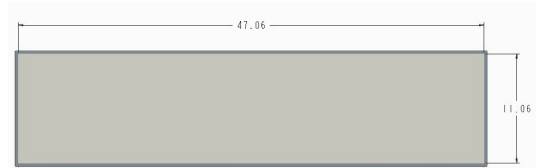


REPORT NUMBER: RAB01261
 ISSUE DATE: 10/14/15
 PREPARED FOR: RAB LIGHTING INC.
 CATALOG NUMBER: PANEL1X4-52YN (Standard Distribution)
 LUMINAIRE: FABRICATED WHITE PAINTED METAL HOUSING, 2 WHITE CIRCUIT
 BOARDS EACH WITH 120 LEDS, FROSTED HOLOGRAPHIC PLASTIC LENS. LENS
 FROSTED SIDE UP.
 LAMPS: TWO HUNDRED FORTY WHITE LIGHT EMITTING DIODES (LEDS), VERTICAL
 BASE-UP POSITION.
 NOTE: DATA SHOWN IS ABSOLUTE FOR THE
 SAMPLE PROVIDED.
 TOTAL INPUT WATTS = 50.567 W AT 277.0 VAC.
 LED DRIVER: RD-052-A1050-R
 TEST PROCEDURE: IESNA LM-79-08
 ACCREDITED LABORATORY CODE 201058-0

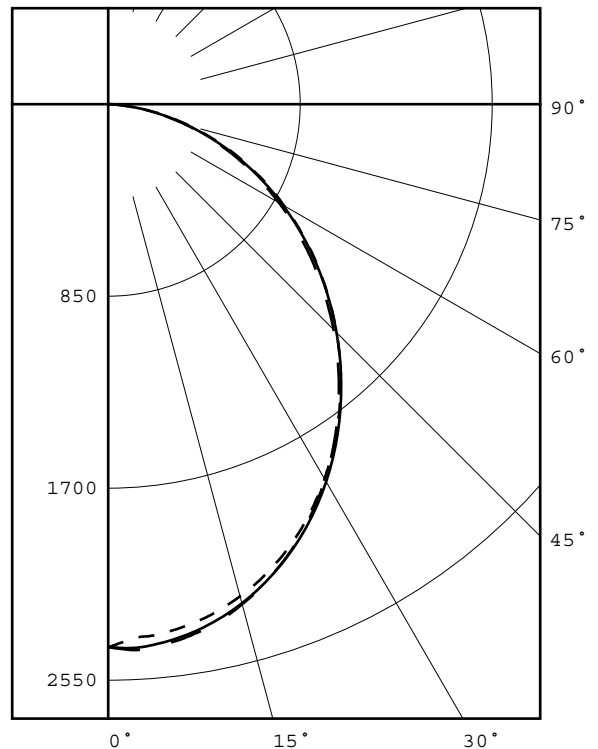
PAGE: 1 OF 5
 DATE SAMPLE TESTED: 10/14/15

CANDELA DISTRIBUTION						FLUX
0.0	22.5	45.0	67.5	90.0		
0	2404	2404	2404	2404	2404	
5	2360	2375	2400	2408	2410	227
15	2255	2267	2287	2290	2292	642
25	2051	2059	2070	2064	2064	950
35	1764	1769	1773	1763	1759	1105
45	1430	1434	1429	1415	1410	1099
55	1077	1082	1071	1054	1047	955
65	723	722	714	701	696	705
75	376	371	369	359	361	389
85	76	74	77	73	76	95
90	4	4	6	7	8	



ZONAL LUMEN SUMMARY		
ZONE	LUMENS	%FIXT
0- 30	1819	29.5
0- 40	2924	47.4
0- 60	4978	80.7
0- 90	6168	100.0
90-180	0	0.0
0-180	6168	100.0

TOTAL INPUT WATTS = 50.6
 EFFICACY = 121.9 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: RAB01261
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	2404	2404	2404	2404	2404
2.5	2369	2385	2410	2418	2419
5.0	2360	2375	2400	2408	2410
7.5	2343	2359	2383	2391	2393
10.0	2321	2335	2358	2365	2368
12.5	2292	2305	2326	2332	2335
15.0	2255	2267	2287	2290	2292
17.5	2214	2224	2242	2242	2244
20.0	2165	2176	2190	2190	2189
22.5	2112	2121	2133	2130	2130
25.0	2051	2059	2070	2064	2064
27.5	1985	1992	2002	1996	1993
30.0	1915	1922	1930	1923	1919
32.5	1841	1848	1853	1845	1841
35.0	1764	1769	1773	1763	1759
37.5	1684	1688	1689	1679	1674
40.0	1602	1604	1604	1593	1588
42.5	1517	1519	1518	1505	1500
45.0	1430	1434	1429	1415	1410
47.5	1342	1346	1340	1325	1319
50.0	1254	1257	1252	1234	1228
52.5	1166	1173	1163	1144	1138
55.0	1077	1082	1071	1054	1047
57.5	988	992	983	967	963
60.0	899	902	893	879	873
62.5	818	812	804	790	784
65.0	723	722	714	701	696
67.5	638	633	628	613	613
70.0	549	544	539	527	528
72.5	461	455	452	441	443
75.0	376	371	369	359	361
77.5	294	289	289	280	282
80.0	213	210	210	203	205
82.5	139	137	138	132	135
85.0	76	74	77	73	76
87.5	28	28	31	30	32
90.0	4	4	6	7	8

REPORT NUMBER: RAB01261
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PAGE: 3 OF 5
DATE SAMPLE TESTED: 10/14/15

ZONAL LUMEN SUMMARY

0- 5	57.
5- 10	170.
10- 15	275.
15- 20	368.
20- 25	445.
25- 30	504.
30- 35	543.
35- 40	561.
40- 45	560.
45- 50	539.
50- 55	503.
55- 60	452.
60- 65	389.
65- 70	316.
70- 75	236.
75- 80	153.
80- 85	75.
85- 90	19.

REPORT NUMBER: RAB01261
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	57
5- 10	170
10- 15	275
15- 20	368
20- 25	445
25- 30	504
30- 35	543
35- 40	561
40- 45	560
45- 50	539
50- 55	503
55- 60	452
60- 65	389
65- 70	316
70- 75	236
75- 80	153
80- 85	75
85- 90	19
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	227
0- 20	869
0- 30	1819
0- 40	2924
0- 50	4022
0- 60	4978
0- 70	5683
0- 80	6072
0- 90	6167
0-100	6168
0-110	6168
0-120	6168
0-130	6168
0-140	6168
0-150	6168
0-160	6168
0-170	6168
0-180	6168

REPORT NUMBER: RAB01261
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	43	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: RAB01262
DATE: 10/13/2015
PREPARED FOR: RAB LIGHTING INC.
CATALOG NUMBER: PANEL1X4-52YN (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

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: RAB01262
 DATE: 10/13/2015
 PREPARED FOR: RAB LIGHTING INC.
 CATALOG NUMBER: PANEL1X4-52YN (Standard Distribution)

RESULTS:

PHOTOMETRIC	
Total Integrated Flux (lumens)	6168 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.4100
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)	3419
ANSI C78.377-2008 Duv	0.000
Total Radiant Flux (milliWatts)	18836 *
ELECTRICAL	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.424
Input Power (Watts)	50.5
Input Power Factor (%)	99.3
Input Current THD (%)	6.3
Input Voltage THD (%)	0.2
EFFICACY (Lumens/Watt)	
122.1	
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.194
Input Power (Watts)	50.6
Input Power Factor (%)	94.2
Input Current THD (%)	9.2
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	64
R9 Strong red	13
R10 Strong yellow	73
R11 Strong green	80
R12 Strong blue	62
R13 Light yellowish pink (skin)	83
R14 Moderate olive green (leaf)	97

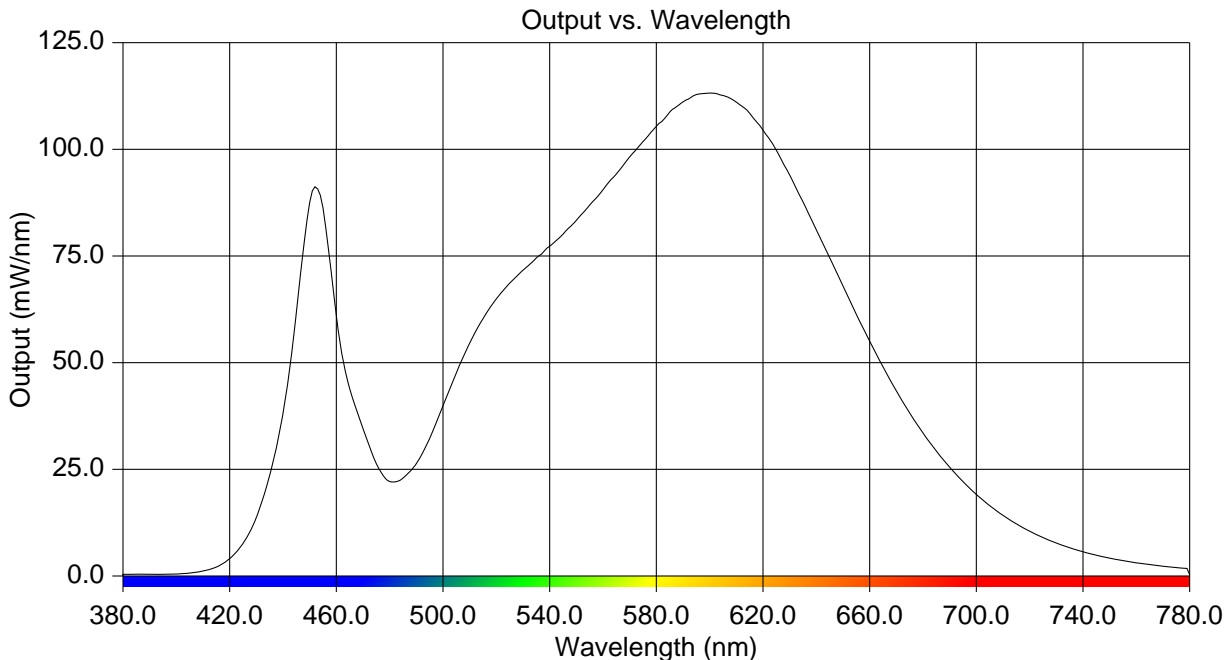
*NOTE:

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.

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 CATALOG NUMBER: PANEL1X4-52YN (Standard Distribution)

RESULTS:

Wavelength	mW per nm	Wavelength	mW per nm	Wavelength	mW per nm
380	0.374	515	60.297	650	67.929
385	0.405	520	64.991	655	61.318
390	0.394	525	68.653	660	55.079
395	0.419	530	71.654	665	48.931
400	0.494	535	74.556	670	43.431
405	0.674	540	77.325	675	38.201
410	1.126	545	80.097	680	33.497
415	2.087	550	83.345	685	29.271
420	4.070	555	86.941	690	25.464
425	7.606	560	90.626	695	22.133
430	13.694	565	94.228	700	19.108
435	23.626	570	98.201	705	16.474
440	38.023	575	101.819	710	14.217
445	61.541	580	105.390	715	12.241
450	87.523	585	108.723	720	10.493
455	86.285	590	111.184	725	8.968
460	61.057	595	112.838	730	7.688
465	43.927	600	113.187	735	6.604
470	34.526	605	112.645	740	5.666
475	26.321	610	111.054	745	4.899
480	22.143	615	108.451	750	4.182
485	22.946	620	104.497	755	3.588
490	26.368	625	99.763	760	3.099
495	32.225	630	94.020	765	2.648
500	39.881	635	87.701	770	2.295
505	47.563	640	81.154	775	1.965
510	54.560	645	74.610	780	0.299



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Page 4 of 4

CIE Chromaticity Diagram

