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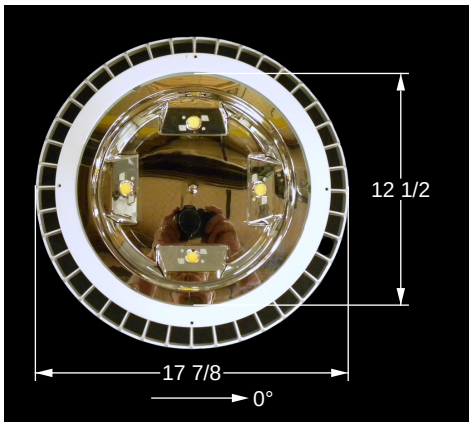
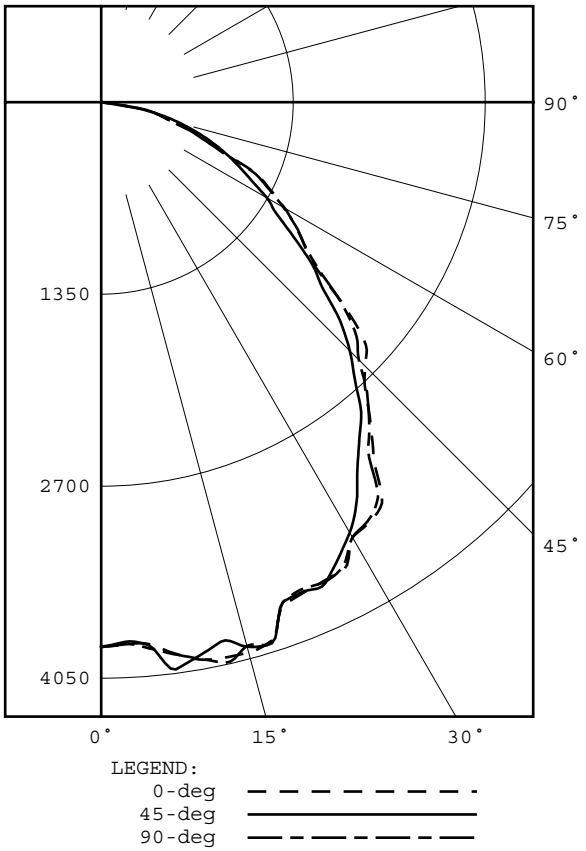
THE LIGHT CENTER OF THE INDUSTRY SINCE 1955
NVLAP LAB CODE: 200925-0
INDEPENDENT TESTING LABORATORIES, INC.
4066 CAMELOT CIRCLE, LONGMONT, CO 80504 USA
PHONE: (303) 442-1255 • FAX: (970) 535-3114 • E-MAIL: itl@itlboulder.com • WEBSITE: www.itlboulder.com

REPORT NUMBER: ITL82098
ISSUE DATE: 07/02/14
PREPARED FOR: RAB LIGHTING, INC.
CATALOG NUMBER: BAYLED104 (FLAT GLASS LENS - CEILING AND/OR PENDENT MOUNT - STANDARD DISTRIBUTION W/ HI-CRI LED)
LUMINAIRE: CAST 2-PIECE WHITE PAINTED FINNED METAL HOUSING, FLAT METAL HEAT SINK MOUNTING PLATE WITH 4 EXTRUDED METAL HEAT SINKS, 4 CIRCUIT BOARDS EACH WITH 1 LED AND MOLDED PLASTIC REFLECTOR WITH SPECULAR FINISH, MOLDED PLASTIC REFLECTOR WITH SPECULAR FINISH AND 1 APERTURE PER LED, CLEAR FLAT GLASS LENS IN CAST WHITE PAINTED METAL LENS FRAME.
LAMPS: FOUR WHITE MULTI-CHIP LIGHT EMITTING DIODES (LEDS), TILTED 30-DEGREES FROM VERTICAL BASE-UP POSITION.
TOTAL INPUT WATTS = 123.0 AT 120.0 VOLTS
LED DRIVERS: FOUR RAB RD26
NOTE: DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED AT RATED INPUT VOLTAGE (120VAC, 60Hz) TO THE DRIVERS.
TEST PROCEDURE: IESNA LM-79-08
TEST DISTANCE = 20.0 FEET



CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0	FLUX
0	3830	3830	3830	3830	3830	
5	3825	3793	3832	3815	3854	372
15	4006	3954	3964	3966	3958	1116
25	3712	3529	3730	3528	3721	1672
35	3441	3291	3140	3296	3392	2006
45	2622	2403	2472	2407	2562	1904
55	1739	1722	1653	1725	1745	1552
65	1218	1145	1069	1144	1202	1122
75	500	553	582	548	501	582
85	8	6	6	6	8	50
90	0	0	0	0	0	
95	0	0	0	0	0	0
105	0	0	0	0	0	0
115	0	0	0	0	0	0
125	0	0	0	0	0	0
135	0	0	0	0	0	0
145	0	0	0	0	0	0
155	0	0	0	0	0	0
165	0	0	0	0	0	0
175	0	0	0	0	0	0
180	0	0	0	0	0	



ZONAL LUMEN SUMMARY

ZONE	LUMENS	%FIXT
0- 30	3160	30.5
0- 40	5166	49.8
0- 60	8622	83.1
0- 90	10375	100.0
90-120	0	0.0
90-130	0	0.0
90-150	0	0.0
90-180	0	0.0
0-180	10375	100.0

EFFICACY = 84.3 lm/W
CIE TYPE - DIRECT
PLANE : 0-DEG 90-DEG
SPACING CRITERIA : 1.39 1.37
BEAM ANGLE (50%) : 103.1 X 103.3 DEGREES
FIELD ANGLE (10%): 156.1 X 155.9 DEGREES

Checked *M KLOPF*
Approved *R BEATTIE*
Lighting Engineer

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LUMINOUS DIAMETER: 12.500

LUMINANCE DATA IN CANDELA/SQ M

ANGLE IN DEG	AVERAGE 0-DEG	AVERAGE 45-DEG	AVERAGE 90-DEG
45	46835.	44156.	45763.
55	38294.	36400.	38426.
65	36402.	31949.	35923.
75	24400.	28402.	24449.
85	1159.	870.	1159.

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CANDELA DISTRIBUTION
LATERAL ANGLE

	0.0	22.5	45.0	67.5	90.0
0.0	3830	3830	3830	3830	3830
5.0	3825	3793	3832	3815	3854
10.0	3979	4002	3954	3954	3973
15.0	4006	3954	3964	3966	3958
20.0	3758	3804	3739	3788	3740
25.0	3712	3529	3730	3528	3721
30.0	3534	3380	3494	3389	3533
35.0	3441	3291	3140	3296	3392
40.0	2946	2796	2843	2764	2932
45.0	2622	2403	2472	2407	2562
50.0	2230	2049	2032	2052	2212
55.0	1739	1722	1653	1725	1745
60.0	1489	1571	1346	1535	1480
65.0	1218	1145	1069	1144	1202
70.0	778	831	833	821	767
75.0	500	553	582	548	501
80.0	336	249	302	245	335
85.0	8	6	6	6	8
90.0	0	0	0	0	0
95.0	0	0	0	0	0
100.0	0	0	0	0	0
105.0	0	0	0	0	0
110.0	0	0	0	0	0
115.0	0	0	0	0	0
120.0	0	0	0	0	0
125.0	0	0	0	0	0
130.0	0	0	0	0	0
135.0	0	0	0	0	0
140.0	0	0	0	0	0
145.0	0	0	0	0	0
150.0	0	0	0	0	0
155.0	0	0	0	0	0
160.0	0	0	0	0	0
165.0	0	0	0	0	0
170.0	0	0	0	0	0
175.0	0	0	0	0	0
180.0	0	0	0	0	0

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5-DEGREE ZONAL LUMEN SUMMARY

0- 5	91
5- 10	281
10- 15	469
15- 20	647
20- 25	773
25- 30	899
30- 35	988
35- 40	1019
40- 45	981
45- 50	923
50- 55	822
55- 60	730
60- 65	634
65- 70	488
70- 75	356
75- 80	226
80- 85	48
85- 90	2
90- 95	0
95-100	0
100-105	0
105-110	0
110-115	0
115-120	0
120-125	0
125-130	0
130-135	0
135-140	0
140-145	0
145-150	0
150-155	0
155-160	0
160-165	0
165-170	0
170-175	0
175-180	0

10-DEGREE ZONAL LUMEN SUMMARY

0- 10	372
0- 20	1488
0- 30	3160
0- 40	5166
0- 50	7070
0- 60	8622
0- 70	9744
0- 80	10325
0- 90	10375
0-100	10375
0-110	10375
0-120	10375
0-130	10375
0-140	10375
0-150	10375
0-160	10375
0-170	10375
0-180	10375

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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	100	96	99	96	93	95	93	90	91	90	88	86
2	100	93	86	81	98	91	85	80	87	82	78	84	80	76	81	78	75	72
3	92	82	74	68	89	80	73	67	77	71	66	75	69	65	72	68	64	62
4	84	73	64	58	82	71	64	58	69	62	57	67	61	56	65	59	55	53
5	78	65	57	50	76	64	56	50	62	55	49	60	54	49	58	53	48	46
6	72	59	50	44	70	58	50	44	56	49	43	55	48	43	53	47	43	41
7	67	54	45	39	65	53	45	39	51	44	39	50	43	38	48	43	38	36
8	62	49	41	35	61	48	40	35	47	40	35	46	39	34	45	39	34	32
9	58	45	37	32	57	44	37	31	43	36	31	42	36	31	41	35	31	29
10	55	42	34	29	53	41	34	29	40	33	28	39	33	28	38	32	28	26

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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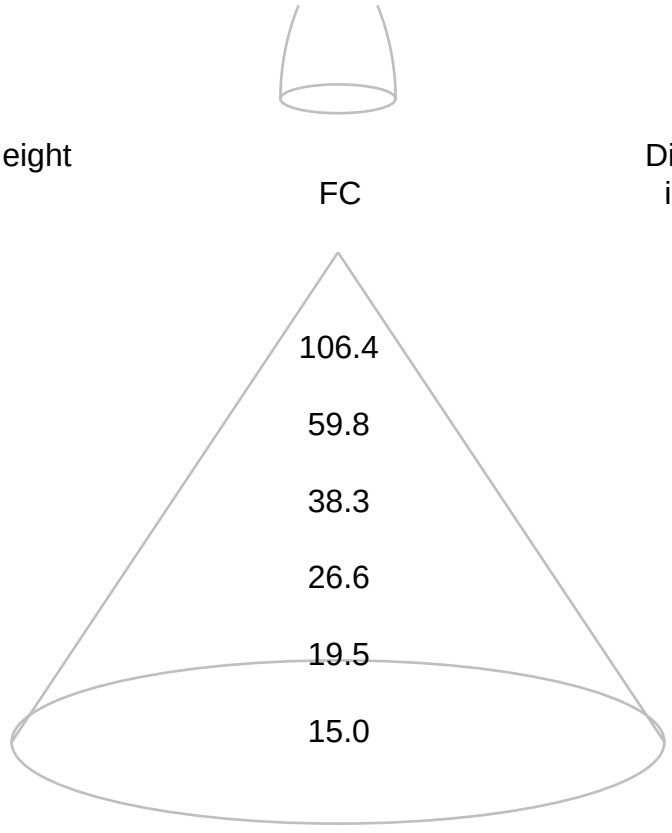
CONE OF LIGHT DIAGRAM

(diameter shown is where fc value is half the fc at nadir)



Mounting Height in feet	FC	Diameter in feet
6.0	106.4	8.0
8.0	59.8	10.6
10.0	38.3	13.3
12.0	26.6	16.0
14.0	19.5	18.6
16.0	15.0	21.3

Note: The candela values used to generate this diagram were obtained by averaging the photometric data into a single plane.

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ADDRESS: 170 LUDLOW AVE
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REPORT NUMBER: ITL82101
DATE: 07/07/14
PREPARED FOR: RAB LIGHTING, INC.
CATALOG NUMBER: BAYLED104 (FLAT GLASS LENS - CEILING AND/OR PENDENT MOUNT - STANDARD DISTRIBUTION W/HI-CRI LED)

ADDRESS: 170 LUDLOW AVE
NORTHVALE, NJ 07647

LUMINAIRE: CAST 2-PIECE WHITE PAINTED FINNED METAL HOUSING, FLAT METAL HEAT SINK MOUNTING PLATE WITH 4 EXTRUDED METAL HEAT SINKS, 4 CIRCUIT BOARDS EACH WITH 1 LED AND MOLDED PLASTIC REFLECTOR WITH SPECULAR FINISH, MOLDED PLASTIC REFLECTOR WITH SPECULAR FINISH AND 1 APERTURE PER LED, CLEAR FLAT GLASS LENS IN CAST WHITE PAINTED METAL LENS FRAME.

LAMP: FOUR WHITE MULTI-CHIP LIGHT EMITTING DIODES (LEDS), TILTED 30-DEGREES FROM VERTICAL BASE-UP POSITION.

DRIVERS: FOUR RAB RD26

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

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	04/13/14
ITL 2.0m Diameter Integrating Sphere S20-2, 4PI Geometry	04/13/14

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)

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

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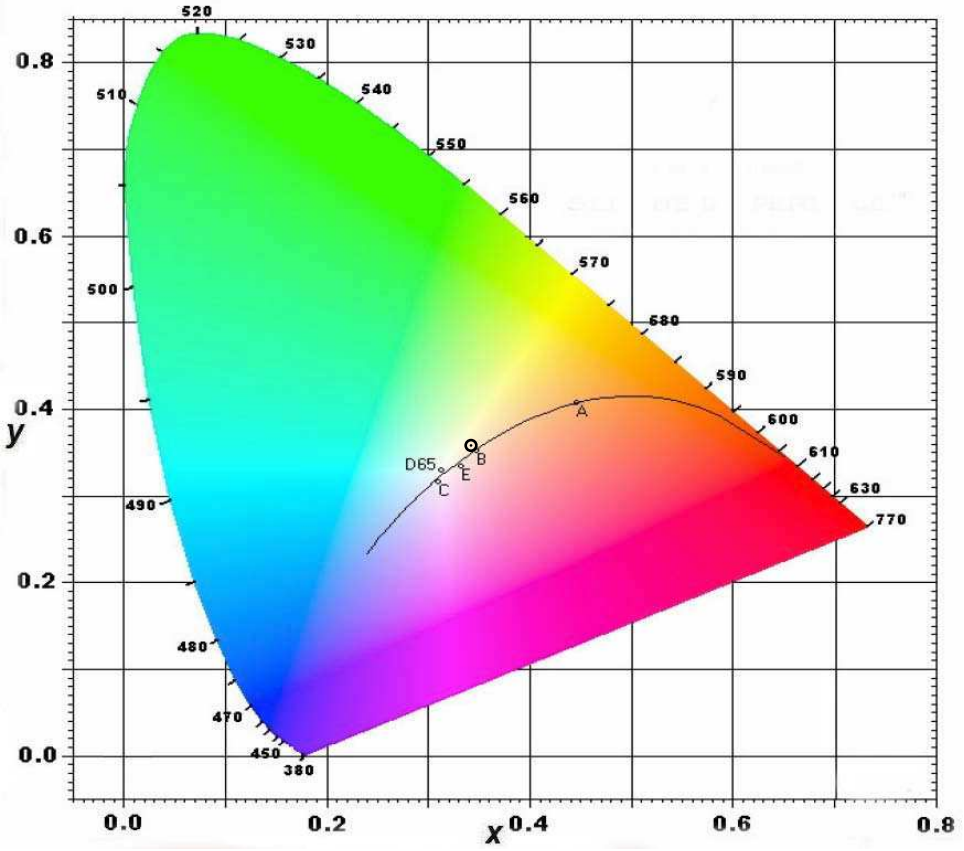
CIE Chromaticity Diagram



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RESULTS:

SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.3418
Chromaticity Ordinate y	0.3579
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2068
Chromaticity Ordinate v'	0.4872
Correlated Color Temp CCT (K)	5143
ANSI C78.377-2008 Duv	0.004
Total Radiant Flux (milliWatts)	31918 *
ELECTRICAL	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	1.03
Input Power (Watts)	123.0
Input Power Factor (%)	99.5
Input Current THD (%)	8.2
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)	0.484
Input Power (Watts)	122.2
Input Power Factor (%)	91.1
Input Current THD (%)	11.3
Input Voltage THD (%)	0.1

COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	82
R1 Light greyish red	80
R2 Dark greyish yellow	86
R3 Strong yellowish green	90
R4 Moderate yellowish green	83
R5 Light bluish green	81
R6 Light blue	81
R7 Light violet	87
R8 Light reddish purple	67
R9 Strong red	3
R10 Strong yellow	66
R11 Strong green	82
R12 Strong blue	58
R13 Light yellowish pink (skin)	81
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	0.912	515	134.824	650	72.561
385	0.926	520	143.344	655	64.554
390	1.003	525	149.101	660	57.043
395	1.144	530	152.488	665	50.070
400	1.454	535	154.065	670	43.825
405	2.093	540	154.517	675	38.194
410	3.445	545	154.513	680	33.189
415	6.180	550	154.536	685	28.773
420	11.783	555	154.656	690	24.864
425	22.876	560	155.307	695	21.470
430	43.206	565	156.622	700	18.467
435	75.717	570	157.758	705	15.896
440	125.933	575	158.963	710	13.672
445	202.570	580	159.982	715	11.743
450	261.786	585	160.236	720	10.070
455	231.604	590	159.553	725	8.626
460	160.135	595	157.508	730	7.403
465	115.024	600	154.028	735	6.361
470	85.979	605	149.294	740	5.461
475	64.793	610	143.306	745	4.710
480	55.986	615	135.930	750	4.066
485	57.119	620	127.686	755	3.509
490	64.245	625	118.806	760	3.029
495	76.533	630	109.269	765	2.615
500	92.374	635	99.866	770	2.263
505	108.646	640	90.423	775	1.965
510	123.216	645	81.265	780	1.706