25.063	630	73.043	765	2.044
500	30.991	635	68.171	770	1.772
505	36.973	640	63.189	775	1.522
510	42.251	645	58.104	780	0.229



REPORT NUMBER: RAB01250
DATE: 10/13/2015
PREPARED FOR: RAB LIGHTING INC.
CATALOG NUMBER: PANEL1X4-41YN (Standard Distribution)

Page 4 of 4

CIE Chromaticity Diagram

