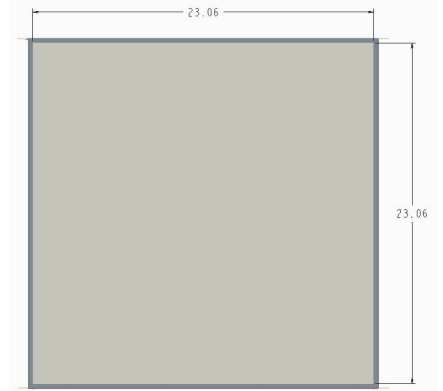


REPORT NUMBER: RAB01255  
 ISSUE DATE: 10/09/15  
 PREPARED FOR: RAB LIGHTING INC.  
 CATALOG NUMBER: PANEL2X2-52YN (Standard Distribution)  
 LUMINAIRE: FABRICATED WHITE PAINTED METAL HOUSING, 2 WHITE CIRCUIT  
 BOARDS EACH WITH 120 LEDS, FROSTED HOLOGRAPHIC PLASTIC DIFFUSER.  
 DIFFUSER FROSTED SIDE UP.  
 LAMPS: TWO HUNDRED FORTY WHITE LIGHT EMITTING DIODES (LEDS), VERTICAL  
 BASE-UP POSITION.  
 MOUNTING: RECESSED  
 NOTE: DATA SHOWN IS ABSOLUTE FOR THE  
 SAMPLE PROVIDED.  
 TOTAL INPUT WATTS = 50.424 W AT 277.0 VAC.  
 LED DRIVER: RD-052-A1050-R  
 TEST PROCEDURE: IESNA LM-79-08  
 ACCREDITED LABORATORY CODE 201058-0

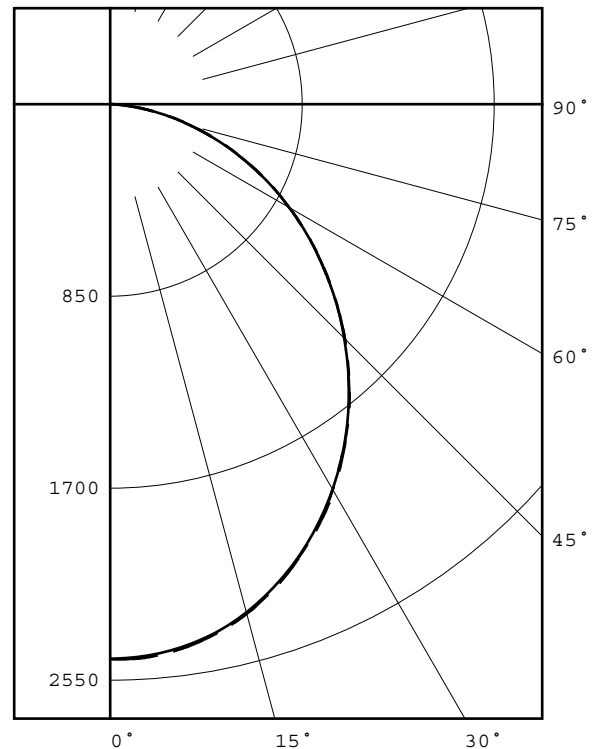
PAGE: 1 OF 5  
 DATE SAMPLE TESTED: 10/09/15



CANDELA DISTRIBUTION						FLUX
0.0	22.5	45.0	67.5	90.0		
0	2456	2456	2456	2456	2456	
5	2448	2444	2441	2444	2449	232
15	2334	2330	2329	2330	2336	657
25	2113	2109	2110	2109	2115	972
35	1815	1813	1814	1811	1817	1134
45	1469	1466	1465	1464	1470	1131
55	1102	1098	1100	1095	1099	982
65	735	732	732	727	731	723
75	379	375	376	370	373	396
85	76	73	74	70	72	93
90	4	3	4	3	3	

ZONAL LUMEN SUMMARY		
ZONE	LUMENS	%FIXT
0- 30	1860	29.4
0- 40	2994	47.4
0- 60	5107	80.8
0- 90	6320	100.0
90-180	0	0.0
0-180	6320	100.0

TOTAL INPUT WATTS = 50.4  
 EFFICACY = 125.4 Lm/W  
 CIE TYPE - DIRECT  
 PLANE : 0-DEG 90-DEG  
 SPACING CRITERIA : 1.2 1.2



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

Checked X.CAO  
 Approved D.WANG-MUNSON

REPORT NUMBER: RAB01255  
 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	2456	2456	2456	2456	2456
2.5	2458	2453	2451	2453	2458
5.0	2448	2444	2441	2444	2449
7.5	2430	2426	2424	2426	2431
10.0	2406	2401	2400	2402	2407
12.5	2374	2370	2369	2370	2375
15.0	2334	2330	2329	2330	2336
17.5	2288	2284	2282	2285	2290
20.0	2235	2231	2230	2231	2237
22.5	2176	2172	2172	2173	2178
25.0	2113	2109	2110	2109	2115
27.5	2044	2041	2041	2042	2050
30.0	1971	1968	1968	1968	1977
32.5	1892	1893	1892	1890	1898
35.0	1815	1813	1814	1811	1817
37.5	1735	1731	1730	1731	1733
40.0	1648	1642	1644	1644	1645
42.5	1558	1556	1555	1555	1556
45.0	1469	1466	1465	1464	1470
47.5	1377	1375	1376	1373	1378
50.0	1286	1282	1283	1280	1285
52.5	1194	1190	1190	1188	1192
55.0	1102	1098	1100	1095	1099
57.5	1010	1007	1008	1003	1007
60.0	918	915	916	910	915
62.5	826	824	824	818	823
65.0	735	732	732	727	731
67.5	644	640	641	634	639
70.0	554	549	551	544	548
72.5	465	460	461	454	458
75.0	379	375	376	370	373
77.5	297	291	292	287	289
80.0	215	210	211	206	208
82.5	140	137	137	132	135
85.0	76	73	74	70	72
87.5	28	26	27	25	25
90.0	4	3	4	3	3

REPORT NUMBER: RAB01255  
ISSUE DATE: 10/09/15  
PREPARED FOR: RAB LIGHTING INC.

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

ZONAL LUMEN SUMMARY

0- 5	59.
5- 10	173.
10- 15	281.
15- 20	376.
20- 25	455.
25- 30	516.
30- 35	557.
35- 40	577.
40- 45	576.
45- 50	555.
50- 55	517.
55- 60	465.
60- 65	400.
65- 70	324.
70- 75	240.
75- 80	156.
80- 85	75.
85- 90	18.

REPORT NUMBER: RAB01255  
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	59
5- 10	173
10- 15	281
15- 20	376
20- 25	455
25- 30	516
30- 35	557
35- 40	577
40- 45	576
45- 50	555
50- 55	517
55- 60	465
60- 65	400
65- 70	324
70- 75	240
75- 80	156
80- 85	75
85- 90	18
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	232
0- 20	889
0- 30	1860
0- 40	2994
0- 50	4125
0- 60	5107
0- 70	5831
0- 80	6227
0- 90	6320
0-100	6320
0-110	6320
0-120	6320
0-130	6320
0-140	6320
0-150	6320
0-160	6320
0-170	6320
0-180	6320

REPORT NUMBER: RAB01255  
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	105	100	97	106	102	98	95	98	95	92	94	92	89	91	88	87	85
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: RAB01256  
DATE: 10/8/2015  
PREPARED FOR: RAB LIGHTING INC.  
CATALOG NUMBER: PANEL2X2-52YN (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 DIFFUSER. DIFFUSER 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: N/A  
CHROMA PROGRAMMABLE DIGITAL POWER METER MODEL 66202 3/9/16  
OCEAN OPTICS QE65PRO Spectroradiometer 10/07/16  
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: RAB01256  
 DATE: 10/8/2015  
 PREPARED FOR: RAB LIGHTING INC.  
 CATALOG NUMBER: PANEL2X2-52YN (Standard Distribution)

RESULTS:

<b>PHOTOMETRIC</b>	
Total Integrated Flux (lumens)	6320 *
<b>SPECTRORADIOMETRIC</b>	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.4092
Chromaticity Ordinate y	0.3930
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2373
Chromaticity Ordinate v'	0.5128
Correlated Color Temp CCT (K)	3434
ANSI C78.377-2008 Duv	0.000
Total Radiant Flux (milliWatts)	19289 *
<b>ELECTRICAL</b>	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.423
Input Power (Watts)	50.4
Input Power Factor (%)	99.3
Input Current THD (%)	6.3
Input Voltage THD (%)	0.2
<b>EFFICACY (Lumens/Watt)</b>	
125.4	
<b>ELECTRICAL AT MAX NONIMAL INPUT</b>	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.193
Input Power (Watts)	50.4
Input Power Factor (%)	94.3
Input Current THD (%)	9.5
Input Voltage THD (%)	0.2
<b>Off-State Power (Watts)</b>	
0.0	

COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	82
R1 Light greyish red	81
R2 Dark greyish yellow	88
R3 Strong yellowish green	93
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	13
R10 Strong yellow	71
R11 Strong green	80
R12 Strong blue	62
R13 Light yellowish pink (skin)	82
R14 Moderate olive green (leaf)	96

\*NOTE:

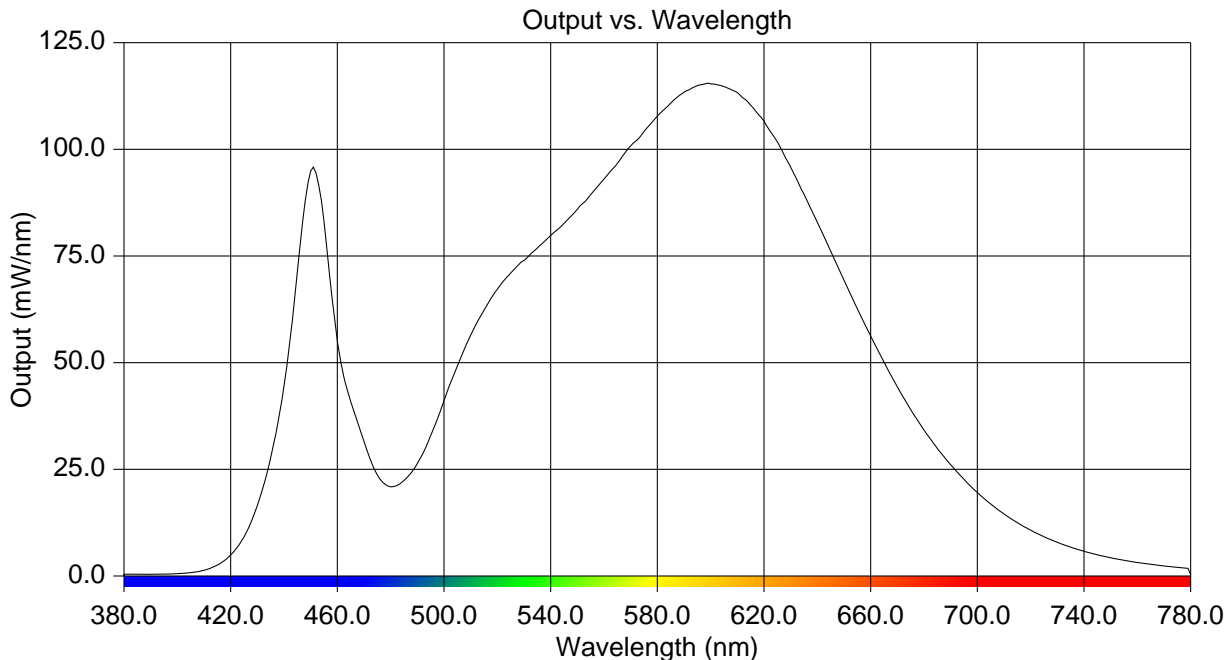
Proper calibration of integrating spheres for measuring total flux output of non-directional samples will produce reliable, repeatable results within the calibration tolerances of the equipment used. However, measurement of test samples with significant self absorption and/or directional output, even 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: RAB01256  
 DATE: 10/8/2015  
 PREPARED FOR: RAB LIGHTING INC.  
 CATALOG NUMBER: PANEL2X2-52YN (Standard Distribution)

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RESULTS:

Wavelength	mW per nm	Wavelength	mW per nm	Wavelength	mW per nm
380	0.376	515	62.267	650	69.327
385	0.405	520	67.204	655	62.652
390	0.411	525	71.016	660	56.094
395	0.420	530	73.960	665	50.018
400	0.547	535	76.860	670	44.361
405	0.788	540	79.869	675	39.027
410	1.327	545	82.645	680	34.207
415	2.553	550	86.030	685	29.903
420	4.931	555	89.384	690	26.017
425	9.172	560	93.020	695	22.660
430	16.497	565	96.620	700	19.531
435	27.779	570	100.792	705	16.905
440	44.208	575	104.176	710	14.552
445	71.332	580	107.775	715	12.480
450	94.897	585	110.766	720	10.726
455	83.107	590	113.445	725	9.169
460	55.385	595	114.938	730	7.862
465	40.913	600	115.346	735	6.753
470	31.480	605	114.763	740	5.777
475	23.677	610	113.331	745	4.985
480	20.887	615	110.362	750	4.283
485	22.386	620	106.634	755	3.671
490	26.355	625	101.740	760	3.156
495	32.900	630	95.815	765	2.727
500	41.080	635	89.482	770	2.339
505	49.147	640	82.987	775	2.029
510	56.439	645	76.140	780	0.304





REPORT NUMBER: RAB01256  
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CATALOG NUMBER: PANEL2X2-52YN (Standard Distribution)

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## CIE Chromaticity Diagram

