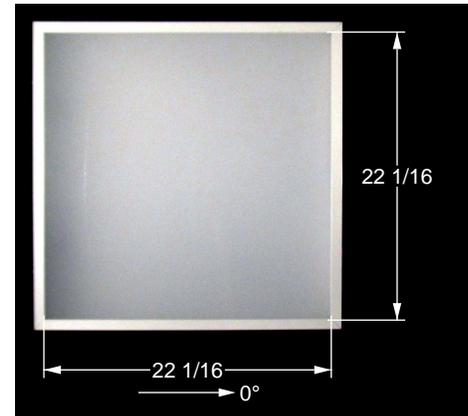


REPORT NUMBER: ITL80224
 ISSUE DATE: 12/19/13
 PREPARED FOR: RAB LIGHTING, INC.
 CATALOG NUMBER: PANEL2X2-52N
 LUMINAIRE: FABRICATED WHITE PAINTED METAL HOUSING, 2 WHITE CIRCUIT BOARDS EACH WITH 120 LEDS, FROSTED HOLOGRAPHIC PLASTIC DIFFUSER. DIFFUSER FROSTED SIDE UP.
 LAMPS: TWO HUNDRED FORTY WHITE LIGHT EMITTING DIODES (LEDS), VERTICAL BASE-UP POSITION.
 TOTAL INPUT WATTS = 53.0 AT 120.0 VOLTS
 MOUNTING: RECESSED
 LED DRIVER: RAB RD-052-A1050-R
 NOTE: DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED AT RATED INPUT VOLTAGE (120VAC, 60Hz) TO THE LED DRIVER.
 TEST PROCEDURE: IESNA LM-79-08
 TEST DISTANCE = 35.0 FEET

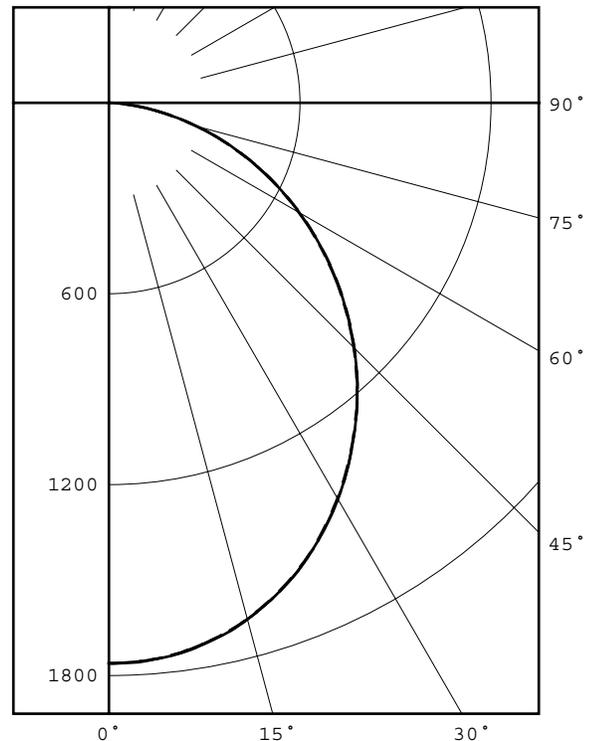


CANDELA DISTRIBUTION						FLUX
	0.0	22.5	45.0	67.5	90.0	
0	1762	1762	1762	1762	1762	167
5	1753	1754	1754	1754	1753	474
15	1679	1681	1681	1680	1680	706
25	1532	1534	1534	1533	1534	831
35	1327	1331	1329	1329	1329	840
45	1090	1089	1089	1087	1087	739
55	828	826	826	827	823	549
65	556	555	555	556	552	303
75	284	285	286	287	286	71
85	54	57	57	55	56	
90	0	0	0	0	0	

ZONAL LUMEN SUMMARY		
ZONE	LUMENS	% FIXT
0- 30	1346	28.8
0- 40	2178	46.5
0- 60	3756	80.3
0- 90	4679	100.0
90-180	0	0.0
0-180	4679	100.0

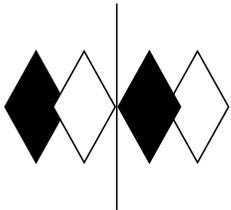
EFFICACY = 88.3 lm/w
 CIE TYPE - DIRECT
 PLANE : 0-DEG 90-DEG
 SPACING CRITERIA : 1.21 1.22
 LUMINOUS LENGTH : 22.063 22.063

LUMINANCE DATA IN CANDELA/SQ M				
ANGLE IN DEG	AVERAGE 0-DEG	AVERAGE 45-DEG	AVERAGE 90-DEG	
45	4909.	4904.	4895.	
55	4597.	4586.	4569.	
65	4189.	4182.	4159.	
75	3494.	3519.	3519.	
85	1973.	2083.	2046.	



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

Checked M KLOPF
 Approved R BEATTIE
 Lighting Engineer



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INDEPENDENT TESTING LABORATORIES, INC.
 4066 CAMELOT CIRCLE, LONGMONT, CO 80504 USA

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REPORT NUMBER: ITL80224
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PAGE: 2 OF 5

CANDELA DISTRIBUTION
 LATERAL ANGLE

	0.0	22.5	45.0	67.5	90.0
0.0	1762	1762	1762	1762	1762
2.5	1759	1760	1761	1760	1759
5.0	1753	1754	1754	1754	1753
7.5	1742	1743	1744	1743	1742
10.0	1725	1726	1727	1726	1725
12.5	1705	1706	1707	1706	1705
15.0	1679	1681	1681	1680	1680
17.5	1648	1650	1650	1649	1650
20.0	1614	1616	1616	1615	1616
22.5	1575	1578	1578	1577	1577
25.0	1532	1534	1534	1533	1534
27.5	1484	1487	1488	1486	1487
30.0	1435	1439	1438	1436	1438
32.5	1382	1386	1385	1385	1385
35.0	1327	1331	1329	1329	1329
37.5	1269	1273	1272	1271	1272
40.0	1215	1213	1213	1211	1212
42.5	1153	1152	1152	1150	1150
45.0	1090	1089	1089	1087	1087
47.5	1026	1025	1024	1024	1022
50.0	961	960	959	959	957
52.5	895	893	893	894	891
55.0	828	826	826	827	823
57.5	760	759	758	759	756
60.0	692	691	691	692	688
62.5	624	623	622	624	620
65.0	556	555	555	556	552
67.5	488	487	487	488	484
70.0	421	419	419	420	416
72.5	353	352	352	353	352
75.0	284	285	286	287	286
77.5	220	221	221	221	222
80.0	159	160	160	160	161
82.5	103	105	106	104	104
85.0	54	57	57	55	56
87.5	20	21	21	20	20
90.0	0	0	0	0	0



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PAGE: 3 OF 5

5-DEGREE
ZONAL LUMEN SUMMARY

0- 5	42
5- 10	125
10- 15	202
15- 20	272
20- 25	330
25- 30	376
30- 35	407
35- 40	424
40- 45	426
45- 50	414
50- 55	388
55- 60	350
60- 65	303
65- 70	246
70- 75	184
75- 80	119
80- 85	58
85- 90	13

10-DEGREE
ZONAL LUMEN SUMMARY

0- 10	167
0- 20	640
0- 30	1346
0- 40	2178
0- 50	3017
0- 60	3756
0- 70	4305
0- 80	4608
0- 90	4679



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REPORT NUMBER: ITL80224

PAGE: 4 OF 5

ISSUE DATE: 12/19/13

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	119	116	116	116	116	111	111	111	111	111	111	106	106	106	102	102	102	100
1	109	104	100	96	96	106	102	98	95	98	95	92	94	91	89	90	88	86	90	88	86	84
2	99	91	84	79	79	97	89	83	78	86	81	76	82	78	74	79	76	73	79	76	73	71
3	91	80	72	66	66	88	79	71	65	76	69	64	73	67	63	70	66	62	70	66	62	60
4	83	71	63	56	56	81	70	62	55	67	60	55	65	59	54	63	58	53	63	58	53	51
5	76	64	55	48	48	74	63	54	48	60	53	47	59	52	47	57	51	46	57	51	46	44
6	71	57	49	42	42	69	56	48	42	55	47	42	53	46	41	51	46	41	51	46	41	39
7	66	52	43	37	37	64	51	43	37	50	42	37	48	42	37	47	41	36	47	41	36	34
8	61	48	39	33	33	60	47	39	33	46	38	33	44	38	33	43	37	33	43	37	33	31
9	57	44	36	30	30	56	43	35	30	42	35	30	41	34	30	40	34	30	40	34	30	28
10	54	40	33	27	27	52	40	32	27	39	32	27	38	32	27	37	31	27	37	31	27	25

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 TEST SAMPLE.



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NVLAP LAB CODE: 200925-0

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PAGE: 5 OF 5

ADDRESS: 170 LUDLOW AVE
NORTHVALE, NJ 07647

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Page 1 of 4

REPORT NUMBER: ITL80227
DATE: 12/27/13
PREPARED FOR: RAB LIGHTING, INC.
CATALOG NUMBER: PANEL2X2-52N

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: RAB RD-052-A1050-R

NOTE: DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED AT RATED INPUT VOLTAGE (120.0 AND 277.0 VAC, 60Hz) TO THE LED DRIVER.

		Calibration Due:
INSTRUMENTS:	Associated Power Technologies APT5010 AC Power Source	N/A
	Yokogawa WT210 Digital Power Meter #6	10/31/14
	Ocean Optics QE65000 Spectroradiometer	10/17/14
	ITL 1.5m Diameter Integrating Sphere S15-2, 4PI Geometry	10/17/14

OBJECT OF TEST: Measure the 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. Report Off-State Power. Measure electrical data including Total Harmonic Distortion (THD) at maximum rated voltage.

PROCEDURE: The test sample was provided by the customer and had an unknown number of operating hours. The test sample was mounted inside the integrating sphere 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 120.0 VAC input. Electrical data was also recorded at maximum nominal rated input voltage (277.0 VAC). All testing performed in a 25 +/-1 degree Celsius free air ambient and in accordance with IESNA LM-79-08. 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)

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Checked	<u>N THOMAS</u>
Approved	<u>L GRABA</u> Lighting Engineer



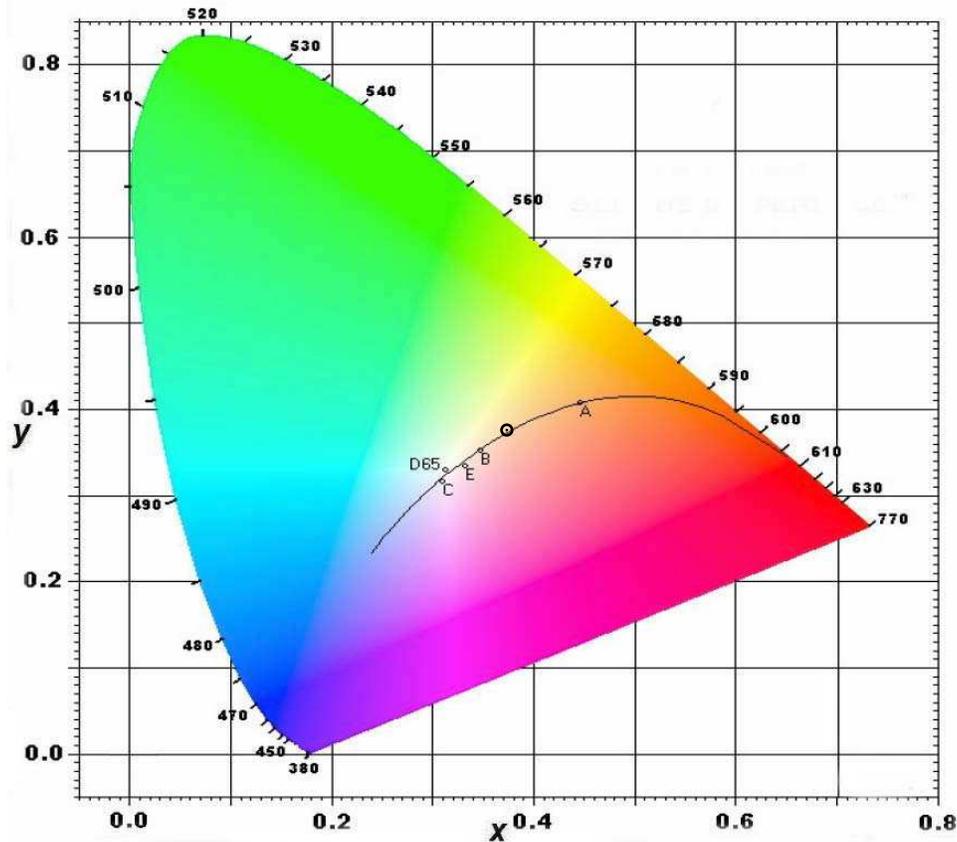
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 NVLAP LAB CODE: 200925-0

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CIE Chromaticity Diagram





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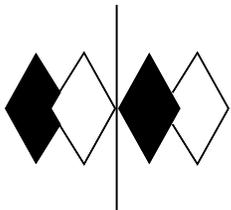
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RESULTS:

SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.3732
Chromaticity Ordinate y	0.3756
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2208
Chromaticity Ordinate v'	0.5000
Correlated Color Temp CCT (K)	4196
ANSI C78.377-2008 Duv	0.002
Total Radiant Flux (milliWatts)	15007 *
ELECTRICAL	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.445
Input Power (Watts)	53.0
Input Power Factor (%)	99.3
Input Current THD (%)	7.1
Input Voltage THD (%)	0.2
Off-State Power (Watts)	
	0.0
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.200
Input Power (Watts)	53.0
Input Power Factor (%)	95.7
Input Current THD (%)	7.1
Input Voltage THD (%)	0.3

COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	83
R1 Light greyish red	81
R2 Dark greyish yellow	86
R3 Strong yellowish green	89
R4 Moderate yellowish green	83
R5 Light bluish green	81
R6 Light blue	80
R7 Light violet	89
R8 Light reddish purple	72
R9 Strong red	23
R10 Strong yellow	66
R11 Strong green	82
R12 Strong blue	60
R13 Light yellowish pink (skin)	82
R14 Moderate olive green (leaf)	94

*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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RESULTS:

Wavelength	mW per nm	Wavelength	mW per nm	Wavelength	mW per nm
380	0.639	515	53.121	650	47.559
385	0.702	520	56.691	655	43.990
390	0.817	525	59.451	660	40.443
395	0.991	530	61.767	665	36.890
400	1.243	535	63.738	670	33.430
405	1.841	540	65.568	675	30.160
410	2.849	545	67.234	680	27.166
415	4.537	550	68.919	685	24.473
420	7.955	555	70.400	690	22.044
425	13.889	560	71.811	695	19.796
430	23.248	565	72.867	700	17.682
435	37.139	570	73.816	705	15.709
440	60.137	575	74.557	710	13.907
445	86.321	580	74.951	715	12.293
450	86.117	585	75.049	720	10.822
455	61.948	590	74.881	725	9.536
460	44.015	595	74.298	730	8.375
465	33.463	600	73.333	735	7.357
470	25.193	605	72.101	740	6.447
475	20.917	610	70.547	745	5.659
480	20.308	615	68.703	750	4.976
485	21.935	620	66.533	755	4.374
490	25.740	625	63.970	760	3.843
495	31.352	630	61.145	765	3.378
500	37.490	635	57.984	770	2.973
505	43.462	640	54.604	775	2.606
510	48.688	645	51.120	780	2.290

