LTL LUMINAIRE TESTING LABORATORY, INC.

SUSTAINING MEMBER of the IESNA

905 Harrison Street · Allentown, PA 18103 · 610-770-1044 · Fax 610-770-8912 · www.LuminaireTesting.com

Photometric Indoor Test Report

Relevant Standards
IES LM-9-2009, IES LM-41-1998
ANSI C78.81-2010, ANSI C82.1-2004, ANSI C82.11, ANSI C82.2, ANSI C82.77
IEC 60081, IEC 60901, IEC 61347-2-3

Prepared For
Renova Lighting Systems, Inc.
Rick Edwards
15 Wellstown Road
Ashaway, RI 02804

Catalog Number
ECS-SGI4-MN-332-UNV-13L

LTL Test Number
23045

Test Date

2011-04-14

Prepared By

Zachary Mooney, Project Coordinator

Approved By

Brian Moyer, Engineer

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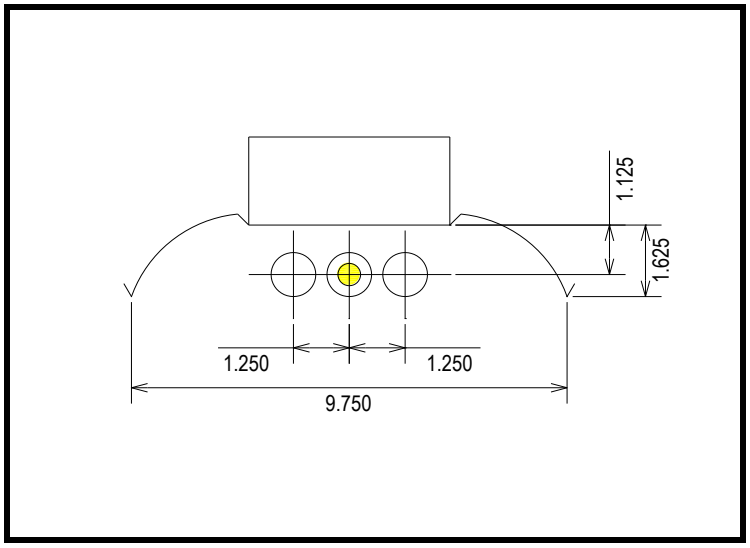
Luminaire Description:	Formed white enamel steel housing, formed specular aluminum reflector, no enclosure
Catalog Number:	ECS-SGI4-MN-332-UNV-13L
Lamp:	Three horizontal 32 Watt T8 linear fluorescent lamps rated at 2850 lumens each
Lamp Catalog Number:	Philips F32T8/TL841/ALTO
Mounting:	Surface / Pendant
Ballast/Driver:	One Sylvania "Quicktronic" QHE-3X32T8/UNV-ISL-SC

Luminaire



Zonal Lumen Summary

Zone (Degrees)	Lumens	% of Lamp	% of Luminaire
0-30	2255	26.4%	28.5%
0-40	3548	41.5%	44.8%
0-60	6194	72.4%	78.2%
0-90	7920	92.6%	99.9%
90-180	4	0.1%	0.1%
0-180	7924	92.7%	100.0%

Test Conditions

Test Temperature:	24.3	°C
Voltage:	120.0	VAC
Current:	0.6315	A
Power:	74.99	W
Power Factor:	0.989	
Frequency:	60	Hz

Summary of Results

Luminaire Efficiency: 92.7 %

Spacing Criterion: 0 Degree: 1.25 90 Degree: 0.94
180 Degree: 1.25 270 Degree: 0.94

CIE Type: Direct

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Candela Tabulation

Horizontal Angle (Degrees)

Vertical Angle (Degrees)	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5
0	3329	3329	3329	3329	3329	3329	3329	3329	3329	3329	3329	3329	3329	3329	3329	3329
5	3308	3340	3363	3339	3337	3339	3363	3340	3308	3340	3363	3339	3337	3339	3363	3340
10	3266	3297	3214	3045	2981	3045	3214	3297	3266	3297	3214	3045	2981	3045	3214	3297
15	3188	3174	2852	2673	2642	2673	2852	3174	3188	3174	2852	2673	2642	2673	2852	3174
20	3084	2961	2585	2365	2317	2365	2585	2961	3084	2961	2585	2365	2317	2365	2585	2961
25	2954	2667	2294	2279	2248	2279	2294	2667	2954	2667	2294	2279	2248	2279	2294	2667
30	2790	2390	2159	2037	2005	2037	2159	2390	2790	2390	2159	2037	2005	2037	2159	2390
35	2598	2151	1956	1861	1885	1861	1956	2151	2598	2151	1956	1861	1885	1861	1956	2151
40	2388	1875	1738	1836	1877	1836	1738	1875	2388	1875	1738	1836	1877	1836	1738	1875
45	2164	1671	1602	1763	1804	1763	1602	1671	2164	1671	1602	1763	1804	1763	1602	1671
50	1921	1498	1538	1652	1688	1652	1538	1498	1921	1498	1538	1652	1688	1652	1538	1498
55	1653	1234	1416	1508	1548	1508	1416	1234	1653	1234	1416	1508	1548	1508	1416	1234
60	1378	1042	1257	1329	1313	1329	1257	1042	1378	1042	1257	1329	1313	1329	1257	1042
65	1100	924	1092	1100	1079	1100	1092	924	1100	924	1092	1100	1079	1100	1092	924
70	811	757	851	741	744	741	851	757	811	757	851	741	744	741	851	757
75	534	576	525	521	518	521	525	576	534	576	525	521	518	521	525	576
80	284	349	313	301	295	301	313	349	284	349	313	301	295	301	313	349
85	86	128	109	93	88	93	109	128	86	128	109	93	88	93	109	128
90	3	11	3	0	0	0	3	11	3	11	3	0	0	0	3	11
95	3	10	2	0	0	0	2	10	3	10	2	0	0	0	2	10
100	1	5	1	0	0	0	1	5	1	5	1	0	0	0	1	5
105	1	2	1	0	0	0	1	2	1	2	1	0	0	0	1	2
110	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0	1
115	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
125	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
130	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
135	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
140	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
145	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
150	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
155	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
160	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
165	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
170	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
175	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
180	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Zonal Lumen Tabulation (5 degree zones)

Zone (Degrees)	Lumens	Zone (Degrees)	Lumens	Zone (Degrees)	Lumens	Zone (Degrees)	Lumens
0-5	80.1	45-50	684.9	90-95	2.1	135-140	0
5-10	233.5	50-55	665.6	95-100	1.4	140-145	0
10-15	358.7	55-60	622.0	100-105	0.7	145-150	0
15-20	457.1	60-65	560.0	105-110	0.3	150-155	0
20-25	534.7	65-70	464.1	110-115	0.1	155-160	0
25-30	591.3	70-75	343.9	115-120	0	160-165	0
30-35	634.4	75-80	227.6	120-125	0	165-170	0
35-40	657.8	80-85	110.7	125-130	0	170-175	0
40-45	674.1	85-90	19.5	130-135	0	175-180	0

Coefficients of Utilization - Zonal Cavity Method

Effective Floor Cavity Reflectance 20%												
Ceiling Cavity Reflectance	90				80				70			
Wall Reflectance	70	50	30	10	70	50	30	10	70	50	30	10
Room Cavity Ratio (RCR)												
0	1.130	1.130	1.130	1.130	1.103	1.103	1.103	1.103	1.078	1.078	1.078	1.078
1	1.035	0.986	0.942	0.903	1.008	0.964	0.924	0.888	0.983	0.942	0.906	0.873
2	0.942	0.857	0.788	0.731	0.916	0.839	0.775	0.722	0.891	0.821	0.763	0.713
3	0.859	0.752	0.670	0.606	0.835	0.736	0.660	0.600	0.812	0.722	0.651	0.594
4	0.787	0.666	0.578	0.512	0.764	0.653	0.571	0.509	0.743	0.640	0.564	0.505
5	0.724	0.595	0.506	0.441	0.703	0.584	0.500	0.438	0.684	0.573	0.495	0.436
6	0.669	0.535	0.448	0.385	0.650	0.526	0.443	0.384	0.632	0.517	0.439	0.382
7	0.620	0.486	0.400	0.341	0.603	0.478	0.397	0.340	0.587	0.470	0.393	0.338
8	0.578	0.444	0.361	0.305	0.562	0.437	0.358	0.304	0.548	0.430	0.355	0.303
9	0.540	0.408	0.328	0.275	0.526	0.402	0.326	0.275	0.513	0.396	0.324	0.274
10	0.506	0.377	0.301	0.250	0.494	0.372	0.299	0.250	0.482	0.367	0.297	0.249

Ceiling Cavity Reflectance	50				30			10			0
Wall Reflectance	70	50	30	10	50	30	10	50	30	10	0
Room Cavity Ratio (RCR)											
0	1.030	1.030	1.030	1.030	0.986	0.986	0.986	0.945	0.945	0.945	0.926
1	0.935	0.903	0.873	0.846	0.866	0.842	0.820	0.833	0.813	0.795	0.776
2	0.846	0.788	0.739	0.697	0.758	0.717	0.681	0.730	0.696	0.665	0.645
3	0.769	0.694	0.633	0.584	0.668	0.617	0.573	0.644	0.601	0.563	0.543
4	0.703	0.617	0.550	0.498	0.595	0.537	0.491	0.575	0.525	0.484	0.464
5	0.648	0.553	0.484	0.431	0.535	0.474	0.426	0.518	0.464	0.422	0.402
6	0.599	0.501	0.431	0.378	0.485	0.422	0.375	0.470	0.415	0.371	0.352
7	0.557	0.456	0.386	0.336	0.442	0.380	0.333	0.430	0.374	0.331	0.312
8	0.521	0.418	0.350	0.301	0.407	0.344	0.299	0.396	0.339	0.297	0.280
9	0.488	0.386	0.319	0.272	0.376	0.315	0.271	0.366	0.310	0.269	0.252
10	0.460	0.358	0.293	0.248	0.349	0.289	0.247	0.341	0.285	0.246	0.230

Average Luminance Table (cd/m²)

Horizontal Angle (Degrees)

Vertical Angle (Degree)	0	45	90
0	21500	21500	21500
45	18870	9697	11170
55	17410	10460	11820
65	15200	10770	11180
75	11240	8156	8764
85	4043	4421	4421

This test was conduted using photometry techniques according to standard IES procedures. The user must therefore use caution in the following situations: 1) This test was performed using a specific ballast/lamp combination. Extrapolation of this data for other ballast/lamp combinations may produce erroneous results. 2) According to IESNA procedures, the ballast(s) and lamp(s) are presumed to produce 100% of rated output. An appropriate ballast factor must be applied to the lumen output ratings and luminous intensity values given. This test was conducted in a controlled laboratory environment where the ambient temperature was held at 25^0C $\pm 1^0$C. Field performance may differ particularly in regards to change in luminous output as a result of difference in ambient temperature and method of mounting the luminaire.

Polar Plot (Candela)