

REPORT NUMBER: ITL80218

PAGE: 1 OF 5

ISSUE DATE: 12/20/13

PREPARED FOR: RAB LIGHTING, INC.

CATALOG NUMBER: PANEL2X2-41N

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 = 39.4 AT 120.0 VOLTS

MOUNTING: RECESSED

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

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

	0.0	22.5	45.0	67.5	90.0	
0	1412	1412	1412	1412	1412	
5	1405	1406	1406	1406	1405	133
15	1346	1347	1348	1346	1345	380
25	1228	1229	1231	1229	1230	566
35	1065	1065	1066	1066	1065	666
45	870	873	874	874	871	673
55	659	661	662	663	663	592
65	442	445	445	445	445	440
75	227	230	231	231	230	244
85	46	46	46	47	45	58
90	0	0	0	0	0	

FLUX

ZONAL LUMEN SUMMARY

ZONE	LUMENS	%FIXT
0- 30	1079	28.8
0- 40	1746	46.5
0- 60	3011	80.2
0- 90	3753	100.0
90-180	0	0.0
0-180	3753	100.0

EFFICACY = 95.3 lm/W

CIE TYPE - DIRECT

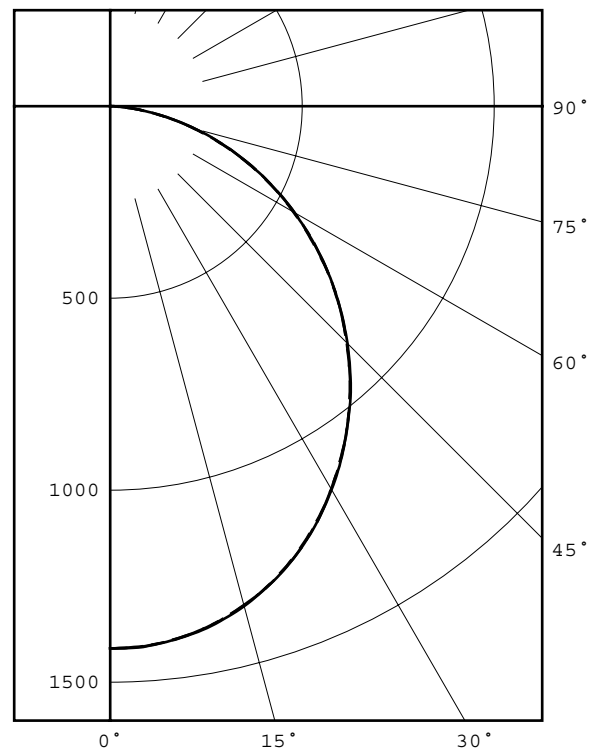
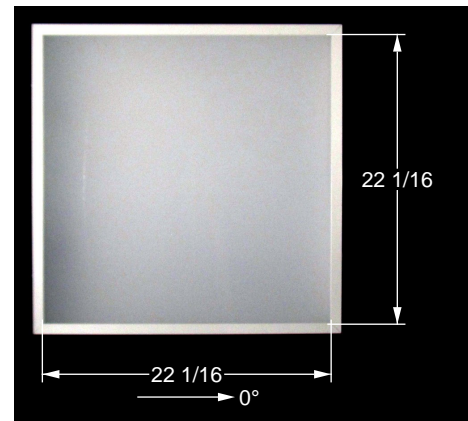
PLANE : 0-DEG 90-DEG

SPACING CRITERIA : 1.21 1.21

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	3918.	3936.	3922.
55	3659.	3675.	3681.
65	3330.	3353.	3353.
75	2793.	2842.	2830.
85	1681.	1681.	1644.



LEGEND:

0-deg - - - - -
45-deg - - - - -
90-deg - - - - -

Checked M KLOPF
Approved R BEATTIE
Lighting Engineer



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CANDELA DISTRIBUTION LATERAL ANGLE

	0.0	22.5	45.0	67.5	90.0
0.0	1412	1412	1412	1412	1412
2.5	1411	1411	1412	1412	1410
5.0	1405	1406	1406	1406	1405
7.5	1396	1397	1397	1397	1396
10.0	1383	1384	1385	1384	1383
12.5	1366	1367	1368	1367	1366
15.0	1346	1347	1348	1346	1345
17.5	1322	1323	1323	1323	1323
20.0	1294	1295	1296	1295	1295
22.5	1263	1264	1265	1264	1265
25.0	1228	1229	1231	1229	1230
27.5	1191	1193	1193	1193	1193
30.0	1151	1152	1153	1152	1151
32.5	1108	1110	1111	1110	1109
35.0	1065	1065	1066	1066	1065
37.5	1019	1019	1020	1020	1019
40.0	971	972	974	972	972
42.5	921	923	924	924	922
45.0	870	873	874	874	871
47.5	821	821	822	822	820
50.0	768	769	770	770	770
52.5	716	716	717	717	717
55.0	659	661	662	663	663
57.5	605	607	608	608	609
60.0	551	553	554	554	554
62.5	497	500	499	499	500
65.0	442	445	445	445	445
67.5	388	391	390	390	391
70.0	333	337	336	337	336
72.5	280	283	284	283	283
75.0	227	230	231	231	230
77.5	180	179	179	181	178
80.0	131	130	130	131	129
82.5	85	84	85	86	84
85.0	46	46	46	47	45
87.5	17	17	17	18	16
90.0	0	0	0	0	0



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5-DEGREE
ZONAL LUMEN SUMMARY

0- 5	34
5- 10	100
10- 15	162
15- 20	218
20- 25	265
25- 30	301
30- 35	326
35- 40	340
40- 45	342
45- 50	332
50- 55	311
55- 60	281
60- 65	242
65- 70	198
70- 75	148
75- 80	96
80- 85	47
85- 90	11

10-DEGREE
ZONAL LUMEN SUMMARY

0- 10	133
0- 20	513
0- 30	1079
0- 40	1746
0- 50	2419
0- 60	3011
0- 70	3451
0- 80	3695
0- 90	3753



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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	96	106	102	98	95	98	95	92	94	91	89	90	88	86	84
2	99	91	84	79	97	89	83	78	86	81	76	82	78	74	79	76	73	71
3	91	80	72	66	88	79	71	65	76	69	64	73	67	63	70	66	62	60
4	83	71	62	56	81	70	62	55	67	60	55	65	59	54	63	58	53	51
5	76	64	55	48	74	63	54	48	60	53	47	58	52	47	57	51	46	44
6	71	57	49	42	69	56	48	42	55	47	42	53	46	41	51	46	41	39
7	66	52	43	37	64	51	43	37	50	42	37	48	42	37	47	41	36	34
8	61	48	39	33	59	47	39	33	46	38	33	44	38	33	43	37	33	31
9	57	44	36	30	56	43	35	30	42	35	30	41	34	30	40	34	30	28
10	54	40	33	27	52	40	32	27	39	32	27	38	32	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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ADDRESS: 170 LUDLOW AVE
NORTHVALE, NJ 07647

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REPORT NUMBER: ITL80221
DATE: 12/27/13
PREPARED FOR: RAB LIGHTING, INC.
CATALOG NUMBER: PANEL2X2-41N

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-080C

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

INSTRUMENTS:	Associated Power Technologies APT5010 AC Power Source	Calibration Due: 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 (CRI_a,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	<i>N THOMAS</i>
Approved	<i>L GRABA</i>
	Lighting Engineer



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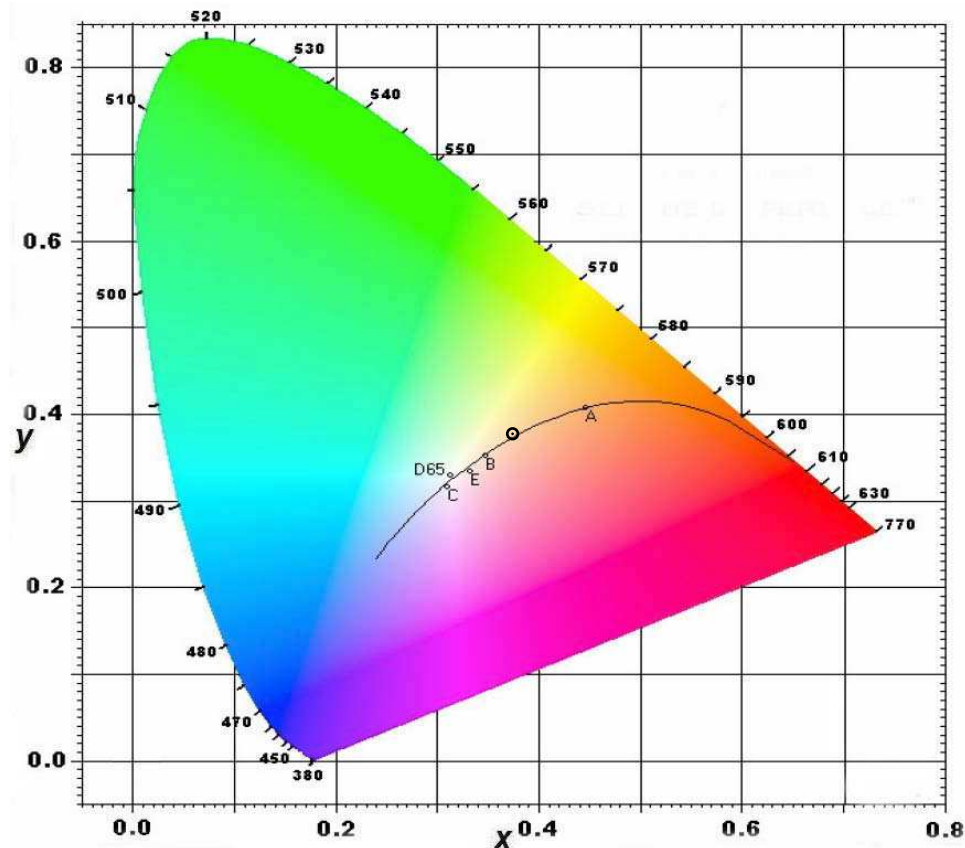
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NVLAP LAB CODE: 200925-0

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CIE Chromaticity Diagram



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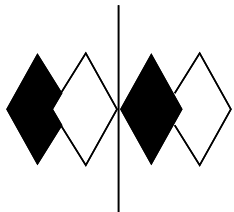
RESULTS:

SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.3739
Chromaticity Ordinate y	0.3771
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2207
Chromaticity Ordinate v'	0.5007
Correlated Color Temp CCT (K)	4184
ANSI C78.377-2008 Duv	0.002
Total Radiant Flux (milliWatts)	12000 *
ELECTRICAL	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.331
Input Power (Watts)	39.5
Input Power Factor (%)	99.4
Input Current THD (%)	6.4
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)	0.157
Input Power (Watts)	40.3
Input Power Factor (%)	92.7
Input Current THD (%)	9.5
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	0.479	515	42.740	650	38.176
385	0.537	520	45.614	655	35.282
390	0.625	525	47.798	660	32.427
395	0.758	530	49.630	665	29.593
400	0.953	535	51.192	670	26.815
405	1.401	540	52.600	675	24.176
410	2.158	545	53.951	680	21.762
415	3.380	550	55.261	685	19.604
420	5.930	555	56.455	690	17.647
425	10.400	560	57.581	695	15.847
430	17.562	565	58.451	700	14.130
435	28.493	570	59.206	705	12.554
440	47.401	575	59.740	710	11.109
445	69.443	580	60.063	715	9.816
450	69.170	585	60.152	720	8.640
455	49.140	590	60.024	725	7.600
460	34.844	595	59.549	730	6.681
465	26.513	600	58.783	735	5.854
470	19.849	605	57.812	740	5.134
475	16.481	610	56.570	745	4.498
480	16.048	615	55.095	750	3.954
485	17.407	620	53.361	755	3.471
490	20.541	625	51.352	760	3.057
495	25.125	630	49.085	765	2.686
500	30.104	635	46.530	770	2.353
505	34.938	640	43.830	775	2.066
510	39.209	645	41.028	780	1.817

