



TEST REPORT

Job No. 170200906SHA

Date: March 5, 2017

REPORT NO. 170200906SHA-002

TEST OF 2x4 Luminaires for Ambient Lighting of Interior Commercial Spaces
MODEL NO. L42TF24DIM/40K

RENDERED TO
Overdrive Electronics Pvt. Ltd
C-121, Hosiery Complex, Phase2 Extn, India

TEST: Electrical and Photometric as required to the IESNA LM-79 test standard and DesignLights Consortium V4.1.

LABORATORY NOTE: The laboratory that conducted the testing detailed in this report has been Qualified, Verified, and Recognized for LM-79 Testing for ENERGY STAR for Luminaires by NVLAP program.

AUTHORIZATION: The testing performed was authorized by signed quote number QSH170215047.

STANDARDS USED: The following American National Standards or Illuminating Engineering Society of North America Test Guides were used in part or totally to test each specimen:

DesignLights Consortium V4.0	Qualification Requirements for Luminaires (Light Fixtures)
NEMA ANSLG C78.377: 2008	Specifications of the Chromaticity of Solid State Lighting Products
IESNA LM-79: 2008	Approved Method for the Electrical and Photometric Measurements of Solid-State Lighting Products
ANSI C82.77-2002	Harmonic Emission Limits – Related Power Quality Requirements for Lighting Equipment
CIE No. 13.3 – 1995	Method of Measuring and Specifying Colour Rendering Properties of Light Sources
IESNA LM-16: 1993	Practical Guide to Colorimetry of Light Sources
UL 1598: 2008	Standard for Safety: Luminaires

DESCRIPTION OF SAMPLE: The client submitted one sample of model L42TF24DIM/40K. The sample was received by Intertek on August 24, 2016, in undamaged condition, and one sample was tested as received. The sample designations was 0160824-12-001.

DATES OF TESTS: August 25, 2016 through September 1, 2016

ISSUED BY: Intertek Testing Services Shanghai

TEST LOCATION: 7 floor, No.51, 1089 Qinzhou Road (North), Shanghai, China 200233

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Intertek Testing Services Shanghai

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SUMMARY

Model Number :	L42TF24DIM/40K
Category :	Indoor Troffer
Primary Use:	2x4 Luminaires for Ambient Lighting of Interior Commercial Spaces
LED Driver Model No:	ME 50_120-277V 1000_D0_FF_W

Test Condition: 120V 60Hz for L42TF24DIM/40K

Criteria	Result
Total Lumen Output	4423.05 lm
Total Power	42.12 W
Luminaire Efficacy	105.02 lm/W
Power Factor	0.991
Correlated Color Temperature (CCT)	3021 K
Color Rendering Index (CRI)	833
THD	8.1%
Maximum LED Source In-Situ Temperature	52.8 °C
Luminaire Zonal Lumen Density in 0-60° Zone	73.1 %
Spacing/MH(C0/180)	1.33
Spacing/MH(C90/270)	1.30
Lumen Maintenance	L ₇₀ ≥ 50000 h
D _{uv}	0.0016

Test Condition: 277V 60Hz for L42TF24DIM/40K

Total Power	42.56W
Power Factor	0.932
THD	16.6%

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EQUIPMENT LIST

Equipment Used	Model Number	Control Number	Calibration Due Date
Fluke Temperature Meter	52	EC2357	2017/04/24
Everfine- DC Power Supply	WY12010	EC4753-7	2017/07/31
Everfine- AC power source for Integrating Sphere System	VPS1010 PWM	EC4760-12	2017/07/31
Everfine - AC power source for Goniophotometer System	VPS1060 PWM	EC4753-8	2017/07/31
Two meter integrating sphere unit	Everfine – 2M	EC4760	---
Everfine - Digital Power Meter	PF2010A	EC4760-10	2017/07/31
YOKOGAWA - Digital Power Meter	WT210	EC4553	2017/07/31
Everfine – Goniophotometer	Go-R5000	EC4753	2016/10/31

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TEST METHOD

Seasoning in Sample Orientation – LED Products

No seasoning was performed in accordance with IESNA LM-79

Light Distribution and Output Measurements

Light Distribution and total light output (luminous flux) were measured using a Go-R5000 Type-C Rotating Mirror Goniophotometer. Temperature 25°C and relative humidity of 60% was measured at a position in the testing laboratory.

The lamp rotates only around the fixed vertical axle in the prescribed burning position. The lamp and mirror permit the measurement of luminous intensity at the direction of any horizontal or vertical angle without tilting the lamp. The lamp was allowed to stabilize before measurements were made.

Chromaticity Measurements

Chromaticity was measured using a 2 meters integrating sphere spectral lamp measurement system. Temperature was measured at a position inside the sphere shielded from direct light. Relative humidity of 65% was measured at a position in the testing laboratory.

Spectral radiant flux measurements were made using spectroradiometer (bandwidth: 2nm) attached to the detector port of the integrating sphere. Each lamp was allowed to stabilize before measurements were made. The calibration of the integrating sphere spectroradiometer system is by the reference/standard lamps which are traceable to NIST. Lamp efficacy (lumens per watt) for each lamp model was then computed based on the luminous flux result. Electrical measurements including voltage, power and power factor were measured using YOKOGAWA - Digital Power Meter., model WT210.

Standard lamp used:

Model: Labsphere SCL-1400

Current: 2.679A

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RESULTS OF TESTS

Test Condition: 120V 60Hz for L42TF24DIM/40K

Photometric Measurements at 25°C

Total operation burning time: 70 min

Stabilization time: 60 min

Intertek Sample No.	Base Orientation	Correlated Color Temperature (K)	CRI	CIE 31' Chromaticity Coordinate (x)	CIE 31' Chromaticity Coordinate (y)	CIE 76' Chromaticity Coordinate (u')	CIE 76' Chromaticity Coordinate (v')
		L42TF24DIM/40K					
0160824-12-001	N/A	3021	83.3	0.4320	0.3963	0.2507	0.5175

Photometric and Electrical Measurements at 25°C

Intertek Sample No.	Base Orientation	Input Voltage (Vac)	Input Current (mA)	Input Power (Watts)	Input Power Factor	Absolute Luminous Flux (Lumens)	Lumen Efficacy (Lumens Per Watt)
		L42TF24DIM/40K					
0160824-12-001	N/A	120.1	354	42.12	0.991	4423.05	105.02

Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens (lm)	% Luminaire (%)
L42TF24DIM/40K		
0-60	3234	73.1 %

Beam Angle

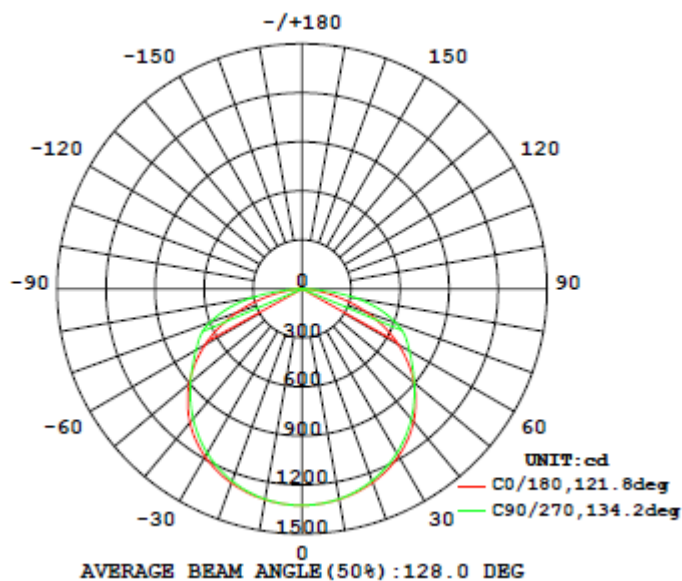
	Horizontal Spread (°)	Vertical Spread (°)
L42TF24DIM/40K		
Beam (50%)	121.8	134.2

Average Beam Angle (50%): 128.0°

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RESULTS OF TESTS (cont'd)Intensity (Candlepower) Summary at 25°C – Candelas**Test Condition: 120V 60Hz for L42TF24DIM/40K**

V \ H(°)	0	22.5	45	67.5	90
0	1325.2	1325.2	1325.2	1325.2	1325.2
5	1320.9	1320.7	1320.6	1320.4	1320.4
10	1307.3	1306.9	1307.3	1308.0	1308.4
15	1284.5	1284.4	1286.0	1287.8	1288.9
20	1252.4	1252.9	1256.3	1259.9	1261.5
25	1211.3	1212.5	1218.1	1223.7	1225.9
30	1161.9	1163.7	1171.6	1179.0	1181.4
35	1103.7	1106.6	1116.6	1124.8	1126.8
40	1038.7	1041.9	1052.4	1060.3	1061.4
45	967.4	970.6	979.8	984.9	984.5
50	892.8	894.7	899.3	899.1	895.2
55	818.4	817.0	812.0	802.1	793.8
60	750.0	742.9	720.7	695.0	680.1
65	689.7	677.8	630.2	580.3	555.5
70	598.8	597.8	546.8	458.5	421.2
75	475.2	478.0	452.8	336.4	282.6
80	313.4	322.3	309.6	220.0	148.0
85	100.9	111.6	118.4	94.0	42.3
90	0.5	0.5	0.3	0.3	2.4



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RESULTS OF TESTS (cont'd)

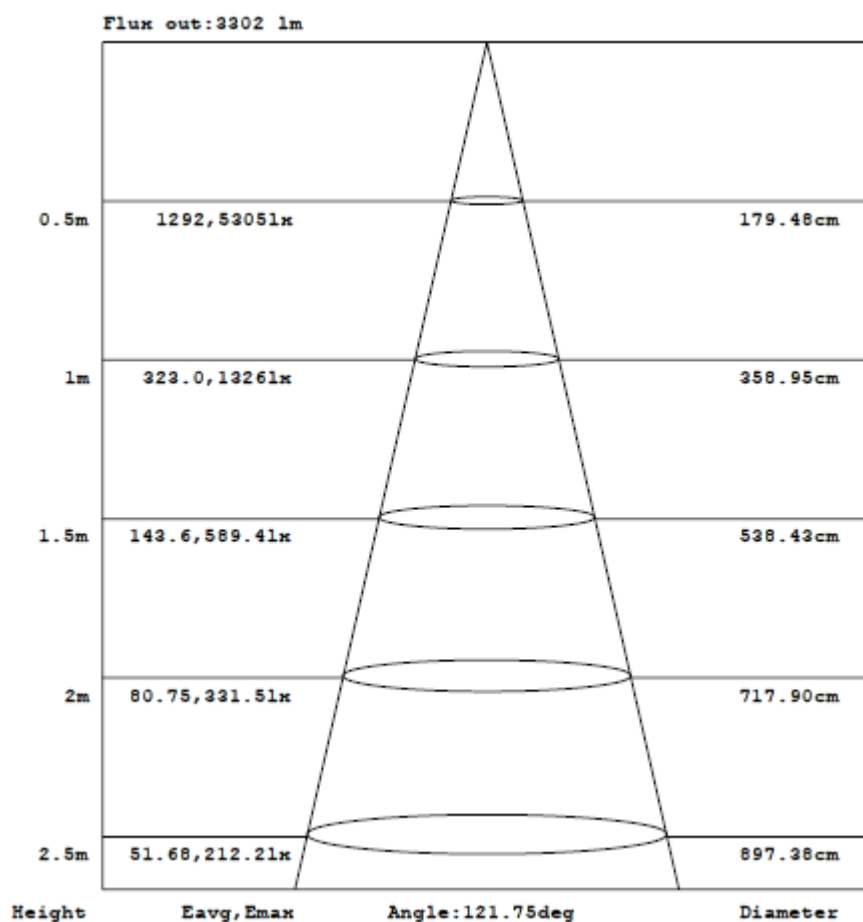
Illumination Plots

Test Condition: 120V 60Hz for L42TF24DIM/40K

Model No.: L42TF24DIM/40K

Mount Height: 2.5 m

Illuminance - Cone of Light



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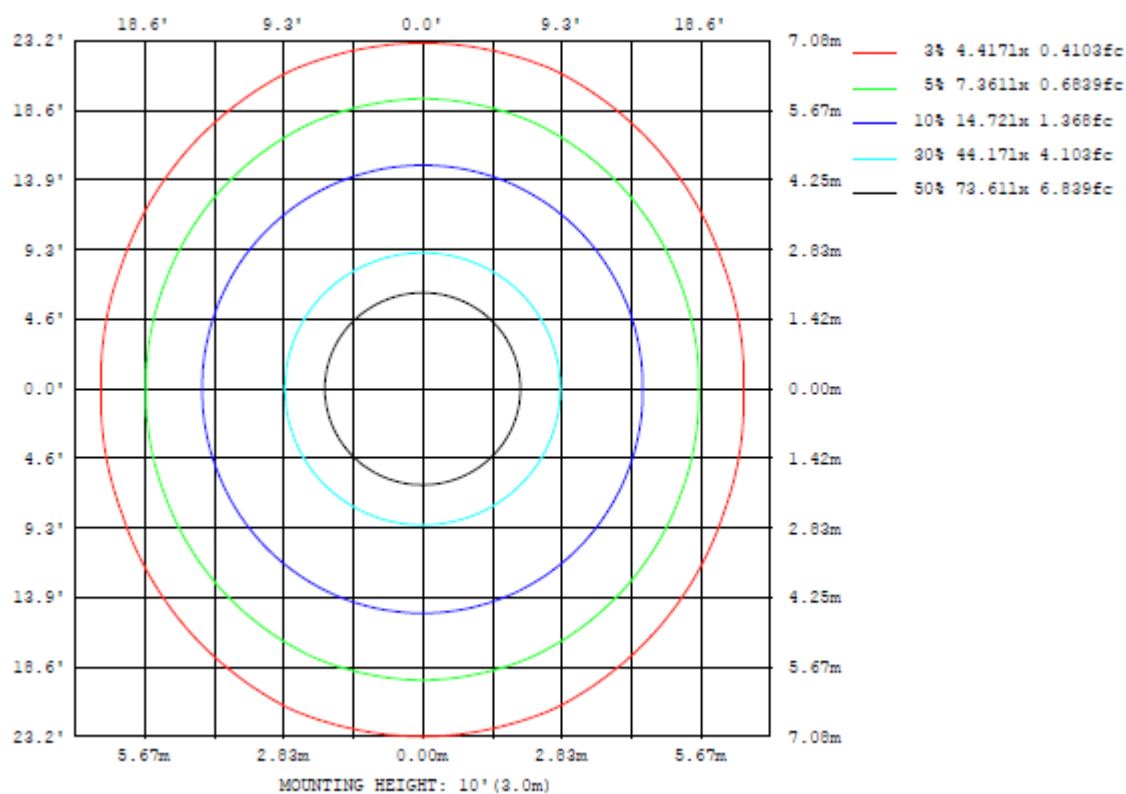
RESULTS OF TESTS (cont'd)

Test Condition: 120V 60Hz for L42TF24DIM/40K

Model No.: L42TF24DIM/40K

Mount Height: 3 m

Isoillumination Plot



Power Factor

Intertek Sample No.	Under 120V	Under 277V
0160824-12-001	0.991	0.932

Total Harmonic Distortion

Test Condition	Total Harmonic Distortion(%)
L42TF24DIM/40K	
120V	8.1
277V	16.6

Minimum Luminaire Warranty

Intertek Sample No.	Minimum Luminaire Warranty(Years)
0160824-12-001	5

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**RESULTS OF TESTS (cont'd)****In-Situ Maximum Measured LED Source Point Temperature****Test Condition:120V 60Hz for L42TF24DIM/40K**

Maximum Junction Temperature from LED specification (T_j) =115°C

Thermal Resistance Formula from LED specification = 25°C/W

Maximum Forward Voltage (V_f) from LED specification =3.3V

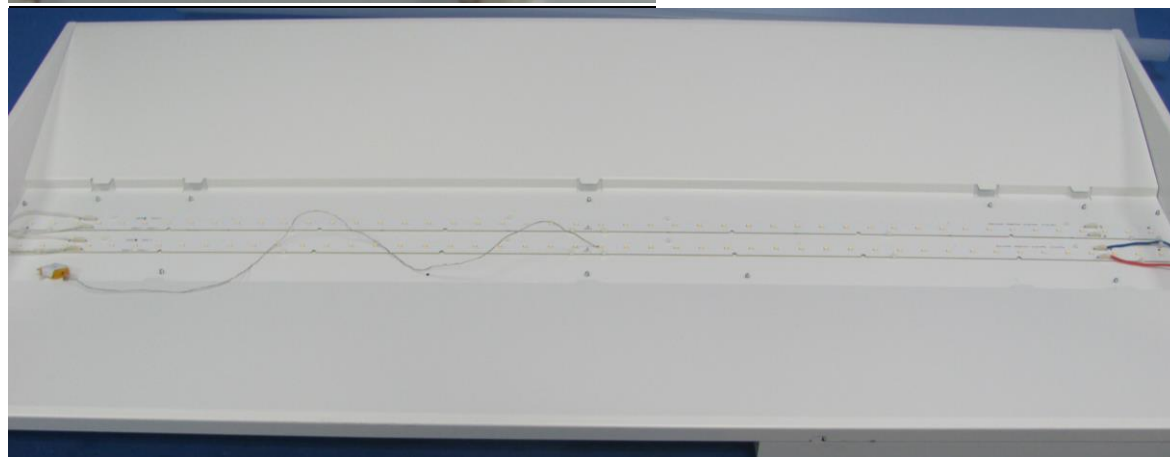
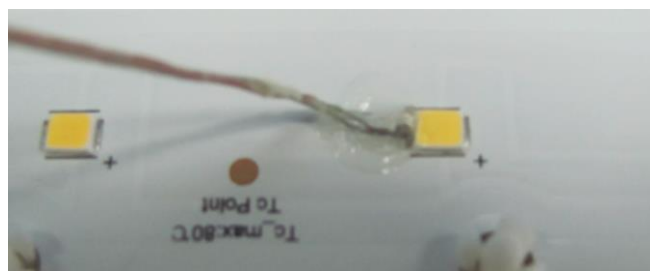
Measured LED Current =124.5mA

Calculated LED Wattage = $V_f \times$ Measured LED Current =0.4109W

Maximum Source Temperature (T_s) = $T_j - (\text{LED Wattage} \times \text{Thermal Resistance})$ =104.73°C

LED Junction Temperature		T_j	115	°C	-	
Item	Unit	Rank	Bin	Min.	Typ.	Max.
Forward Voltage (VF)	V	WA	A2	2.9		3.0
			A3	3.0		3.1
			A4	3.1	-	3.2
			A5	3.2	-	3.3
Color Rendering Index (Ra)	-	5		80	-	-
Thermal Resistance (junction to solder point)	°C/W			-	25	-

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RESULTS OF TESTS (cont'd)Manufacturer Supplied Documentation:LED Chip identified as Samsung LM281BIn-Situ Picture – Ts point

Intertek Sample No.	Model no.	Maximum Measured Source Temperature (°C)	Maximum Rated Source Temperature (°C)
0160824-12-001	L42TF24DIM/40K	52.8	104.73

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Lumen Maintenance

Table 1: Report at each LM-80 Test Condition					
Description of LED Light Source Tested (manufacturer, model, catalog number)		Manufacturer : Samsung Model : LM281B			
		Test Condition 1 - 55°C Case Temp		Test Condition 2 - 85°C Case Temp	
Sample size	25	Sample size	25	Sample size	-
Number of failures	0	Number of failures	0	Number of failures	-
DUT drive current used in the test (mA)	150	DUT drive current used in the test (mA)	150	DUT drive current used in the test (mA)	-
Test duration (hours)	10,000	Test duration (hours)	10,000	Test duration (hours)	-
Test duration used for projection (hour to hour)	5,000 - 10,000	Test duration used for projection (hour to hour)	5,000 - 10,000	Test duration used for projection (hour to hour)	-
Tested case temperature (°C)	55	Tested case temperature (°C)	85	Tested case temperature (°C)	-
α	7.159E-06	α	7.253E-06	α	-
B	1.017	B	1.008	B	-
Reported L70(10k) (hours)	52,000	Reported L70(10k) (hours)	50,000	Reported L70(10k) (hours)	-

Table 2: Interpolation Report (projection based on <i>in-situ</i> temperature entered)	
T_{s1} (°C)	55.00
T_{s1} (K)	328.15
α_1	7.159E-06
B_1	1.017
T_{s2} (°C)	-
T_{s2} (K)	-
α_2	-
B_2	-
E_2/k_0	-
A	-
B_0	1.017
T_{s1} (°C)	52.80
T_{s1} (K)	325.95
α_1	7.159E-06
Reported L70(10k) at	52,000

Results

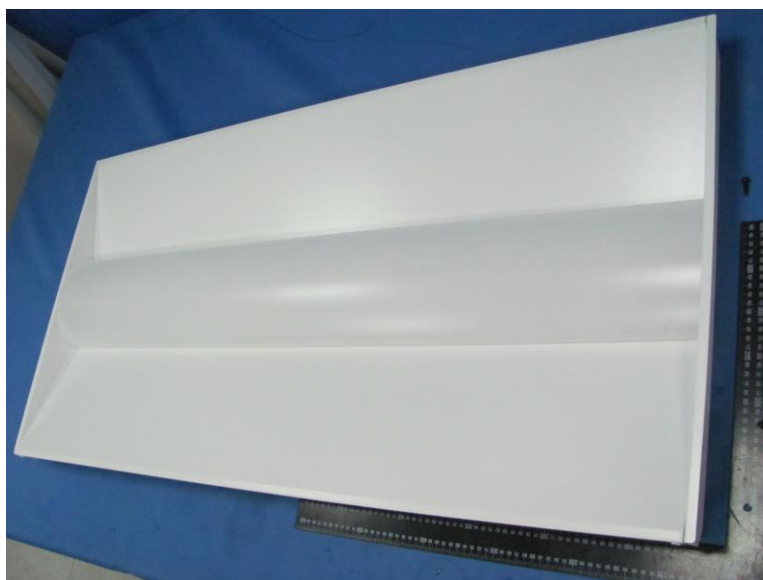
Time (t) at which to estimate lumen maintenance (hours):	50,000
Lumen maintenance at time (t) (%):	71.09%
Reported L70 (hours):	52,000

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RESULTS OF TESTS (cont'd)

Product Picture (not to scale)



In Charge Of Tests:

Report Reviewed By:

Steven Zong
Project Engineer

Jimmy Wang
Reviewer

Attachment: None

***** End of Report *****

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