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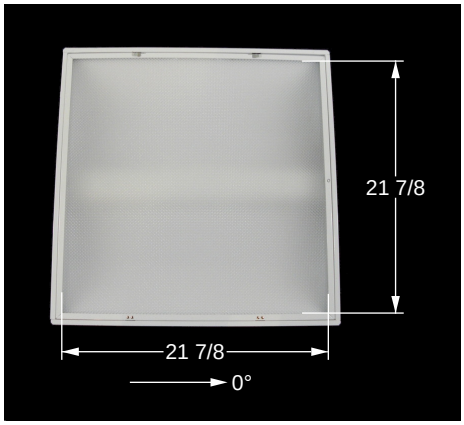
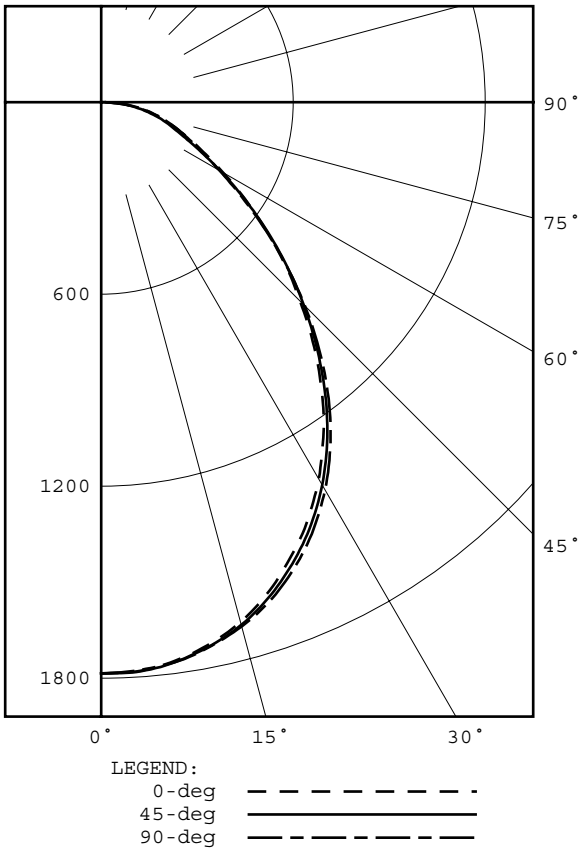
THE LIGHT CENTER OF THE INDUSTRY SINCE 1955
NVLAP LAB CODE: 200925-0
INDEPENDENT TESTING LABORATORIES, INC.
4066 CAMELOT CIRCLE, LONGMONT, CO 80504 USA
PHONE: (303) 442-1255 • FAX: (970) 535-3114 • E-MAIL: itl@itlboulder.com • WEBSITE: www.itlboulder.com

REPORT NUMBER: ITL82327
ISSUE DATE: 07/25/14
PREPARED FOR: RAB LIGHTING, INC.
CATALOG NUMBER: TRLED2X2-50Y/D10
LUMINAIRE: FABRICATED METAL HOUSING WITH WHITE PAINTED INTERIOR FINISH, FORMED WHITE PAINTED METAL DRIVER COVER, 4 WHITE CIRCUIT BOARDS EACH WITH 32 LEDS, CLEAR FLAT PRISMATIC PLASTIC LENS IN FABRICATED WHITE PAINTED METAL FRAME. LENS PRISMS OUT.
LAMPS: ONE HUNDRED TWENTY-EIGHT WHITE LIGHT EMITTING DIODES (LEDS), VERTICAL BASE-UP POSITION.
TOTAL INPUT WATTS = 49.7 AT 120.0 VOLTS
MOUNTING: RECESSED
LED DRIVER: RAB LIGHTING RDD-050W-450G, DRIVER HAS MULTIPLE LEADS, ONLY LINE INPUT AND LED OUTPUT LEADS CONNECTED FOR THIS TEST.
NOTE: DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED AT RATED INPUT VOLTAGE (120VAC, 60Hz) TO THE DRIVER. DRIVER INFORMATION PROVIDED BY CLIENT.
TEST PROCEDURE: IESNA LM-79-08
TEST DISTANCE = 20.0 FEET



CANDELA DISTRIBUTION						FLUX
	0.0	22.5	45.0	67.5	90.0	
0	1785	1785	1785	1785	1785	
5	1777	1778	1779	1775	1775	169
15	1682	1684	1691	1694	1696	476
25	1488	1494	1507	1519	1524	692
35	1213	1218	1232	1244	1250	767
45	879	885	894	898	900	688
55	570	569	569	558	560	508
65	337	327	320	322	329	328
75	196	188	186	189	198	201
85	70	64	66	66	73	71
90	0	0	0	0	0	



ZONAL LUMEN SUMMARY

ZONE	LUMENS	%FIXT
0- 30	1336	34.3
0- 40	2104	54.0
0- 60	3299	84.6
0- 90	3899	100.0
90-180	0	0.0
0-180	3899	100.0

EFFICACY = 78.5 lm/W
CIE TYPE - DIRECT

PLANE	: 0-DEG	90-DEG
SPACING CRITERIA	: 1.15	1.17
LUMINOUS LENGTH	:21.875	21.875

LUMINANCE DATA IN CANDELA/SQ M

ANGLE IN DEG	AVERAGE 0-DEG	AVERAGE 45-DEG	AVERAGE 90-DEG
45	4027.	4095.	4123.
55	3219.	3213.	3163.
65	2583.	2453.	2522.
75	2453.	2328.	2478.
85	2602.	2453.	2713.

Checked *B HYRE*
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	1785	1785	1785	1785	1785
2.5	1784	1785	1785	1782	1782
5.0	1777	1778	1779	1775	1775
7.5	1761	1763	1765	1763	1765
10.0	1740	1743	1745	1746	1747
12.5	1714	1716	1721	1722	1723
15.0	1682	1684	1691	1694	1696
17.5	1642	1646	1654	1659	1663
20.0	1595	1603	1610	1619	1623
22.5	1542	1550	1561	1572	1576
25.0	1488	1494	1507	1519	1524
27.5	1425	1432	1447	1458	1464
30.0	1360	1365	1381	1392	1399
32.5	1286	1293	1309	1321	1327
35.0	1213	1218	1232	1244	1250
37.5	1131	1138	1150	1160	1167
40.0	1048	1055	1065	1076	1080
42.5	964	970	980	987	991
45.0	879	885	894	898	900
47.5	801	802	810	809	810
50.0	720	720	727	722	722
52.5	642	642	646	636	638
55.0	570	569	569	558	560
57.5	503	499	497	486	489
60.0	441	433	430	423	427
62.5	385	376	371	368	374
65.0	337	327	320	322	329
67.5	296	286	278	284	292
70.0	259	251	243	250	259
72.5	227	219	214	219	228
75.0	196	188	186	189	198
77.5	165	158	156	160	168
80.0	133	127	127	129	139
82.5	102	95	97	98	107
85.0	70	64	66	66	73
87.5	33	31	31	31	33
90.0	0	0	0	0	0

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5-DEGREE ZONAL LUMEN SUMMARY

0- 5	43
5- 10	126
10- 15	204
15- 20	272
20- 25	327
25- 30	365
30- 35	384
35- 40	383
40- 45	362
45- 50	326
50- 55	279
55- 60	229
60- 65	183
65- 70	145
70- 75	115
75- 80	86
80- 85	53
85- 90	18

10-DEGREE ZONAL LUMEN SUMMARY

0- 10	169
0- 20	644
0- 30	1336
0- 40	2104
0- 50	2791
0- 60	3299
0- 70	3627
0- 80	3828
0- 90	3899

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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	110	105	101	98	107	103	99	96	99	96	93	95	93	90	91	89	88	86
2	101	93	87	82	98	91	86	81	88	83	79	85	81	77	82	78	75	73
3	93	83	75	69	90	81	74	69	78	72	68	76	71	66	73	69	65	63
4	85	74	66	60	83	73	65	59	71	64	59	68	63	58	66	61	57	55
5	79	67	59	52	77	66	58	52	64	57	52	62	56	51	60	55	51	49
6	73	61	52	46	72	60	52	46	58	51	46	57	50	45	55	49	45	43
7	68	56	47	41	67	55	47	41	53	46	41	52	46	41	51	45	40	39
8	64	51	43	37	62	50	43	37	49	42	37	48	41	37	47	41	37	35
9	60	47	39	34	58	46	39	34	45	38	34	44	38	34	43	38	33	32
10	56	44	36	31	55	43	36	31	42	35	31	41	35	31	40	35	31	29

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: ITL82339
DATE: 07/30/14
PREPARED FOR: RAB LIGHTING, INC.
CATALOG NUMBER: TRLED2X2-50Y/D10

ADDRESS: 170 LUDLOW AVE
NORTHVALE, NJ 07647

LUMINAIRE: FABRICATED METAL HOUSING WITH WHITE PAINTED INTERIOR FINISH, FORMED WHITE PAINTED METAL DRIVER COVER, 4 WHITE CIRCUIT BOARDS EACH WITH 32 LEDS, CLEAR FLAT PRISMATIC PLASTIC LENS IN FABRICATED WHITE PAINTED METAL FRAME. LENS PRISMS OUT.

LAMP: ONE HUNDRED TWENTY-EIGHT WHITE LIGHT EMITTING DIODES (LEDS), VERTICAL BASE-UP POSITION.

DRIVER: RAB LIGHTING RDD-050W-450G, DRIVER HAS MULTIPLE LEADS, ONLY LINE INPUT AND LED OUTPUT LEADS CONNECTED FOR THIS TEST.

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

INSTRUMENTS:		Calibration Due:
	Associated Power Technologies APT5040 AC Power Source	N/A
	Yokogawa WT210 Digital Power Meter #8	12/31/14
	Ocean Optics QE65000 Spectroradiometer	07/14/15
	ITL 2.0m Diameter Integrating Sphere S20-2, 4PI Geometry	07/14/15

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)

Checked *N THOMAS*
Approved *P O'CONNOR*
Sphere Lab Supervisor

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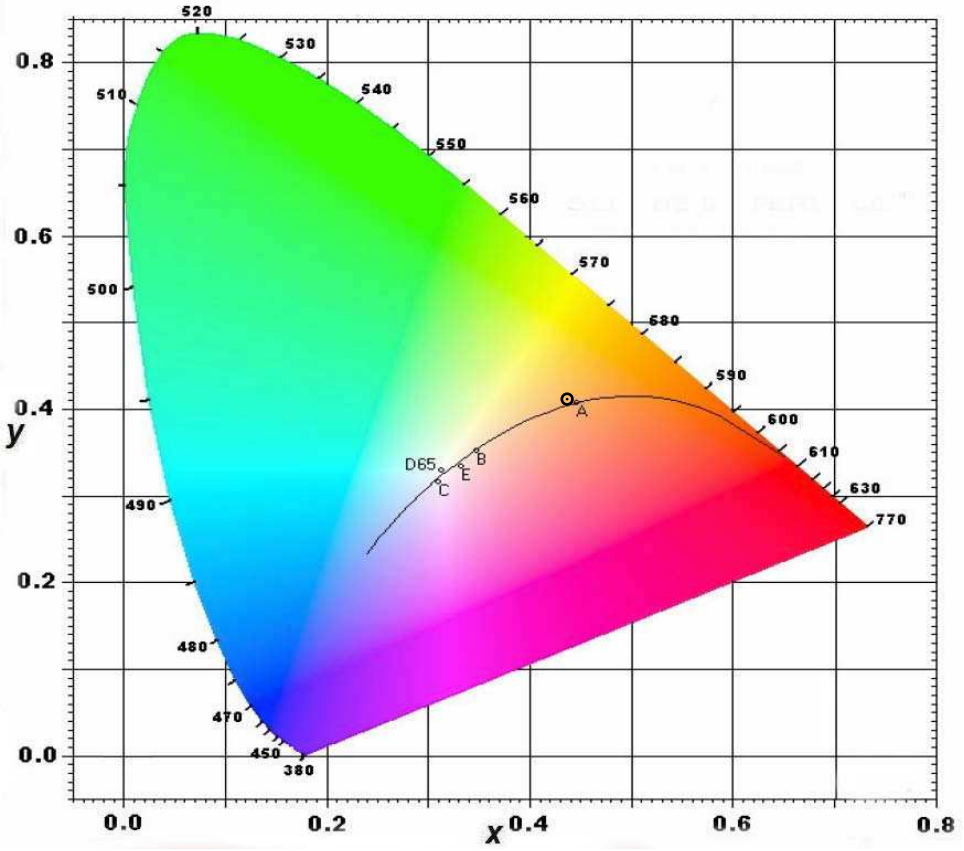
CIE Chromaticity Diagram



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RESULTS:

SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.4365
Chromaticity Ordinate y	0.4113
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2472
Chromaticity Ordinate v'	0.5241
Correlated Color Temp CCT (K)	3065
ANSI C78.377-2008 Duv	0.003
Total Radiant Flux (milliWatts)	12234 *
ELECTRICAL	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.417
Input Power (Watts)	49.6
Input Power Factor (%)	99.1
Input Current THD (%)	10.4
Input Voltage THD (%)	0.1
Off-State Power (Watts)	0.0
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.195
Input Power (Watts)	48.9
Input Power Factor (%)	90.5
Input Current THD (%)	14.4
Input Voltage THD (%)	0.1

COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	82
R1 Light greyish red	79
R2 Dark greyish yellow	88
R3 Strong yellowish green	95
R4 Moderate yellowish green	79
R5 Light bluish green	78
R6 Light blue	83
R7 Light violet	86
R8 Light reddish purple	63
R9 Strong red	14
R10 Strong yellow	71
R11 Strong green	76
R12 Strong blue	61
R13 Light yellowish pink (skin)	80
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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RESULTS:

Wavelength	mW per nm	Wavelength	mW per nm	Wavelength	mW per nm
380	0.255	515	33.453	650	51.078
385	0.261	520	36.407	655	47.294
390	0.244	525	39.012	660	43.465
395	0.268	530	41.540	665	39.617
400	0.317	535	43.936	670	35.946
405	0.411	540	46.469	675	32.468
410	0.630	545	49.191	680	29.209
415	1.033	550	52.040	685	26.203
420	1.928	555	55.018	690	23.412
425	3.452	560	58.056	695	20.843
430	6.033	565	61.053	700	18.456
435	10.005	570	63.858	705	16.260
440	15.909	575	66.425	710	14.262
445	25.615	580	68.737	715	12.439
450	36.667	585	70.748	720	10.843
455	38.112	590	72.320	725	9.421
460	29.248	595	73.339	730	8.182
465	22.483	600	73.841	735	7.087
470	18.585	605	73.670	740	6.147
475	14.989	610	72.909	745	5.329
480	13.224	615	71.712	750	4.617
485	13.719	620	69.818	755	3.977
490	15.583	625	67.440	760	3.444
495	18.544	630	64.721	765	2.969
500	22.322	635	61.697	770	2.565
505	26.329	640	58.323	775	2.213
510	30.083	645	54.791	780	1.916