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THE LIGHT CENTER OF THE INDUSTRY SINCE 1955

NVLAP
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: ITL82333

PAGE: 1 OF 5

ISSUE DATE: 07/29/14

PREPARED FOR: RAB LIGHTING, INC.

CATALOG NUMBER: TRLED2X4-50Y/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 = 50.4 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 = 35.0 FEET

CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0
0	1750	1750	1750	1750	1750
5	1737	1744	1741	1739	1741
15	1651	1658	1654	1654	1654
25	1478	1482	1480	1481	1479
35	1223	1225	1223	1223	1218
45	923	923	920	916	908
55	630	628	622	612	608
65	391	386	377	374	377
75	226	222	218	220	225
85	81	77	80	81	87
90	0	0	0	0	0

FLUX

165
466
680
764
709
557
380
234
86

ZONAL LUMEN SUMMARY

ZONE	LUMENS	%FIXT
0- 30	1312	32.5
0- 40	2075	51.4
0- 60	3340	82.7
0- 90	4041	100.0
90-180	0	0.0
0-180	4041	100.0

EFFICACY = 80.2 lm/W

CIE TYPE - DIRECT

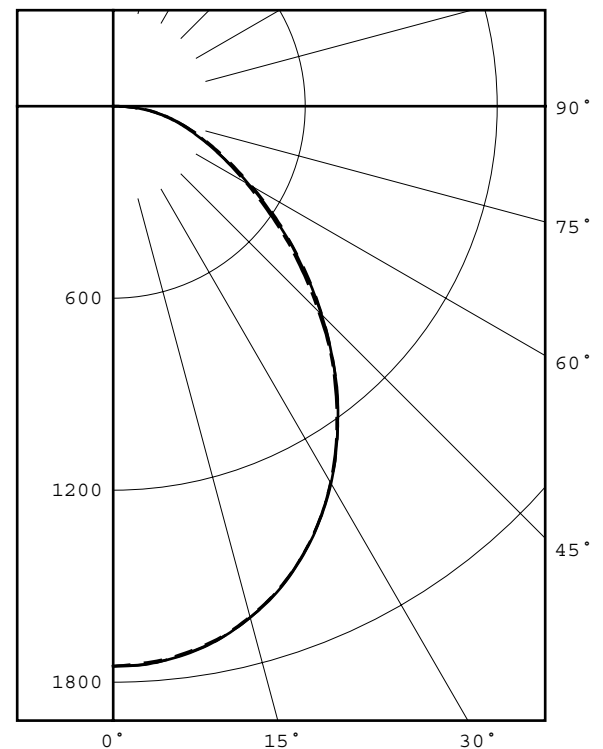
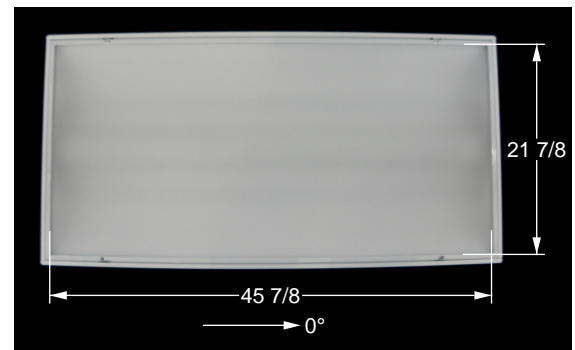
PLANE : 0-DEG 90-DEG

SPACING CRITERIA : 1.16 1.16

LUMINOUS LENGTH : 45.875 21.875

LUMINANCE DATA IN CANDELA/SQ M

ANGLE	AVERAGE	AVERAGE	AVERAGE
IN DEG	0-DEG	45-DEG	90-DEG
45	2016.	2010.	1983.
55	1697.	1675.	1637.
65	1429.	1378.	1378.
75	1349.	1301.	1343.
85	1435.	1418.	1542.



LEGEND:

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

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	1750	1750	1750	1750	1750
2.5	1744	1751	1749	1747	1748
5.0	1737	1744	1741	1739	1741
7.5	1723	1730	1728	1726	1726
10.0	1705	1713	1710	1708	1709
12.5	1682	1688	1685	1683	1684
15.0	1651	1658	1654	1654	1654
17.5	1617	1622	1620	1620	1618
20.0	1576	1581	1579	1579	1578
22.5	1530	1534	1532	1532	1530
25.0	1478	1482	1480	1481	1479
27.5	1421	1424	1423	1423	1421
30.0	1359	1363	1361	1361	1358
32.5	1294	1295	1294	1294	1290
35.0	1223	1225	1223	1223	1218
37.5	1151	1151	1152	1149	1144
40.0	1076	1077	1076	1073	1070
42.5	999	1000	998	994	991
45.0	923	923	920	916	908
47.5	847	848	843	837	829
50.0	772	772	765	760	752
52.5	699	699	694	684	680
55.0	630	628	622	612	608
57.5	563	562	556	543	540
60.0	500	497	491	480	480
62.5	442	438	432	424	425
65.0	391	386	377	374	377
67.5	343	339	331	330	334
70.0	301	297	289	290	295
72.5	263	258	252	254	261
75.0	226	222	218	220	225
77.5	190	186	184	186	192
80.0	155	151	151	153	159
82.5	120	115	117	119	126
85.0	81	77	80	81	87
87.5	38	38	40	41	44
90.0	0	0	0	0	0



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5-DEGREE
ZONAL LUMEN SUMMARY

0- 5	42
5- 10	123
10- 15	200
15- 20	267
20- 25	321
25- 30	360
30- 35	380
35- 40	383
40- 45	369
45- 50	340
50- 55	301
55- 60	256
60- 65	211
65- 70	170
70- 75	134
75- 80	100
80- 85	64
85- 90	22

10-DEGREE
ZONAL LUMEN SUMMARY

0- 10	165
0- 20	631
0- 30	1312
0- 40	2075
0- 50	2784
0- 60	3340
0- 70	3721
0- 80	3955
0- 90	4041



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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	102	99	95	98	95	92	94	92	90	91	89	87	85
2	100	92	86	80	97	90	84	79	87	82	78	84	79	76	81	77	74	72
3	92	82	74	68	89	80	73	67	77	71	66	75	69	65	72	68	64	62
4	84	73	65	58	82	72	64	58	69	62	57	67	61	56	65	60	56	54
5	78	66	57	51	76	65	57	51	63	55	50	61	54	49	59	53	49	47
6	72	60	51	45	71	59	51	45	57	50	44	55	49	44	54	48	44	42
7	67	54	46	40	66	54	46	40	52	45	40	51	44	39	49	43	39	37
8	63	50	42	36	61	49	41	36	48	41	36	47	40	35	45	40	35	33
9	59	46	38	33	57	45	38	32	44	37	32	43	37	32	42	36	32	30
10	55	42	35	30	54	42	35	30	41	34	30	40	34	29	39	33	29	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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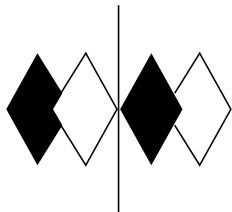
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ADDRESS: 170 LUDLOW AVE
NORTHVALE, NJ 07647

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REPORT NUMBER: ITL82345
DATE: 07/30/14
PREPARED FOR: RAB LIGHTING, INC.
CATALOG NUMBER: TRLED2X4-50Y/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:	Associated Power Technologies APT5040 AC Power Source	Calibration Due: 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 (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>P O'CONNOR</i> Sphere Lab Supervisor



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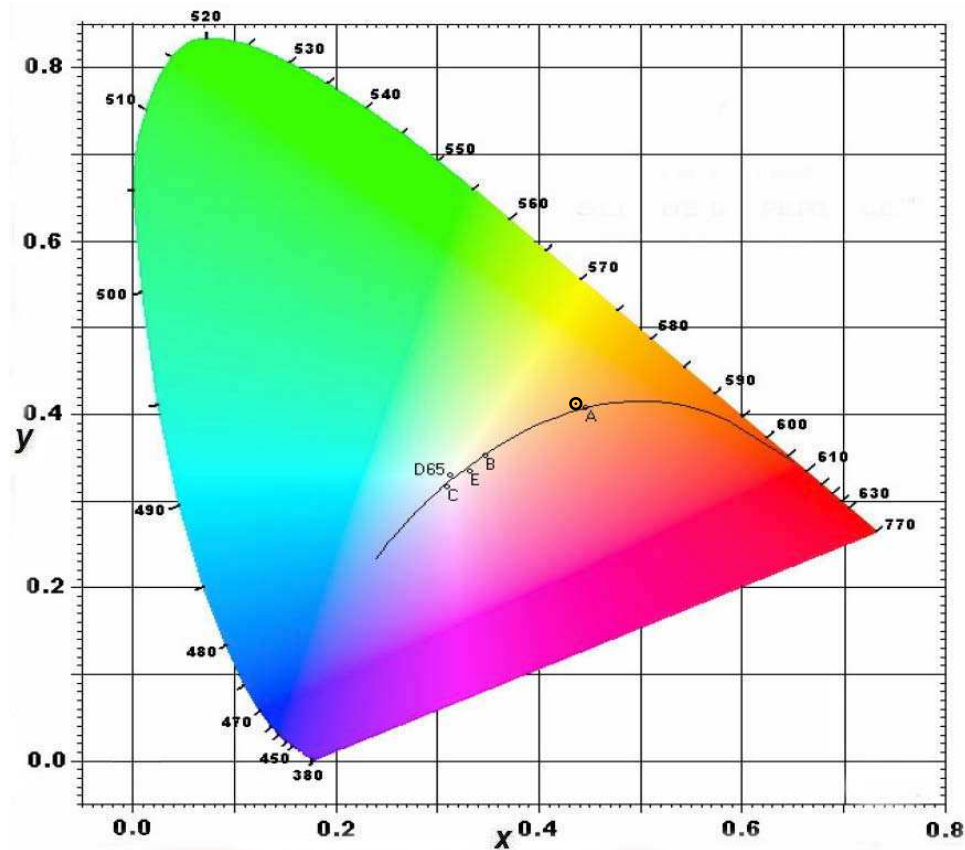
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CIE Chromaticity Diagram



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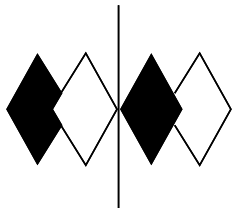
RESULTS:

SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.4362
Chromaticity Ordinate y	0.4118
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2468
Chromaticity Ordinate v'	0.5243
Correlated Color Temp CCT (K)	3074
ANSI C78.377-2008 Duv	0.003
Total Radiant Flux (milliWatts)	12662 *
ELECTRICAL	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.424
Input Power (Watts)	50.5
Input Power Factor (%)	99.3
Input Current THD (%)	11.0
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)	0.197
Input Power (Watts)	49.6
Input Power Factor (%)	90.9
Input Current THD (%)	14.4
Input Voltage THD (%)	0.1

COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	81
R1 Light greyish red	79
R2 Dark greyish yellow	87
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	13
R10 Strong yellow	70
R11 Strong green	76
R12 Strong blue	60
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	0.295	515	34.926	650	52.570
385	0.303	520	38.032	655	48.710
390	0.307	525	40.736	660	44.852
395	0.325	530	43.307	665	41.017
400	0.370	535	45.797	670	37.350
405	0.490	540	48.397	675	33.789
410	0.742	545	51.174	680	30.400
415	1.250	550	54.137	685	27.239
420	2.218	555	57.207	690	24.332
425	3.972	560	60.390	695	21.669
430	6.925	565	63.446	700	19.175
435	11.415	570	66.303	705	16.870
440	18.131	575	68.842	710	14.815
445	28.856	580	71.158	715	12.928
450	39.141	585	73.185	720	11.263
455	37.732	590	74.739	725	9.792
460	27.998	595	75.798	730	8.508
465	21.727	600	76.296	735	7.386
470	17.777	605	76.167	740	6.418
475	14.285	610	75.442	745	5.556
480	12.883	615	73.963	750	4.816
485	13.664	620	71.921	755	4.166
490	15.760	625	69.413	760	3.599
495	19.069	630	66.535	765	3.108
500	23.164	635	63.385	770	2.682
505	27.452	640	59.969	775	2.315
510	31.383	645	56.381	780	1.997

