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: 07932 DATE: 02-13-2004

PREPARED FOR: SIM-KAR LIGHTING

CATALOG NUMBER: ADJUST-454

LUMINAIRE: FORMED STEEL HOUSING WITH CAST ALUMINUM ENDS, FORMED SPECULAR ALUMINUM REFLECTORS, NO ENCLOSURE. LAMPS IN MEDIUM 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: 90.4 BASED ON A MEASURED BALLAST FACTOR OF 116.0%

NOTE: THIS TEST WAS PRORATED FROM LTL TEST NUMBER 07929 TO SIMULATE A FOUR LAMP T5 LINEAR FLUORESCENT LUMINAIRE.

MOUNTING: PENDENT

LUMEN TO CANDELA RATIO USED = 9.18

TOTAL AS TESTED INPUT WATTS =335.3 AT 120.0 VOLTS

TOTAL PRORATED INPUT WATTS = 223.5 AT 120.0 VOLTS

THE 0 DEGREE PLANE IS PARALLEL WITH THE LAMPS.

CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0	FLUX
0	7803	7803	7803	7803	7803	
5	7799	7909	8127	8278	8322	783
15	7517	8212	8999	9346	9373	2463
25	6971	8268	8503	7660	7240	3612
35	6172	7624	6044	4596	4206	3665
45	5155	5866	3441	2586	2383	3037
55	3959	3390	1835	1968	1897	2264
65	2632	1452	1220	626	437	1208
75	1299	644	61	0	0	366
85	159	0	0	0	0	30
90	0	0	0	0	0	

ZONAL LUMEN SUMMARY

ZONE	LUMENS	%LAMP	%FIXT
0- 30	6858	39.0	39.3
0- 40	10523	59.8	60.4
0- 60	15824	89.9	90.8
0- 90	17428	99.0	100.0
90-180	0	0.0	0.0
0-180	17428	99.0	100.0

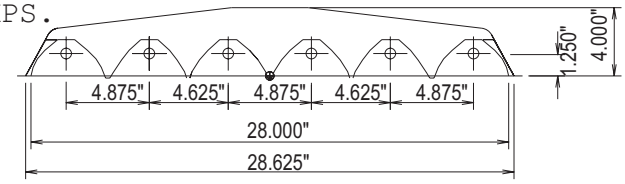
TOTAL LUMINAIRE EFFICIENCY: 99.0%

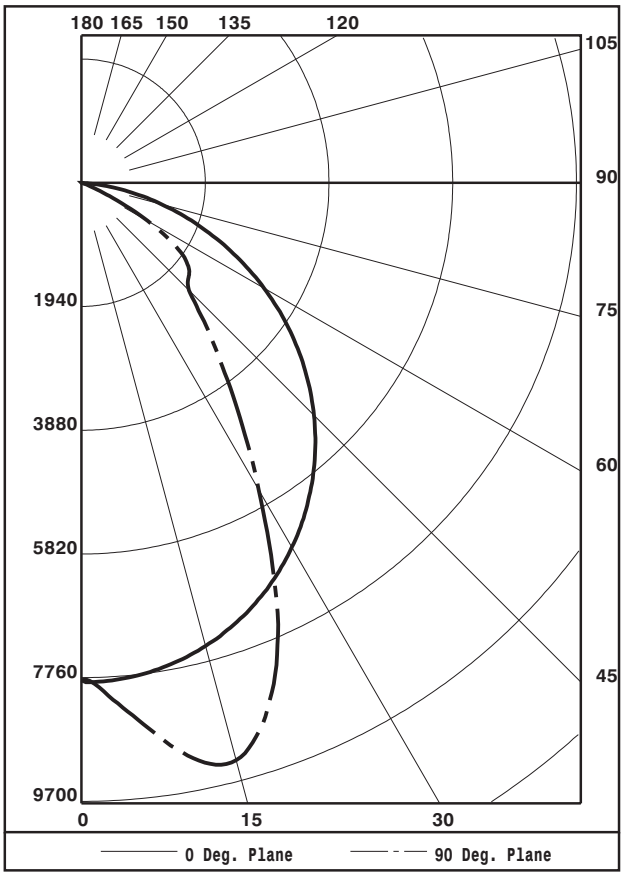
CIE TYPE:	DIRECT	
PLANE:	0-DEG	90-DEG
SPACING CRITERIA:	1.3	1.1
LUMINOUS LENGTH:	48.125	28.625

LUMINANCE IN CANDELA PER SQUARE METER

ANGLE IN DEG	AVERAGE 0-DEG	AVERAGE 45-DEG	AVERAGE 90-DEG
0	8779.	8779.	8779.
45	8202.	5475.	3792.
55	7766.	3599.	3721.
65	7007.	3248.	1163.
75	5647.	265.	0.
85	2053.	0.	0.

#07932





TESTED BY HERSCHEL SCHRECK

CHECKED BY MIKE GRATHER

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

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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	118	118	118	118	115	115	115	115	110	110	110	105	105	105	101	101	101	99
1	111	107	104	101	108	105	102	99	101	98	96	97	95	93	94	92	91	89
2	103	97	92	87	101	95	90	86	92	88	84	89	85	82	86	83	81	79
3	96	88	81	76	94	86	80	76	83	78	74	81	77	73	78	75	72	70
4	89	79	72	67	87	78	71	66	76	70	65	74	69	65	72	67	64	62
5	82	71	64	58	80	70	63	58	68	62	57	67	61	57	65	60	56	54
6	76	65	57	52	75	64	57	52	62	56	51	61	55	51	59	54	50	49
7	71	59	51	46	69	58	51	46	57	50	46	56	50	45	54	49	45	43
8	66	53	46	41	64	53	46	40	52	45	40	50	44	40	49	44	40	38
9	61	48	41	36	59	48	41	36	47	40	35	46	40	35	45	39	35	33
10	57	44	37	32	55	44	37	32	43	36	32	42	36	32	41	35	31	30

CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0
0	7803	7803	7803	7803	7803
5	7799	7909	8127	8278	8322
10	7693	8086	8581	8949	9065
15	7517	8212	8999	9346	9373
20	7274	8283	9086	8844	8633
25	6971	8268	8503	7660	7240
30	6596	8084	7440	6053	5557
35	6172	7624	6044	4596	4206
40	5686	6866	4631	3454	3152
45	5155	5866	3441	2586	2383
50	4580	4663	2505	2140	2204
55	3959	3390	1835	1968	1897
60	3304	2280	1622	1418	1197
65	2632	1452	1220	626	437
70	1954	945	515	112	52
75	1299	644	61	0	0
80	685	122	0	0	0
85	159	0	0	0	0
90	0	0	0	0	0

ZONAL LUMEN SUMMARY

0- 5	189.
5- 10	594.
10- 15	1028.
15- 20	1435.
20- 25	1733.
25- 30	1879.
30- 35	1884.
35- 40	1781.
40- 45	1618.
45- 50	1420.
50- 55	1240.
55- 60	1024.
60- 65	755.
65- 70	453.
70- 75	246.
75- 80	120.
80- 85	28.
85- 90	2.

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.