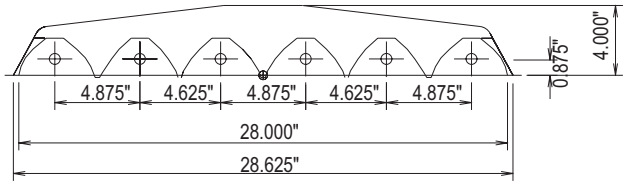
LTL LUMINAIRE TESTING LABORATORY, INC.

IES SUSTAINING MEMBER

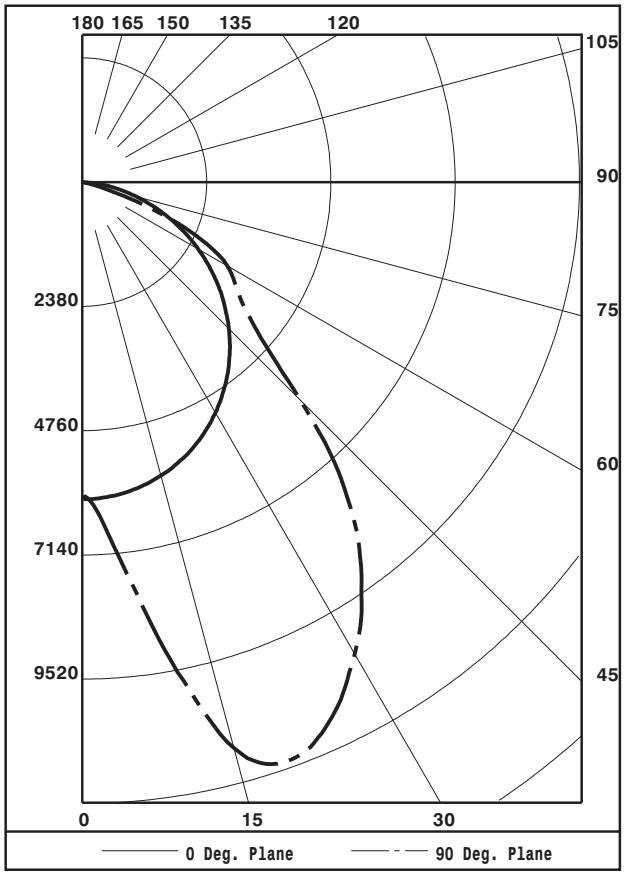
905 Harrison Street · Allentown, PA 18103 · (610) 770-1044 · Fax (610) 770-8912 · www.LuminaireTesting.com

LTL NUMBER: 07930 DATE: 02-13-2004
PREPARED FOR: SIM-KAR LIGHTING
CATALOG NUMBER: ADJUST-654
LUMINAIRE: FORMED STEEL HOUSING WITH CAST ALUMINUM ENDS, FORMED SPECULAR ALUMINUM REFLECTORS, NO ENCLOSURE. LAMPS IN LOW POSITION.
LAMPS: SIX 54 WATT HIGH OUTPUT T5 LINEAR FLUORESCENT LAMPS RATED AT 4400 LUMENS EACH.
LAMP CATALOG NUMBER: SYLVANIA FP54/830/HO
BALLASTS: TWO WORKHORSE WH7-120-L
LER: 90.2 BASED ON A MEASURED BALLAST FACTOR OF 116.0%
MOUNTING: PENDENT
LUMEN TO CANDELA RATIO USED = 9.18
TOTAL INPUT WATTS =337.3 AT 120.0 VOLTS
THE 0 DEGREE PLANE IS PARALLEL WITH THE LAMPS.

#07930



CANDELA DISTRIBUTION						FLUX
	0.0	22.5	45.0	67.5	90.0	
0	6046	6046	6046	6046	6046	
5	6042	6235	6588	6904	7015	654
15	5816	7182	9315	10797	11222	2541
25	5390	8464	11150	11355	11308	4525
35	4764	9313	9971	9568	9323	5596
45	3965	8335	7736	6622	5897	5307
55	3050	6239	4432	3680	3639	3988
65	2059	3568	2510	2523	2367	2652
75	1072	1289	915	405	292	914
85	211	32	0	0	0	71
90	0	0	0	0	0	



ZONAL LUMEN SUMMARY

ZONE	LUMENS	%LAMP	%FIXT
0- 30	7719	29.2	29.4
0- 40	13315	50.4	50.7
0- 60	22610	85.6	86.1
0- 90	26247	99.4	100.0
90-180	0	0.0	0.0
0-180	26247	99.4	100.0

TOTAL LUMINAIRE EFFICIENCY: 99.4%

CIE TYPE:	DIRECT	
PLANE:	0-DEG	90-DEG
SPACING CRITERIA:	1.3	1.8
LUMINOUS LENGTH:	48.125	28.625

LUMINANCE IN CANDELA PER SQUARE METER

ANGLE IN DEG	AVERAGE 0-DEG	AVERAGE 45-DEG	AVERAGE 90-DEG
0	6802.	6802.	6802.
45	6309.	12309.	9383.
55	5983.	8693.	7138.
65	5481.	6682.	6301.
75	4660.	3977.	1269.
85	2724.	0.	0.

TESTED BY HERSCHEL SCHRECK
CHECKED BY MIKE GRATHER

THIS REPORT BASED ON LM-41 AND OTHER PERTINENT IESNA PROCEDURES.

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PREPARED FOR: SIM-KAR LIGHTING

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	118	118	118	118	116	116	116	116	110	110	110	106	106	106	101	101	101	99
1	110	106	103	100	108	104	101	98	100	97	95	96	94	92	93	91	89	87
2	102	95	89	84	99	93	88	83	90	85	81	86	83	80	84	80	78	76
3	94	85	78	72	91	83	77	71	80	75	70	78	73	69	75	71	68	66
4	86	76	68	62	84	74	67	61	72	66	61	70	64	60	68	63	59	57
5	79	67	59	53	77	66	58	52	64	57	52	62	56	51	60	55	51	49
6	73	60	52	46	71	59	51	46	58	50	45	56	50	45	54	49	44	42
7	67	54	46	40	65	53	45	40	52	45	39	50	44	39	49	43	39	37
8	61	48	40	34	60	48	40	34	46	39	34	45	39	34	44	38	34	32
9	56	43	35	29	55	42	35	29	41	34	29	40	34	29	39	33	29	27
10	52	39	31	26	51	38	31	26	37	30	26	36	30	25	36	30	25	24

CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0
0	6046	6046	6046	6046	6046
5	6042	6235	6588	6904	7015
10	5960	6657	7786	8742	9099
15	5816	7182	9315	10797	11222
20	5629	7808	10746	11642	11758
25	5390	8464	11150	11355	11308
30	5100	9037	10761	10569	10438
35	4764	9313	9971	9568	9323
40	4382	9031	8950	8319	7900
45	3965	8335	7736	6622	5897
50	3529	7373	6305	4627	4306
55	3050	6239	4432	3680	3639
60	2561	4980	3083	3181	3205
65	2059	3568	2510	2523	2367
70	1552	2037	1926	1420	1176
75	1072	1289	915	405	292
80	625	707	133	10	2
85	211	32	0	0	0
90	0	0	0	0	0

ZONAL LUMEN SUMMARY

0- 5	148.
5- 10	506.
10- 15	986.
15- 20	1555.
20- 25	2065.
25- 30	2459.
30- 35	2736.
35- 40	2860.
40- 45	2798.
45- 50	2509.
50- 55	2164.
55- 60	1824.
60- 65	1529.
65- 70	1123.
70- 75	632.
75- 80	283.
80- 85	67.
85- 90	4.

THIS TEST WAS CONDUCTED USING RELATIVE PHOTOMETRY TECHNIQUES ACCORDING TO STANDARD IESNA PROCEDURES. THE USER MUST THEREFORE USE CAUTION IN THE FOLLOWING SITUATIONS: 1) THIS TEST WAS PERFORMED USING A SPECIFIC BALLAST/LAMP COMBINATION. EXTRAPOLATION OF THESE 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. 3) THIS TEST WAS CONDUCTED IN A CONTROLLED LABORATORY ENVIRONMENT WHERE THE AMBIENT TEMPERATURE WAS HELD AT 25 C 1 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.

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A Notice About Extremely High Efficiencies and Efficiencies Exceeding 100%

Preface

All fluorescent lamps exhibit some change in lumen output as a function of ambient temperature. This change in lumen output is a non-linear function that has a peak output temperature located near the middle of the lamp's usable temperature range. See Figure 1 for the temperature response of a typical T5 lamp. The specific temperature where the peak lumen output occurs is dependent on many variables within the lamp manufacturing process.

In the case of T5 lamps, the peak lumen output temperature falls near the 35˚C(95˚F) temperature.

What does this have to do with testing?

You might be wondering, "Since IESNA standards on fluorescent testing are based on relative photometry, what effect does this have on my photometric test?" Although the relative photometry method of testing luminaires is designed to normalize as many variables as possible, the efficiency that is calculated from the results of a relative photometric test is not a pure "optical efficiency". Consider the following:

- When the "bare lamps" are tested, they are tested in the ambient atmosphere of the lab 25˚C(77˚F).
- When the luminaire is tested, it is tested in the ambient atmosphere of the lab 25˚C(77˚F). The ambient temperature within the luminaire is guaranteed to be warmer than 25˚C(77˚F).

As it was stated earlier, the lumen output of the lamps will vary as a function of the ambient temperature. This means that the lumen output of the lamps when operated inside of the luminaire will be different from the lumen output of the lamps when they are tested for bare lamp output. The efficiency that is reported on a photometric test report is the ratio of the total luminous output of the luminaire to the total luminous output of the bare lamps. The only way that a test report can show the true "optical efficiency" of a luminaire is if the lamps produce the same amount of lumens in the luminaire as they did in the bare lamp test.

The point of this notice

Because the lumen output of the lamps operating within the luminaire can be different from the lumen output of the lamps operating outside of the luminaire, the luminaire efficiency can be increased/decreased beyond the "optical efficiency" of the luminaire. This situation occurs mostly in one or two lamp pendant T5 luminaires where mutual heating of the lamps, reflected radiant heat, contained heat, etc. can bring the temperature of the lamp close to the temperature that the lamp would operate at if it were in a 35˚C(95˚F) ambient temperature. Since T5 lamps have a peak lumen output near 35˚C(95˚F) ambient temperature, there is a possibility that an already high efficiency could be increased above 100%.

A Word of Caution

Although the efficiency shown in a relative photometric test report is not a pure "optical efficiency", this does not mean that there is a problem with the test procedure. It means that there is a temperature factor included into the test report based on an ambient temperature of 25˚C(77˚F). If you are using the test results in a situation where you know the ambient temperature will be significantly different from the 25˚C(77˚F) laboratory conditions, make sure that you use an appropriate temperature correction factor.

Figure 1. Temperature Response of a Typical T5 Lamp.