

itl boulder
THE LIGHT CENTER OF THE INDUSTRY SINCE 1985

INDEPENDENT TESTING LABORATORIES, INC.
3386 LONGHORN ROAD, BOULDER, CO 80302 USA

PHONE: (303)442-1255 * FAX: (303)449-5274 * E-MAIL: itl@itlboulder.com * WEBSITE: www.itlboulder.com

REPORT NUMBER: XXX-XX

DATE: 6/20/08

PAGE 1 of 7

PREPARED FOR: SSL Manufacturer X

CATALOG NUMBER: ENERGY STAR 1A

LUMINAIRE: EXTRUDED DARK BRONZE COLORED METAL HOUSING WITH MOLDED BLACK PLASTIC END CAPS, ONE BLACK CIRCUIT BOARD WITH NINE LEDS, CLEAR FLAT PLASTIC LENS.

LAMP: NINE WHITE MULTI-CHIP LIGHT EMITTING DIODES (LEDS), VERTICAL BASE-UP POSITION.

LED DRIVER: Generic Driver #1

GONIOMETRIC

INSTRUMENTATION: ITL Moving Mirror Goniophotometer - 25.25' Test Distance
Yokogawa WT210 Digital Power Meter
Elgar CW2501 AC Power Source
Omega HH-81 Digital Thermometer with Type J thermocouples

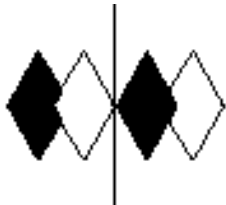
SPECTRORADIOMETRIC

INSTRUMENTATION: Yokogawa WT210 Digital Power Meter
Optronics Laboratories OL770 Spectroradiometer
1.5 meter integrating sphere
Elgar CW2501 AC Power Source
BK Precision 1745A DC Power Source

OBJECT OF TEST: Measure distribution photometry and input electrical parameters on the goniophotometer. Report candela distribution and calculated lumen output. Using the supplied LED driver, measure the total flux output in lumens, Correlated Color Temperature (CCT), Color Rendering Index (CRI), Chromaticity Coordinates (x/y; u'/v'), and Spectral Power Distribution (SPD) of the unit and input electrical parameters when operated in the integrating sphere. Using a DC power supply, measure the total flux output in lumens, Correlated Color Temperature (CCT), Color Rendering Index (CRI), Chromaticity Coordinates (x/y; u'/v'), and Spectral Power Distribution (SPD) of the unit and input electrical parameters when operated in the integrating sphere at 24 volts DC. Measure surface temperature of the unit at one location.

PROCEDURE: The luminaire was supplied by client with an unknown number of burn hours. The luminaire was prewarmed overnight before each test. Stabilization data was recorded to assure stable operation (stabilization data available on request). Distribution photometry and input electrical data were measured with the unit mounted on the goniophotometer. CCT, CRI, x/y and u'/v' chromaticity coordinates, SPD, total flux, and input electrical data were measured with the unit operating in the integrating sphere. In order to measure the mean performance, twenty data sets were averaged using the Optronics OL770. A Type J thermocouple was attached to the surface of the unit to measure operating temperature (see photograph in the report for location). All data are traceable to the National Institute of Standards and Technology. Goniometric and one Spectroradiometric test were performed with the unit operated at 120V AC in a 25 +/-1 degree Celsius free air ambient. The second Spectroradiometric test was performed at 24 volts DC.

Checked: <u>R BERGIN</u>
Approved: <u>R BEATTIE</u>



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PAGE 2 of 7

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LUMINAIRE: EXTRUDED DARK BRONZE COLORED METAL HOUSING WITH MOLDED BLACK PLASTIC END CAPS, ONE BLACK CIRCUIT BOARD WITH NINE LEDS, CLEAR FLAT PLASTIC LENS.

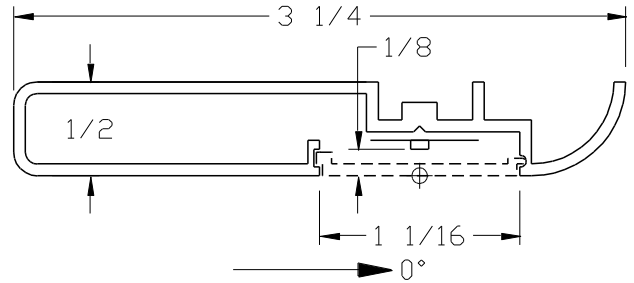
LAMP: NINE WHITE MULTI-CHIP LIGHT EMITTING DIODES (LEDS), VERTICAL BASE-UP POSITION.

TOTAL INPUT WATTS = 11.0 AT 120.0 VOLTS, 0.1250 AMPS

MOUNTING: SURFACE

LED DRIVER: Generic Driver #1

NOTE: DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED AT RATED INPUT VOLTAGE (120VAC) TO THE LED DRIVER.



CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0	FLUX
0	154	154	154	154	154	15
5	153	154	153	153	153	42
15	147	147	147	147	148	63
25	136	137	137	137	138	76
35	121	121	122	122	123	79
45	101	101	102	103	104	69
55	76	76	77	78	79	47
65	46	47	47	48	49	20
75	19	19	18	19	19	2
85	1	1	1	1	1	
90	0	0	0	0	0	

ZONAL LUMEN SUMMARY

ZONE	LUMENS	%FIXT
0- 30	119	29.0
0- 40	196	47.6
0- 60	343	83.5
0- 90	411	100.0
90-180	0	0.0
0-180	411	100.0

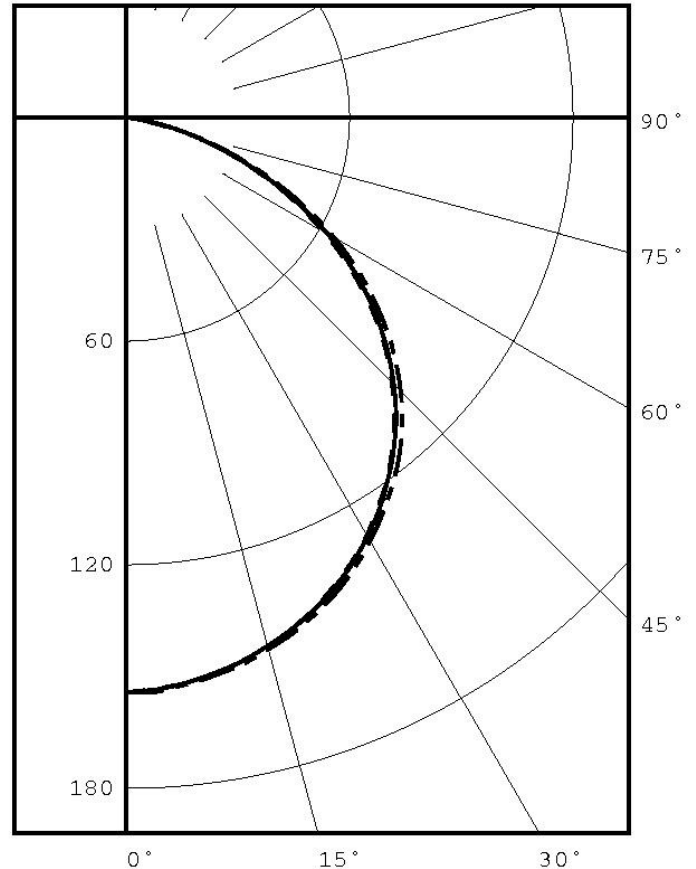
EFFICACY = 37.36 Lm/W

CIE TYPE - DIRECT

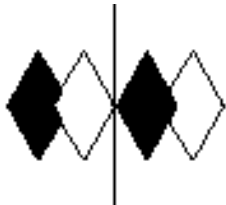
PLANE : 0-DEG 90-DEG
 SPACING CRITERIA : 1.2 1.3
 LUMINOUS LENGTH : 1.063 18.188

LUMINANCE DATA IN CANDELA/SQ M

ANGLE IN DEG	AVERAGE 0-DEG	AVERAGE 45-DEG	AVERAGE 90-DEG
45	11452.	11531.	11826.
55	10567.	10735.	11042.
65	8764.	8897.	9258.
75	5731.	5638.	5917.
85	552.	644.	1288.



LEGEND:
 0-deg: - - - - -
 45-deg: = = = = =
 90-deg: - - - - -



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PAGE 3 of 7

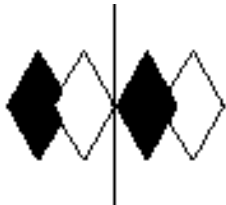
PREPARED FOR: SSL Manufacturer X

CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0
0.0	154	154	154	154	154
2.5	154	154	154	154	154
5.0	153	154	153	153	153
7.5	152	153	152	152	152
10.0	151	151	150	150	151
12.5	149	149	149	149	150
15.0	147	147	147	147	148
17.5	145	145	145	145	146
20.0	142	143	142	143	143
22.5	139	140	140	140	141
25.0	136	137	137	137	138
27.5	133	133	133	134	135
30.0	129	130	130	130	131
32.5	125	126	126	126	127
35.0	121	121	122	122	123
37.5	117	117	117	118	119
40.0	112	112	112	113	115
42.5	107	107	107	108	110
45.0	101	101	102	103	104
47.5	95	96	96	97	99
50.0	89	90	90	91	92
52.5	83	83	83	85	86
55.0	76	76	77	78	79
57.5	69	69	70	71	72
60.0	61	62	63	63	65
62.5	54	54	55	56	57
65.0	46	47	47	48	49
67.5	39	39	39	41	41
70.0	31	32	32	33	33
72.5	25	25	25	26	26
75.0	19	19	18	19	19
77.5	11	12	13	12	13
80.0	4	5	7	7	7
82.5	1	1	3	4	4
85.0	1	1	1	1	1
87.5	0	0	0	0	0
90.0	0	0	0	0	0

ZONAL LUMEN SUMMARY

Zone	Lumen
0- 5	4.
5- 10	11.
10- 15	18.
15- 20	24.
20- 25	29.
25- 30	34.
30- 35	37.
35- 40	39.
40- 45	40.
45- 50	39.
50- 55	36.
55- 60	32.
60- 65	27.
65- 70	20.
70- 75	13.
75- 80	6.
80- 85	1.
85- 90	0.



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PAGE 4 of 7

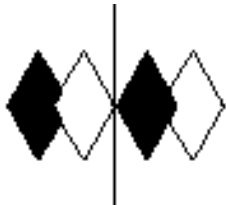
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COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

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	120	120	120	120	117	117	117	117	112	112	112	107	107	107	103	103	103	100
1	110	106	102	98	108	104	100	97	99	96	94	95	93	91	92	90	88	86
2	101	93	86	81	98	91	85	80	87	82	78	84	80	76	81	78	75	73
3	92	82	74	68	90	80	73	67	77	71	66	75	69	65	72	68	64	62
4	84	73	64	58	82	71	63	57	69	62	56	67	61	56	64	59	55	53
5	78	65	56	50	76	64	56	49	62	54	49	60	53	48	58	52	48	46
6	72	59	50	43	70	58	49	43	56	48	43	54	48	42	53	47	42	40
7	66	53	44	38	65	52	44	38	51	43	38	49	43	38	48	42	37	35
8	62	48	40	34	60	48	40	34	46	39	34	45	39	34	44	38	34	32
9	58	45	36	31	56	44	36	31	43	36	31	42	35	30	41	35	30	28
10	54	41	33	28	53	41	33	28	40	33	28	39	32	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 LUMINAIRE SAMPLE.



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PAGE 5 of 7

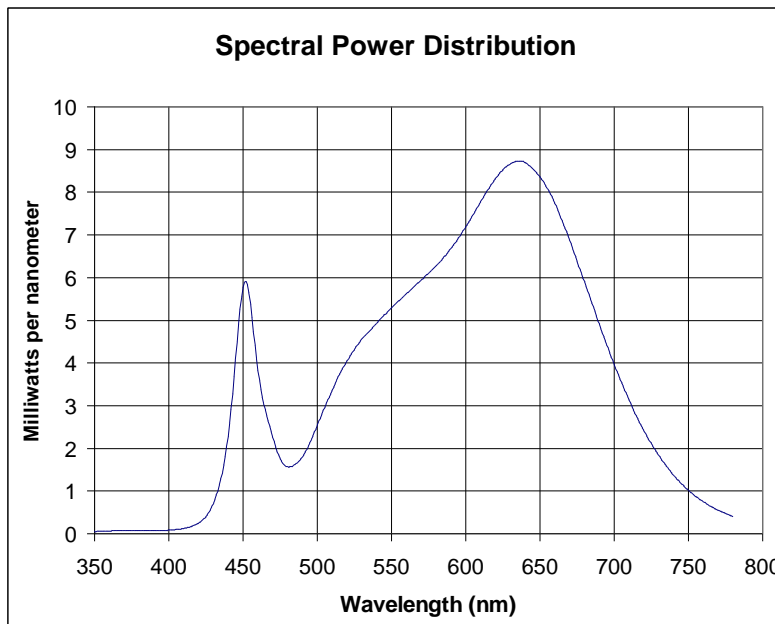
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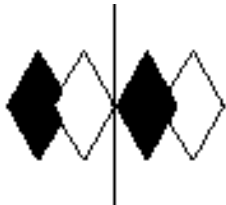
120V AC Power Supply

RESULTS:

SPECTRORADIOMETRIC TESTING IN INTEGRATING SPHERE	
PHOTOMETRIC	
Total Integrated Flux (Lumens)	407*
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.4302
Chromaticity Ordinate y	0.3840
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2550
Chromaticity Ordinate v'	0.5122
Correlated Color Temp CCT (K)	2945
Color Rendering Index (CRI)	96
Total Radiant Flux (milliWatts)	1579*
ELECTRICAL	
Input Voltage (Volts AC)	120.0
Input Current (mA AC)	140
Input Power (Watts)	11.03
EFFICACY	
Lumens/Watt	36.90



*NOTE: Proper calibration of integrating spheres for measuring total flux output of non-directional lamps will produce reliable, repeatable results within the calibration tolerances of the equipment used. However, measurement of lamps 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. For this test, the integrating sphere was calibrated using a directional incandescent flux standard with a distribution similar to the luminaire under test, per IESNA LM78-06.



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PAGE 6 of 7

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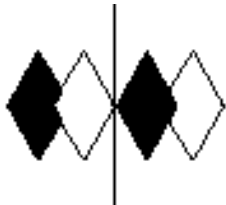
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120V AC Power Supply

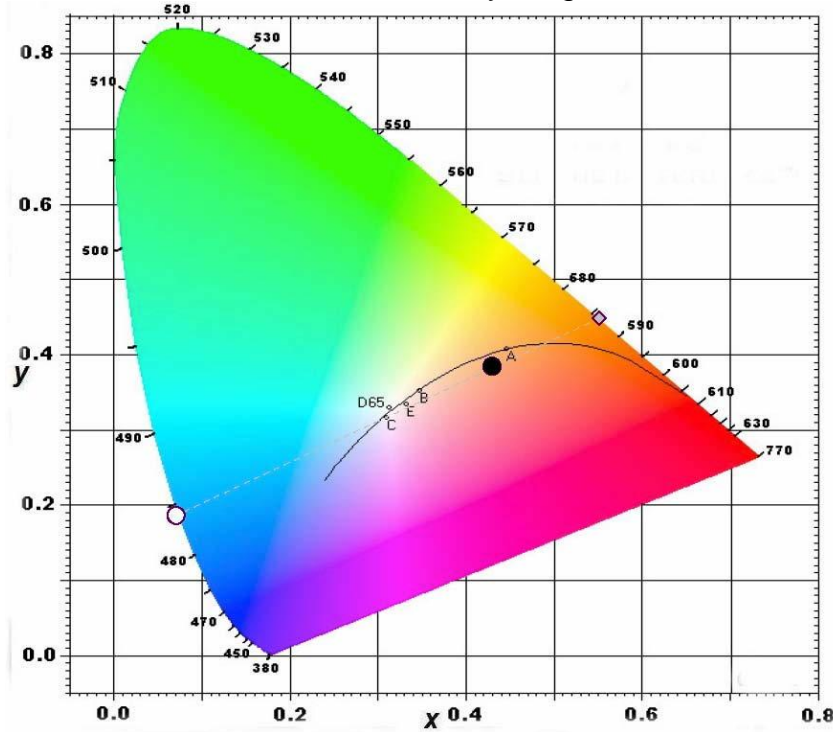
RESULTS:

Tabulated Spectral Power Distribution

Wavelength (nm)	mWatts/nm	Wavelength (nm)	mWatts/nm
350.0	0.05603	570.0	5.93580
360.0	0.06347	580.0	6.27734
370.0	0.07386	590.0	6.68525
380.0	0.07380	600.0	7.19331
390.0	0.07092	610.0	7.77944
400.0	0.08313	620.0	8.31587
410.0	0.12536	630.0	8.67000
420.0	0.24214	640.0	8.69811
430.0	0.71856	650.0	8.35533
440.0	2.29940	660.0	7.73539
450.0	5.77792	670.0	6.87621
460.0	3.81615	680.0	5.89537
470.0	2.26049	690.0	4.89720
480.0	1.56966	700.0	3.96361
490.0	1.80451	710.0	3.12733
500.0	2.54969	720.0	2.41106
510.0	3.36319	730.0	1.83129
520.0	4.04462	740.0	1.36823
530.0	4.56607	750.0	1.01847
540.0	4.93993	760.0	0.75361
550.0	5.29140	770.0	0.55396
560.0	5.62200	780.0	0.40785



CIE Chromaticity Diagram



ADDITIONAL NOTES: Stabilization data was recorded for approximately one hour prior to each test on each apparatus to ensure complete stabilization prior to testing. If RDS would like this data supplied, please notify ITL and we will supply the data needed.

Total time this unit was energized for all testing is 154.0 hours.