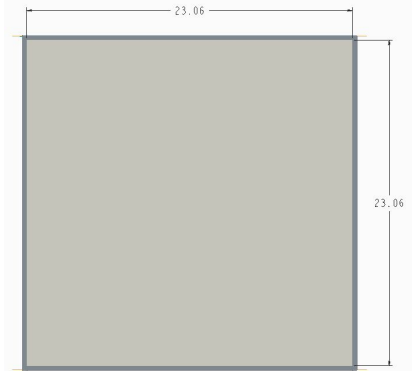


REPORT NUMBER: RAB01231
 ISSUE DATE: 10/09/15
 PREPARED FOR: RAB LIGHTING INC.
 CATALOG NUMBER: PANEL2X2-34YN (Standard Distribution)
 LUMINAIRE: FABRICATED WHITE PAINTED METAL HOUSING, 2 WHITE CIRCUIT
 BOARDS EACH WITH 120 LEDS, FROSTED HOLOGRAPHIC PLASTIC DIFFUSER.
 DIFFUSER FROSTED SIDE UP.
 LAMP: TWO HUNDRED FORTY WHITE LIGHT EMITTING DIODES (LEDS), VERTICAL
 BASE-UP POSITION.
 NOTE: DATA SHOWN IS ABSOLUTE FOR THE
 SAMPLE PROVIDED.
 TOTAL INPUT WATTS = 33.45 W AT 277.0 VAC.
 LED DRIVER: RD-042-A0700N
 TEST PROCEDURE: IESNA LM-79-08
 ACCREDITED LABORATORY CODE 201058-0

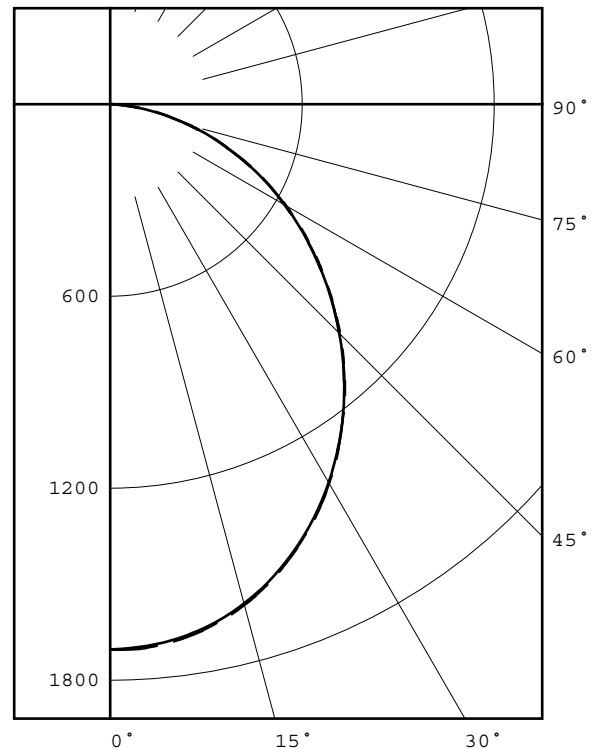
PAGE: 1 OF 5
 DATE SAMPLE TESTED: 10/09/15

CANDELA DISTRIBUTION						FLUX
	0.0	22.5	45.0	67.5	90.0	
0	1704	1704	1704	1704	1704	
5	1698	1695	1693	1696	1698	161
15	1619	1617	1615	1617	1620	456
25	1466	1465	1463	1468	1468	675
35	1255	1259	1256	1259	1257	787
45	1016	1016	1012	1016	1012	783
55	762	762	759	760	757	679
65	508	508	505	504	504	501
75	262	263	260	260	258	276
85	53	54	51	51	48	65
90	3	2	2	2	2	



ZONAL LUMEN SUMMARY		
ZONE	LUMENS	%FIXT
0- 30	1292	29.5
0- 40	2078	47.4
0- 60	3540	80.8
0- 90	4383	100.0
90-180	0	0.0
0-180	4383	100.0

TOTAL INPUT WATTS = 33.5
 EFFICACY = 130.8 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: RAB01231
 ISSUE DATE: 10/09/15
 PREPARED FOR: RAB LIGHTING INC.

PAGE: 2 OF 5
 DATE SAMPLE TESTED: 10/09/15

CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0
0.0	1704	1704	1704	1704	1704
2.5	1705	1702	1700	1702	1705
5.0	1698	1695	1693	1696	1698
7.5	1686	1683	1681	1683	1686
10.0	1669	1666	1664	1666	1670
12.5	1646	1645	1643	1645	1648
15.0	1619	1617	1615	1617	1620
17.5	1588	1586	1584	1588	1589
20.0	1551	1548	1547	1551	1551
22.5	1509	1509	1507	1511	1511
25.0	1466	1465	1463	1468	1468
27.5	1418	1419	1416	1420	1420
30.0	1368	1369	1365	1370	1369
32.5	1313	1316	1312	1316	1315
35.0	1255	1259	1256	1259	1257
37.5	1200	1202	1198	1201	1199
40.0	1141	1141	1138	1141	1138
42.5	1079	1080	1076	1079	1076
45.0	1016	1016	1012	1016	1012
47.5	953	952	949	952	949
50.0	888	889	885	888	884
52.5	825	825	821	824	820
55.0	762	762	759	760	757
57.5	698	698	695	696	693
60.0	635	635	631	632	629
62.5	571	571	569	568	569
65.0	508	508	505	504	504
67.5	444	444	441	441	440
70.0	382	384	379	379	378
72.5	323	324	322	320	319
75.0	262	263	260	260	258
77.5	203	204	201	202	199
80.0	150	149	145	147	143
82.5	97	97	95	95	94
85.0	53	54	51	51	48
87.5	20	20	19	19	16
90.0	3	2	2	2	2

REPORT NUMBER: RAB01231
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PAGE: 3 OF 5
DATE SAMPLE TESTED: 10/09/15

ZONAL LUMEN SUMMARY

0- 5	41.
5- 10	120.
10- 15	195.
15- 20	261.
20- 25	316.
25- 30	359.
30- 35	387.
35- 40	400.
40- 45	399.
45- 50	384.
50- 55	358.
55- 60	322.
60- 65	277.
65- 70	224.
70- 75	168.
75- 80	109.
80- 85	53.
85- 90	13.

REPORT NUMBER: RAB01231
ISSUE DATE: 10/09/15
PREPARED FOR: RAB LIGHTING INC.

PAGE: 4 OF 5
DATE SAMPLE TESTED: 10/09/15

5-DEGREE
ZONAL LUMEN SUMMARY

0- 5	41
5- 10	120
10- 15	195
15- 20	261
20- 25	316
25- 30	359
30- 35	387
35- 40	400
40- 45	399
45- 50	384
50- 55	358
55- 60	322
60- 65	277
65- 70	224
70- 75	168
75- 80	109
80- 85	53
85- 90	13
90- 95	0
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	161
0- 20	617
0- 30	1292
0- 40	2078
0- 50	2861
0- 60	3540
0- 70	4041
0- 80	4317
0- 90	4383
0-100	4383
0-110	4383
0-120	4383
0-130	4383
0-140	4383
0-150	4383
0-160	4383
0-170	4383
0-180	4383

REPORT NUMBER: RAB01231
 ISSUE DATE: 10/09/15

PAGE: 5 OF 5
 DATE SAMPLE TESTED: 10/09/15

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: RAB01232
DATE: 10/12/2015
PREPARED FOR: RAB LIGHTING INC.
CATALOG NUMBER: PANEL2X2-34YN (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 DIFFUSER. DIFFUSER FROSTED SIDE UP.

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

DRIVER: RD-042-A0700N

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: RAB01232
 DATE: 10/12/2015
 PREPARED FOR: RAB LIGHTING INC.
 CATALOG NUMBER: PANEL2X2-34YN (Standard Distribution)

RESULTS:

PHOTOMETRIC	
Total Integrated Flux (lumens)	4383 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.4094
Chromaticity Ordinate y	0.3931
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2374
Chromaticity Ordinate v'	0.5129
Correlated Color Temp CCT (K)	3430
ANSI C78.377-2008 Duv	0.000
Total Radiant Flux (milliWatts)	13376 *
ELECTRICAL	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.277
Input Power (Watts)	33.0
Input Power Factor (%)	99.3
Input Current THD (%)	6.6
Input Voltage THD (%)	0.2
EFFICACY (Lumens/Watt)	
132.8	
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.129
Input Power (Watts)	33.5
Input Power Factor (%)	93.8
Input Current THD (%)	11.1
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	88
R3 Strong yellowish green	94
R4 Moderate yellowish green	82
R5 Light bluish green	81
R6 Light blue	84
R7 Light violet	86
R8 Light reddish purple	65
R9 Strong red	14
R10 Strong yellow	72
R11 Strong green	81
R12 Strong blue	62
R13 Light yellowish pink (skin)	82
R14 Moderate olive green (leaf)	96

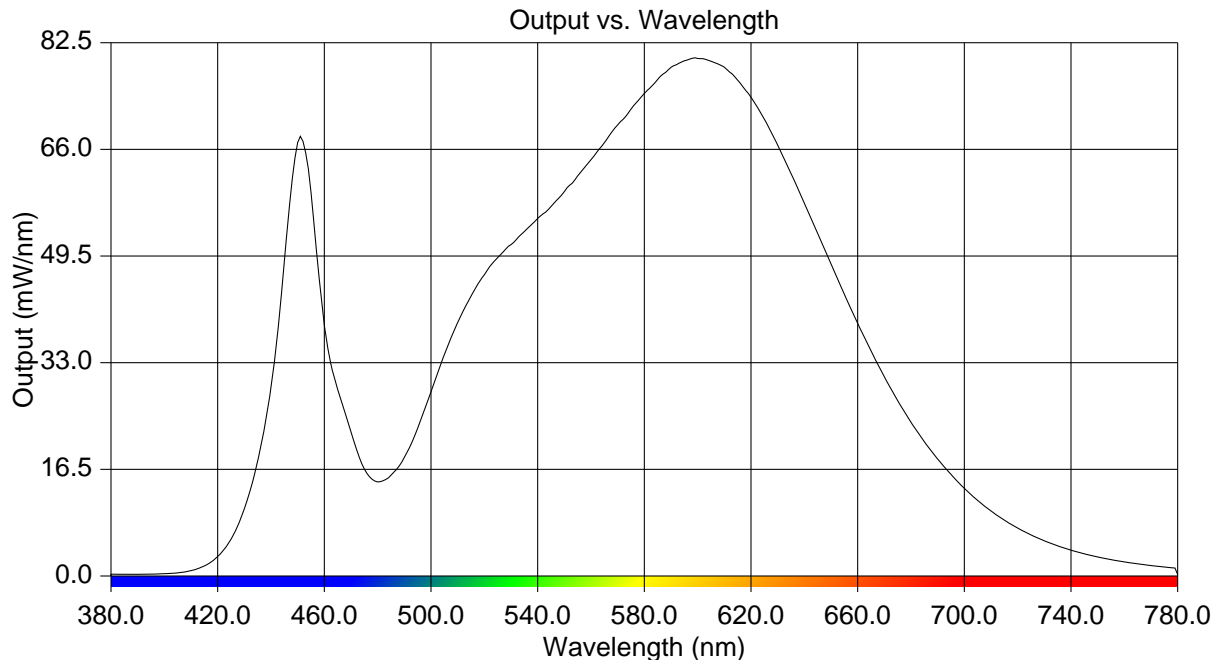
*NOTE:

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: RAB01232
 DATE: 10/12/2015
 PREPARED FOR: RAB LIGHTING INC.
 CATALOG NUMBER: PANEL2X2-34YN (Standard Distribution)

RESULTS:

Wavelength	mW per nm	Wavelength	mW per nm	Wavelength	mW per nm
380	0.261	515	43.246	650	48.263
385	0.260	520	46.596	655	43.587
390	0.268	525	49.242	660	39.089
395	0.281	530	51.261	665	34.783
400	0.360	535	53.281	670	30.823
405	0.481	540	55.326	675	27.175
410	0.822	545	57.155	680	23.786
415	1.554	550	59.522	685	20.775
420	3.007	555	61.888	690	18.055
425	5.687	560	64.393	695	15.722
430	10.380	565	66.975	700	13.554
435	17.890	570	69.777	705	11.701
440	29.072	575	72.220	710	10.048
445	48.578	580	74.636	715	8.632
450	67.053	585	76.805	720	7.415
455	59.380	590	78.686	725	6.355
460	38.999	595	79.694	730	5.434
465	28.862	600	80.057	735	4.663
470	22.260	605	79.654	740	3.979
475	16.548	610	78.707	745	3.436
480	14.549	615	76.691	750	2.946
485	15.588	620	74.094	755	2.532
490	18.343	625	70.727	760	2.170
495	22.858	630	66.657	765	1.880
500	28.600	635	62.257	770	1.620
505	34.165	640	57.738	775	1.392
510	39.212	645	53.002	780	0.208



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CIE Chromaticity Diagram

