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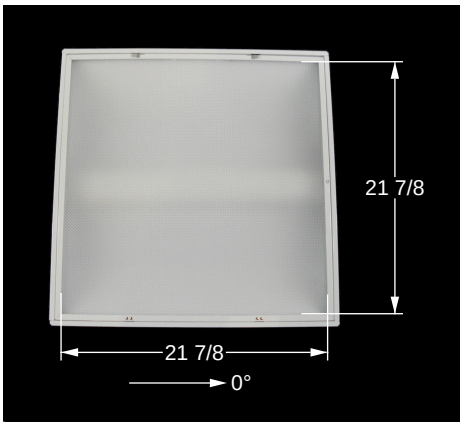
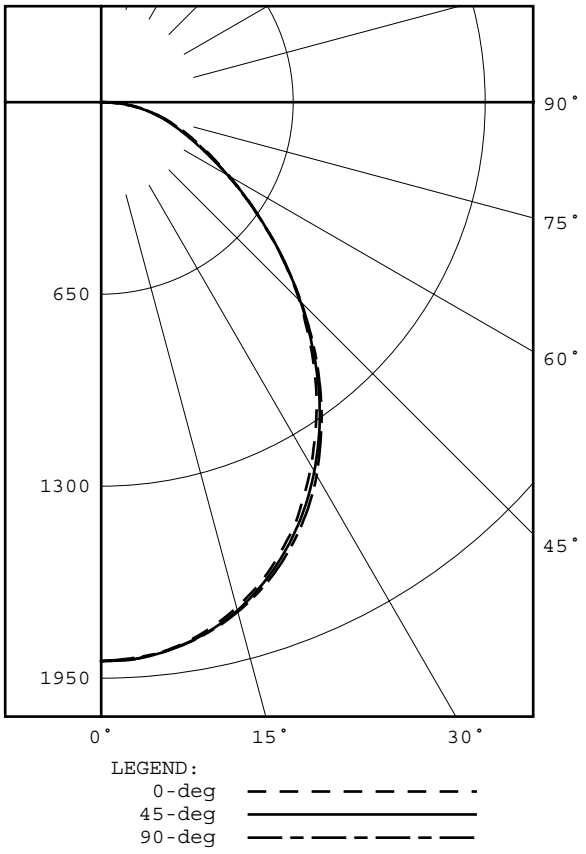
THE LIGHT CENTER OF THE INDUSTRY SINCE 1955
NVLAP LAB CODE: 200925-0
INDEPENDENT TESTING LABORATORIES, INC.
4066 CAMELOT CIRCLE, LONGMONT, CO 80504 USA
PHONE: (303) 442-1255 • FAX: (970) 535-3114 • E-MAIL: itl@itlboulder.com • WEBSITE: www.itlboulder.com

REPORT NUMBER: ITL82328
ISSUE DATE: 07/25/14
PREPARED FOR: RAB LIGHTING, INC.
CATALOG NUMBER: TRLED2X2-50YN/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 = 51.1 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	1892	1892	1892	1892	1892	
5	1880	1882	1882	1879	1879	178
15	1771	1775	1781	1784	1786	501
25	1563	1566	1578	1586	1593	725
35	1271	1277	1290	1297	1301	803
45	949	949	954	956	957	735
55	633	633	633	630	630	568
65	393	387	379	379	385	384
75	228	223	218	220	226	235
85	83	79	77	73	77	82
90	0	0	0	0	0	



ZONAL LUMEN SUMMARY

ZONE	LUMENS	%FIXT
0- 30	1404	33.3
0- 40	2207	52.4
0- 60	3509	83.4
0- 90	4210	100.0
90-180	0	0.0
0-180	4210	100.0

EFFICACY = 82.4 lm/W
CIE TYPE - DIRECT

PLANE	: 0-DEG	90-DEG
SPACING CRITERIA	: 1.13	1.16
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	4347.	4370.	4384.
55	3575.	3575.	3558.
65	3012.	2905.	2951.
75	2853.	2728.	2828.
85	3085.	2862.	2862.

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	1892	1892	1892	1892	1892
2.5	1891	1892	1891	1887	1887
5.0	1880	1882	1882	1879	1879
7.5	1863	1865	1866	1865	1866
10.0	1839	1842	1844	1845	1846
12.5	1808	1812	1816	1817	1819
15.0	1771	1775	1781	1784	1786
17.5	1728	1732	1739	1744	1747
20.0	1679	1684	1691	1697	1702
22.5	1622	1626	1637	1646	1650
25.0	1563	1566	1578	1586	1593
27.5	1492	1500	1513	1521	1529
30.0	1421	1430	1443	1452	1459
32.5	1346	1355	1368	1377	1380
35.0	1271	1277	1290	1297	1301
37.5	1193	1196	1208	1214	1217
40.0	1111	1114	1122	1129	1132
42.5	1028	1031	1037	1043	1044
45.0	949	949	954	956	957
47.5	867	867	871	871	870
50.0	787	786	789	787	787
52.5	706	708	708	706	706
55.0	633	633	633	630	630
57.5	565	563	562	558	559
60.0	501	498	495	491	494
62.5	444	439	433	431	436
65.0	393	387	379	379	385
67.5	346	340	331	334	340
70.0	304	298	290	293	300
72.5	265	259	253	256	263
75.0	228	223	218	220	226
77.5	192	187	182	184	189
80.0	157	151	148	148	152
82.5	121	115	113	110	115
85.0	83	79	77	73	77
87.5	39	39	37	33	32
90.0	0	0	0	0	0

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5-DEGREE ZONAL LUMEN SUMMARY

0- 5	45
5- 10	133
10- 15	215
15- 20	286
20- 25	343
25- 30	382
30- 35	402
35- 40	402
40- 45	384
45- 50	351
50- 55	308
55- 60	260
60- 65	213
65- 70	171
70- 75	135
75- 80	100
80- 85	62
85- 90	20

10-DEGREE ZONAL LUMEN SUMMARY

0- 10	178
0- 20	679
0- 30	1404
0- 40	2207
0- 50	2942
0- 60	3509
0- 70	3893
0- 80	4128
0- 90	4210

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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	105	101	97	107	103	99	96	98	95	93	95	92	90	91	89	87	85
2	100	93	86	81	98	91	85	80	87	82	78	84	80	76	81	78	75	72
3	92	82	75	68	90	81	74	68	78	72	67	75	70	66	73	68	64	62
4	85	74	65	59	83	72	65	59	70	63	58	68	62	57	65	60	56	54
5	78	66	58	51	76	65	57	51	63	56	51	61	55	50	59	54	50	48
6	73	60	52	46	71	59	51	45	57	50	45	56	49	45	54	49	44	42
7	68	55	46	41	66	54	46	40	53	45	40	51	45	40	50	44	40	38
8	63	50	42	37	62	50	42	36	48	41	36	47	41	36	46	40	36	34
9	59	46	39	33	58	46	38	33	45	38	33	44	37	33	43	37	33	31
10	56	43	35	30	54	42	35	30	42	35	30	41	34	30	40	34	30	28

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: ITL82340
DATE: 07/30/14
PREPARED FOR: RAB LIGHTING, INC.
CATALOG NUMBER: TRLED2X2-50YN/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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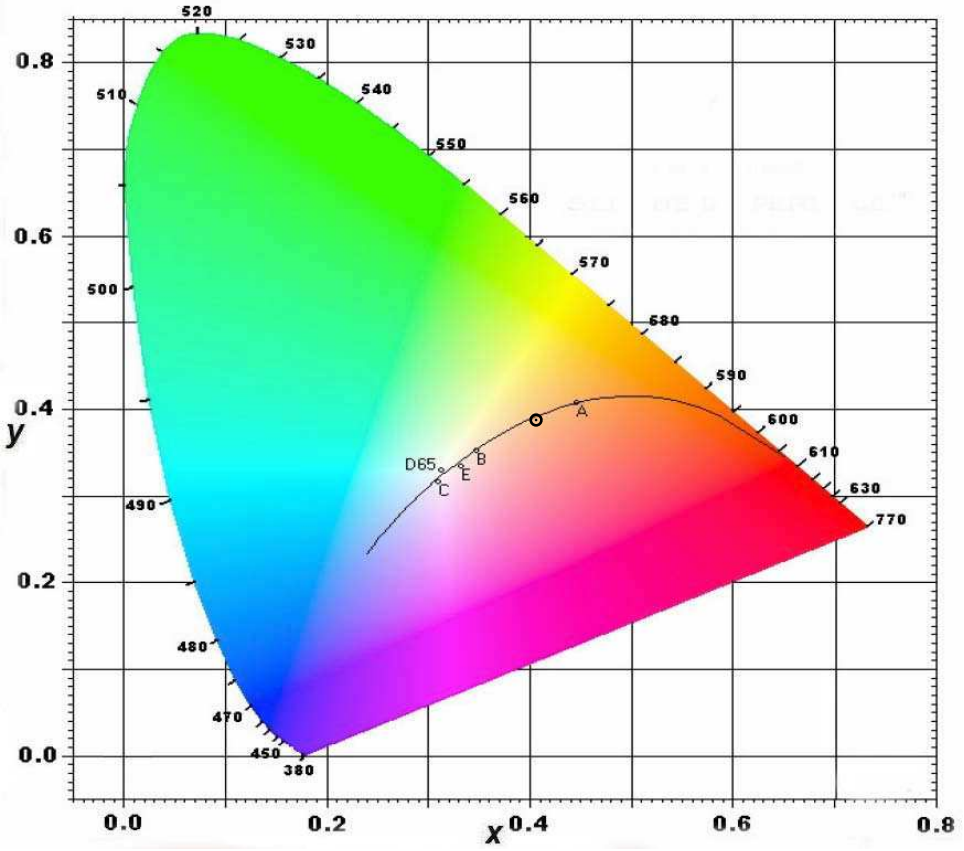
CIE Chromaticity Diagram



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RESULTS:

SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.4059
Chromaticity Ordinate y	0.3872
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2376
Chromaticity Ordinate v'	0.5099
Correlated Color Temp CCT (K)	3457
ANSI C78.377-2008 Duv	-0.002
Total Radiant Flux (milliWatts)	13530 *
ELECTRICAL	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.429
Input Power (Watts)	51.1
Input Power Factor (%)	99.3
Input Current THD (%)	10.9
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)	0.199
Input Power (Watts)	50.1
Input Power Factor (%)	90.9
Input Current THD (%)	14.4
Input Voltage THD (%)	0.1

COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	84
R1 Light greyish red	83
R2 Dark greyish yellow	90
R3 Strong yellowish green	95
R4 Moderate yellowish green	82
R5 Light bluish green	82
R6 Light blue	86
R7 Light violet	87
R8 Light reddish purple	69
R9 Strong red	26
R10 Strong yellow	76
R11 Strong green	79
R12 Strong blue	63
R13 Light yellowish pink (skin)	84
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	0.313	515	39.285	650	51.600
385	0.300	520	42.449	655	47.726
390	0.319	525	45.211	660	43.750
395	0.329	530	47.835	665	39.652
400	0.390	535	50.222	670	35.714
405	0.523	540	52.671	675	32.144
410	0.796	545	55.260	680	29.016
415	1.369	550	57.847	685	26.186
420	2.485	555	60.461	690	23.489
425	4.597	560	63.107	695	20.916
430	8.439	565	65.661	700	18.494
435	14.658	570	68.029	705	16.255
440	24.073	575	70.163	710	14.225
445	39.542	580	71.996	715	12.410
450	59.402	585	73.467	720	10.803
455	65.746	590	74.412	725	9.408
460	50.761	595	74.823	730	8.182
465	36.743	600	74.753	735	7.108
470	29.231	605	74.164	740	6.191
475	22.692	610	73.248	745	5.374
480	18.661	615	72.130	750	4.663
485	18.269	620	70.401	755	4.042
490	19.918	625	68.175	760	3.488
495	22.933	630	65.527	765	3.018
500	26.990	635	62.498	770	2.610
505	31.446	640	59.038	775	2.252
510	35.598	645	55.427	780	1.943