



# itl boulder

THE LIGHT CENTER OF THE INDUSTRY SINCE 1955

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: ITL78296

PAGE: 1 OF 6

ISSUE DATE: 08/29/13

PREPARED FOR: PRECISION ARCHITECTURAL LIGHTING

CATALOG NUMBER: MLS5-I2/D2-4-TWA-120-T5

LUMINAIRE: EXTRUDED 2-PIECE METAL HOUSING WITH WHITE PAINTED GENERAL INTERIOR FINISH, FABRICATED WHITE PAINTED METAL END CAPS AND 2 DISTINCT OPTICAL COMPARTMENTS, TOP OPTICAL COMPARTMENT CONSISTS OF: FORMED WHITE PAINTED METAL REFLECTOR, FORMED SPECULAR METAL SOCKET MOUNTING BRACKETS. BOTTOM OPTICAL COMPARTMENT CONSISTS OF: FORMED WHITE PAINTED METAL REFLECTOR AND SOCKET MOUNTING BRACKETS, EXTRUDED TRANSLUCENT WHITE FROSTED ACRYLIC DIFFUSER. DIFFUSER FROSTED BOTH SIDES. OPEN TOP.

LAMPS: FOUR 28-WATT T-5 SYLVANIA FP28/841/ECO LINEAR FLUORESCENTS.

BALLAST: UNIVERSAL B228PUNV-C, UNIVERSAL B228PUNV-N

THE 0 DEGREE PLANE IS PARALLEL WITH THE LAMPS.

TOTAL REFLECTANCE OF PAINT = 89.9 %

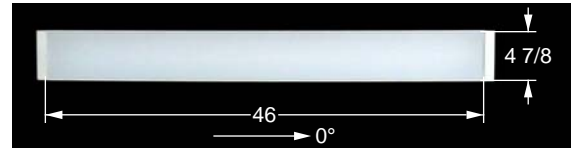
MOUNTING: SUSPENDED/WALL

TOTAL INPUT WATTS = 119.5 AT 120.0 VOLTS

NOTE: DIFFUSER MATERIAL INFORMATION PROVIDED

BY CLIENT.

REPORT IS BASED ON 2600 LUMENS PER LAMP. \*



### CANDELA DISTRIBUTION

### FLUX

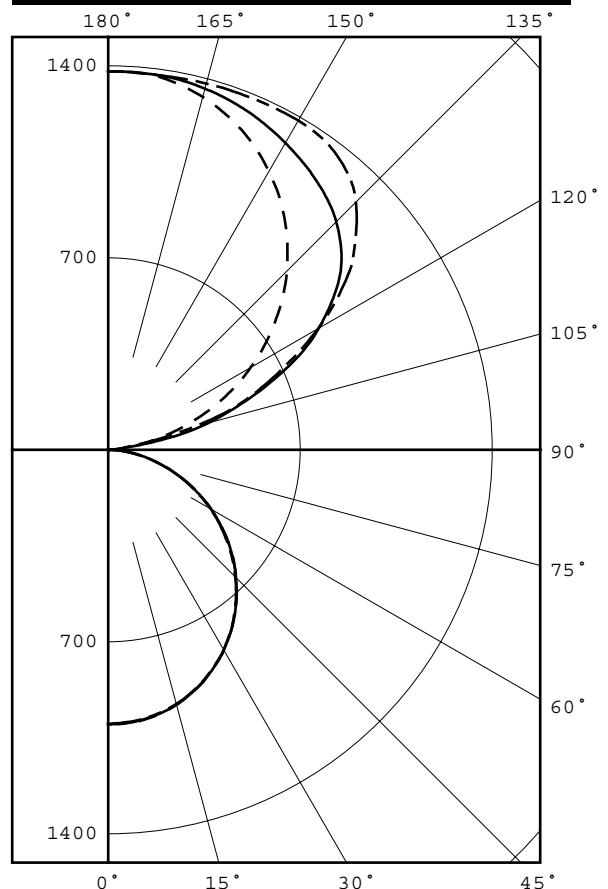
	0.0	22.5	45.0	67.5	90.0	
0	1000	1000	1000	1000	1000	
5	999	991	997	998	994	95
15	962	956	962	963	959	271
25	890	885	890	892	888	410
35	788	785	788	788	786	492
45	660	657	659	657	655	507
55	513	512	512	509	507	456
65	353	352	352	349	350	348
75	191	192	192	192	193	204
85	53	54	55	55	55	61
90	0	0	0	0	0	
95	35	54	37	44	45	62
105	238	396	379	346	326	365
115	482	686	730	713	702	671
125	713	861	1014	1052	1048	848
135	922	1009	1176	1263	1277	876
145	1099	1149	1260	1349	1376	782
155	1237	1259	1321	1369	1386	608
165	1332	1334	1363	1379	1382	384
175	1379	1372	1379	1379	1378	131
180	1380	1380	1380	1380	1380	

### ZONAL LUMEN SUMMARY

ZONE	LUMENS	%LAMP	%FIXT
0- 30	775	7.5	10.2
0- 40	1267	12.2	16.7
0- 60	2231	21.4	29.5
0- 90	2843	27.3	37.6
90-120	1098	10.6	14.5
90-130	1945	18.7	25.7
90-150	3603	34.6	47.6
90-180	4726	45.4	62.4
0-180	7569	72.8	100.0

TOTAL LUMINAIRE EFFICIENCY = 72.8 % \*

CIE TYPE - SEMI-INDIRECT  
PLANE : 0-DEG 90-DEG  
SHIELDING ANGLES : 90 90



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

Checked       M KLOPF        
Approved       R BEATTIE        
Lighting Engineer

\* SEE ADDENDUM FOR FURTHER INFORMATION

THIS REPORT IS BASED ON PUBLISHED INDUSTRY PROCEDURES. FIELD PERFORMANCE MAY DIFFER FROM LABORATORY PERFORMANCE.



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PAGE: 2 OF 6

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PLANE : 0-DEG 90-DEG  
LUMINOUS LENGTH : 46.000 4.875

LUMINANCE DATA IN CANDELA/SQ M				
ANGLE	AVERAGE	AVERAGE	AVERAGE	
IN DEG	0-DEG	45-DEG	90-DEG	
45	6451.	6442.	6403.	
55	6182.	6170.	6110.	
65	5773.	5757.	5724.	
75	5101.	5127.	5154.	
85	4203.	4362.	4362.	



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PAGE: 3 OF 6

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CANDELA DISTRIBUTION  
 LATERAL ANGLE

	0.0	22.5	45.0	67.5	90.0
0.0	1000	1000	1000	1000	1000
5.0	999	991	997	998	994
10.0	985	978	984	985	981
15.0	962	956	962	963	959
20.0	930	925	930	931	928
25.0	890	885	890	892	888
30.0	843	838	843	844	842
35.0	788	785	788	788	786
40.0	726	724	726	725	723
45.0	660	657	659	657	655
50.0	589	586	588	585	583
55.0	513	512	512	509	507
60.0	435	433	433	430	430
65.0	353	352	352	349	350
70.0	271	271	270	270	270
75.0	191	192	192	192	193
80.0	117	119	120	119	120
85.0	53	54	55	55	55
90.0	0	0	0	0	0
95.0	35	54	37	44	45
100.0	128	219	177	125	104
105.0	238	396	379	346	326
110.0	359	556	548	540	535
115.0	482	686	730	713	702
120.0	600	782	887	890	883
125.0	713	861	1014	1052	1048
130.0	821	935	1110	1167	1175
135.0	922	1009	1176	1263	1277
140.0	1014	1083	1223	1318	1342
145.0	1099	1149	1260	1349	1376
150.0	1171	1208	1292	1362	1386
155.0	1237	1259	1321	1369	1386
160.0	1290	1301	1345	1376	1384
165.0	1332	1334	1363	1379	1382
170.0	1362	1358	1375	1380	1379
175.0	1379	1372	1379	1379	1378
180.0	1380	1380	1380	1380	1380



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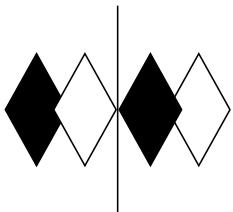
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5-DEGREE  
ZONAL LUMEN SUMMARY

0- 5	24
5- 10	71
10- 15	115
15- 20	156
20- 25	191
25- 30	219
30- 35	240
35- 40	252
40- 45	256
45- 50	251
50- 55	238
55- 60	218
60- 65	190
65- 70	157
70- 75	121
75- 80	83
80- 85	47
85- 90	14
90- 95	11
95-100	51
100-105	136
105-110	229
110-115	305
115-120	367
120-125	411
125-130	436
130-135	443
135-140	433
140-145	409
145-150	373
150-155	329
155-160	278
160-165	222
165-170	162
170-175	98
175-180	33

10-DEGREE  
ZONAL LUMEN SUMMARY

0- 10	95
0- 20	366
0- 30	775
0- 40	1267
0- 50	1774
0- 60	2231
0- 70	2578
0- 80	2782
0- 90	2843
0-100	2905
0-110	3270
0-120	3941
0-130	4788
0-140	5664
0-150	6446
0-160	7054
0-170	7438
0-180	7569



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PAGE: 5 OF 6

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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	76	76	76	76	69	69	69	69	56	56	56	44	44	44	33	33	33	27	
1	69	66	63	61	62	60	57	55	49	47	45	38	37	36	29	28	27	23	
2	63	57	53	49	57	52	48	45	42	40	37	33	32	30	25	24	23	19	
3	57	50	45	41	52	46	41	38	37	34	31	29	27	25	22	21	19	16	
4	52	44	39	34	47	40	36	32	33	29	27	26	24	21	20	18	17	14	
5	48	39	34	29	43	36	31	27	29	26	23	23	21	18	18	16	14	12	
6	44	35	29	25	40	32	27	23	26	23	20	21	18	16	16	14	13	10	
7	41	32	26	22	37	29	24	20	24	20	17	19	16	14	15	13	11	9	
8	38	29	23	19	34	26	21	18	22	18	15	17	15	13	13	11	10	8	
9	35	26	21	17	32	24	19	16	20	16	14	16	13	11	12	10	9	7	
10	33	24	19	15	30	22	17	14	18	15	12	15	12	10	11	9	8	7	

ALL CANDELA, LUMENS, LUMINANCE, COEFFICIENT OF UTILIZATION AND VCP VALUES IN THIS REPORT ARE BASED ON RELATIVE PHOTOMETRY WHICH ASSUMES A BALLAST FACTOR OF 1.000. ANY CALCULATIONS PREPARED FROM THESE DATA SHOULD INCLUDE AN APPROPRIATE BALLAST FACTOR.



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ADDENDUM

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SPECIAL TEST PROCEDURES FOR T-5 LAMPS INCLUDING EXPLANATION OF THE IMPORTANCE OF LAMP LUMEN RATINGS.

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This test was performed using standard relative photometric practices in accordance with recommendations of the Illuminating Engineering Society of North America. Fluorescent testing using the guidelines of relative photometric practice presupposes that the lamps will be operated at their nominal electrical characteristics (e.g., a 40 watt lamp will operate very nearly at 40 watts, and at the voltage and current required for 40-watt operation). Fluorescent lamps in general are temperature sensitive, the lumen output varies with ambient temperature and follows a characteristic curve. The T-5 fluorescent lamps used in this test produce maximum light output in an ambient temperature other than 25 degrees C. A critical step in relative photometric testing involves measurement of the total flux output from the lamp(s) suspended in free air at a 25 degree C ambient temperature per IES LM41-1998. This measurement process is a separate step from the photometric exploration of the luminaire itself. This "bare lamp" measurement is made with the lamp(s) operated by the same ballast(s) which are to be used in the luminaire. Since the test procedure involves measuring the bare lamp flux output at 25 degrees C and this lamp type peaks at a temperature other than 25 degrees C, the flux measured for this lamp type will be less than the maximum output the lamp is designed to produce.

As a result, the measurement of the "bare lamp" total flux output is lower than it would be if the lamps were operated at their optimum operating temperature and at nominal electrical characteristics. When this "bare lamp" measurement is incorporated into the luminaire test report, the net effect is that total luminaire efficiency on the report is higher than what the lighting industry would expect this luminaire to produce. These lighting industry expectations are based on comparisons to the total luminaire efficiency of the same luminaire with T-12 or T-8 lamps.

On this particular test, the lamp lumen rating shown is for a 25 degree C ambient temperature. Since this report was based on the lamp lumen rating at 25 degrees C, the candela values in this report should be accurate, as long as the lamp(s) used for this test follow the manufacturer's light output vs. temperature curve.

T5TEMP3.DIS