



LM-79-19 TEST REPORT

for

ESPEN TECHNOLOGY INC.

12257 FLORENCE AVE SANTA FE SPRINGS LOS ANGELES CA 90670, USA

LED Tube

Model: L48T8/850/8G-ID DE (a)

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ25090032b

The laboratory that conducted the testing detailed in this report has been accredited for SSL by NVLAP.

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Sep. 23, 2025

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Note: This report does not imply product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

TEST SUMMARY

Model	L48T8/850/8G-ID DE (a)
Luminous Efficacy (Lumens /Watt)	193.0
Total Luminous Flux (Lumens)	1667.7
Power (Watts)	8.64
Power Factor	0.9760
CCT (K)	4959
CRI	82.2
Stabilization Time (Light & Power)	50 mins
Note	5000K

Table 1: Executive Data Summary

Test specifications:

Date of Receipt	: Jul. 30, 2024
Date of Test	: Jul. 31, 2024
Test item	: Total Luminous Flux, Luminous Efficacy, Correlated Color Temperature, Color Rendering Index, Chromaticity Coordinate, Electrical parameters
Reference Standard	: IESNA LM-79-2019 Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products ANSI/IES TM-30-18 IES Method for Evaluating Light Source Color Rendition

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SAMPLE PHOTO

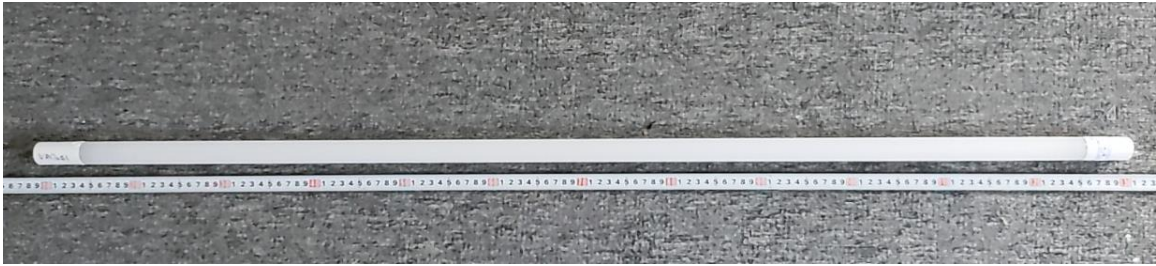


Figure 1- Overview of the sample

Equipment Under Test(EUT)

Name	: LED Tube
Model	: L48T8/850/8G-ID DE (a)
Electrical Ratings	: 120-277V, 50/60Hz ,8.5W
Product Description	: 5000K

TEST RESULTS

Test ambient temperature was 25.0 °C.

Base orientation was base up. Test was conducted without a dimmer in the circuit.

The stabilization time of the sample was 50 minutes, and the total operating time including stabilization was 55 minutes.

Sphere-Spectroradiometer Method

Parameter	Result	
Test Voltage (V)	120.0	277.0
Voltage frequency (Hz)	60	60
Test Current (A)	0.074	0.034
Power Factor	0.9760	0.9421
Test Power (W)	8.64	8.82
THD A%	18.83	14.58
Luminous Efficacy (lm/W)	193.0	190.4
Total Luminous Flux (lm)	1667.7	1679.5
Color Rendering Index (CRI)	82.2	
R9	9.6	
Correlated Color Temperature (CCT)(K)	4959	
Chromaticity Chroma x	0.3465	
Chromaticity Chroma y	0.3565	
Chromaticity Chroma u	0.2105	
Chromaticity Chroma v	0.3248	
Duv	0.0019	
Chromaticity Chroma u'	0.2105	
Chromaticity Chroma v'	0.4873	

Special Color Rendering Indices	
R1	80
R2	87
R3	91.7
R4	81.3
R5	80.1
R6	81.3
R7	87.7
R8	68.3
R9	9.6
R10	68.8
R11	79.8
R12	54.6
R13	81.6
R14	95.5

Table 2: Test data per Sphere-Spectroradiometer Method

Note: According to CIE 1976 (u',v') diagram, $u' = u = 4x/(-2x+12y+3)$, $v' = 3v/2 = 9y/(-2x+12y+3)$.

Spectral Power Distribution - Sphere Spectroradiometer Method

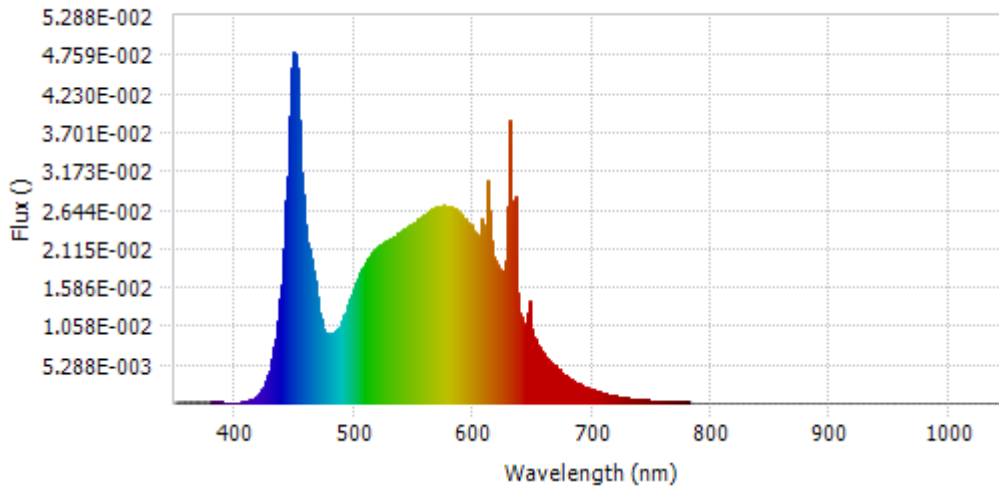
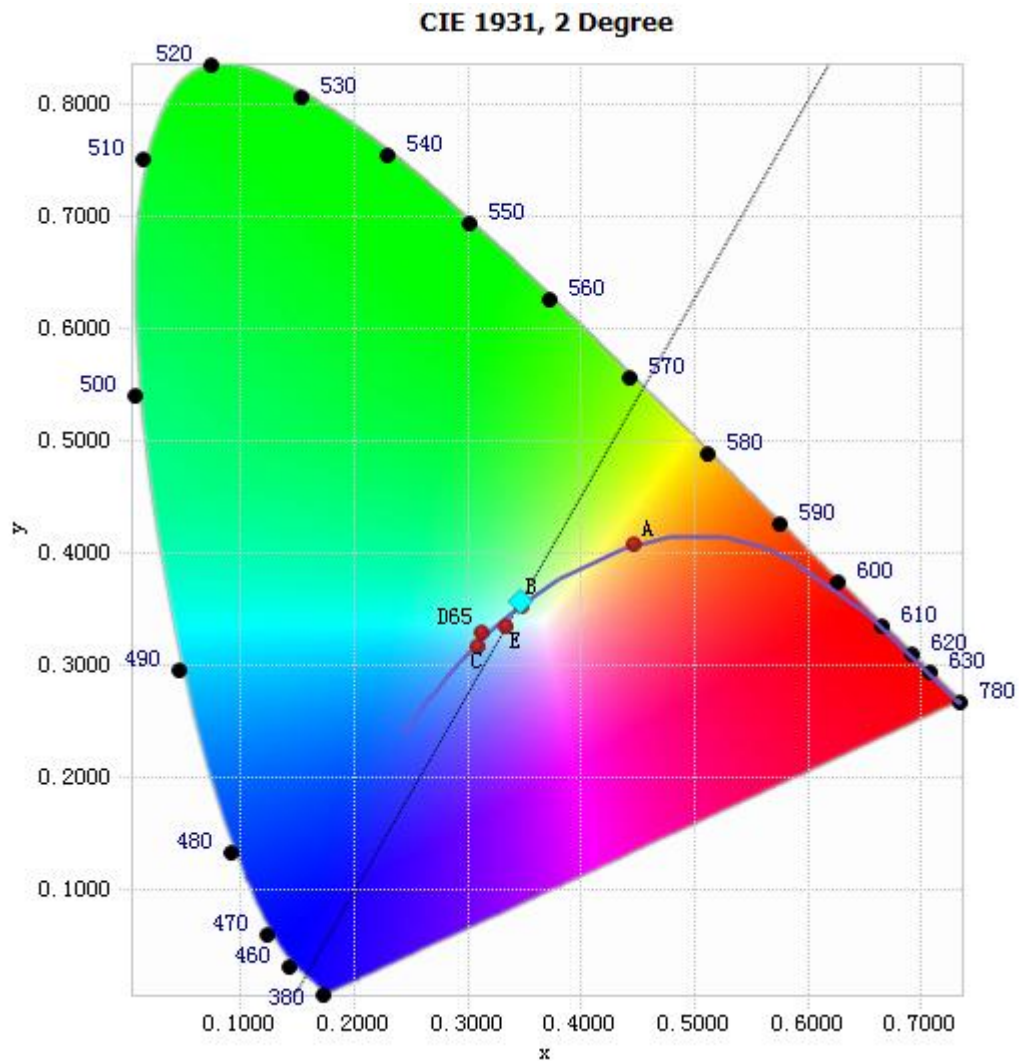


Chart 1: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	1.64E-04	485	9.98E-03	590	2.58E-02	695	2.18E-03
385	1.61E-04	490	1.12E-02	595	2.47E-02	700	1.86E-03
390	1.48E-04	495	1.33E-02	600	2.37E-02	705	1.58E-03
395	1.11E-04	500	1.57E-02	605	2.25E-02	710	1.35E-03
400	1.01E-04	505	1.77E-02	610	2.23E-02	715	1.14E-03
405	1.33E-04	510	1.92E-02	615	2.23E-02	720	9.82E-04
410	2.81E-04	515	2.06E-02	620	1.89E-02	725	8.40E-04
415	5.99E-04	520	2.13E-02	625	1.80E-02	730	7.22E-04
420	1.25E-03	525	2.19E-02	630	3.87E-02	735	6.16E-04
425	2.60E-03	530	2.25E-02	635	2.84E-02	740	5.27E-04
430	5.17E-03	535	2.29E-02	640	1.17E-02	745	4.53E-04
435	9.90E-03	540	2.35E-02	645	1.06E-02	750	3.94E-04
440	1.85E-02	545	2.40E-02	650	9.32E-03	755	3.36E-04
445	3.51E-02	550	2.46E-02	655	7.81E-03	760	2.90E-04
450	4.81E-02	555	2.53E-02	660	6.63E-03	765	2.51E-04
455	3.51E-02	560	2.59E-02	665	5.57E-03	770	2.17E-04
460	2.29E-02	565	2.64E-02	670	4.97E-03	775	1.85E-04
465	1.89E-02	570	2.67E-02	675	4.10E-03	780	1.62E-04
470	1.33E-02	575	2.69E-02	680	3.49E-03		
475	9.82E-03	580	2.69E-02	685	2.99E-03		
480	9.45E-03	585	2.66E-02	690	2.56E-03		

Table 3: Spectral Power Distribution Numerical Data per Sphere - Spectroradiometer Method

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.3465, 0.3565)

Chart 2: Chromaticity Diagram per Sphere - Spectroradiometer Method

Note: The location on the diagram of the tristimulus coordinates are indicated by the blue diamond.

Nominal CCT Quadrangles – Sphere Spectroradiometer Method

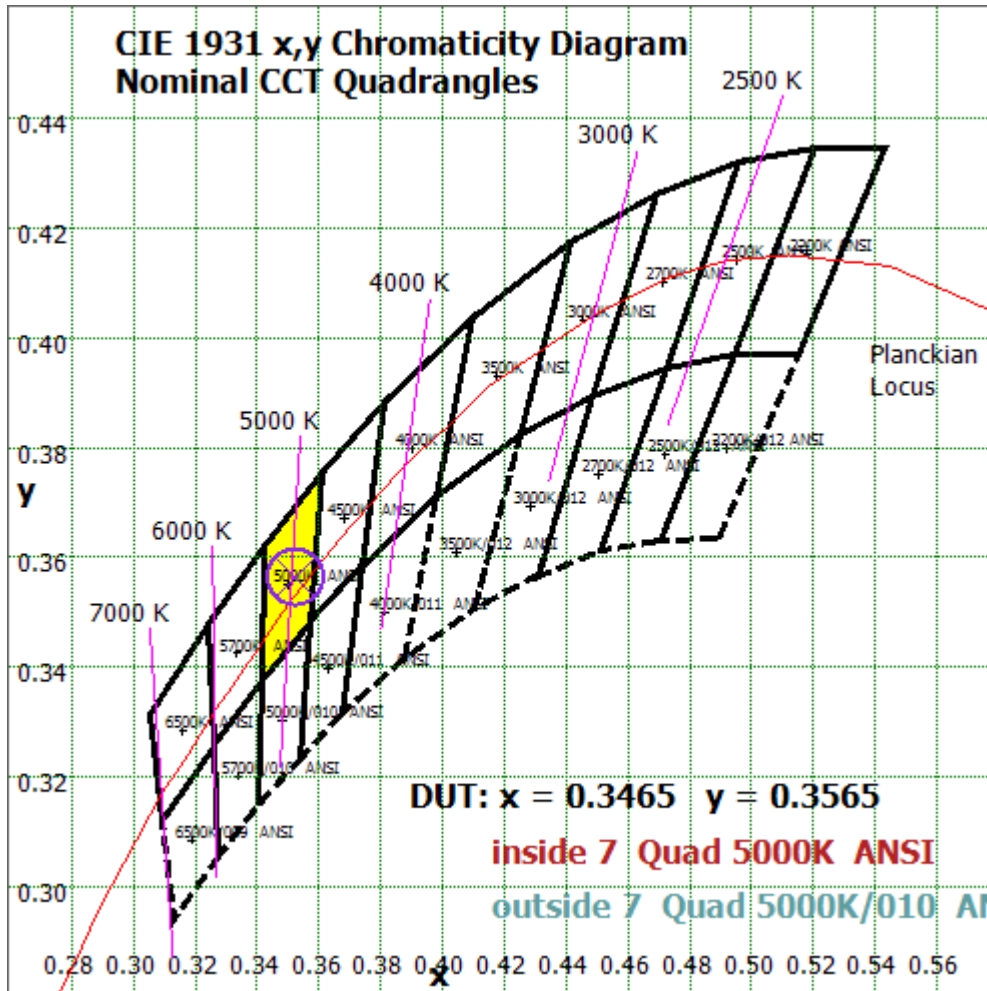


Chart 3: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

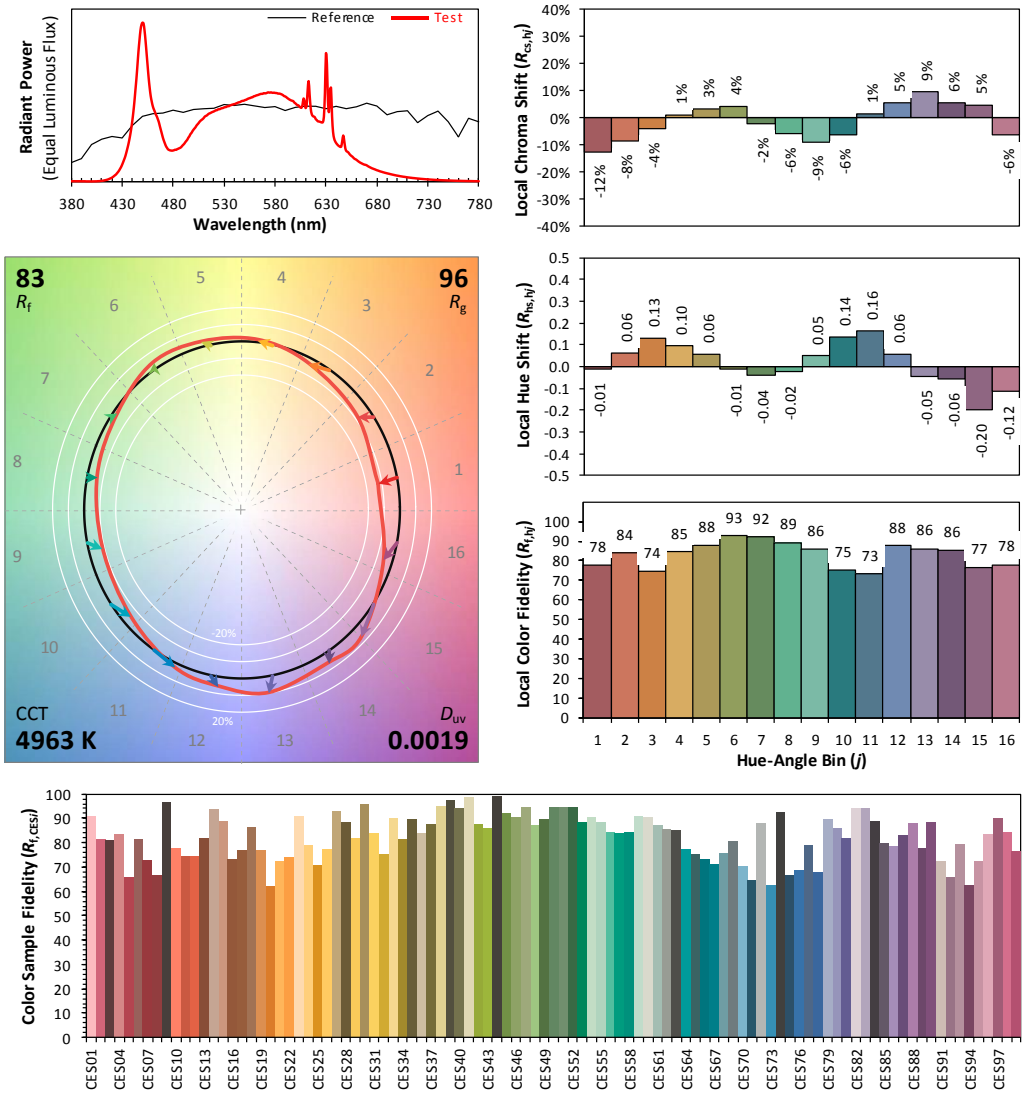
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: ESPEN TECHNOLOGY INC.

Date: 2024/07/31

Model: L48T8/850/8G-ID DE (a)



Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x 0.3465
 y 0.3565
 u' 0.2105
 v' 0.4873

CIE 13.3-1995 (CRI)	
R_a	82
R_g	10

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.

Chart 4: Full Report Created with the IES TM-30 Calculator

Note: The values in this diagram might be a little different from the values in Table 2 due to rounding.

EQUIPMENT LIST

Test Equipment	Model	Equipment No.	Calibration Date	Calibration Due date
Integrate Sphere system	3M	HZTE015-04	Jun. 18, 2024	-
Digital Power Meter	WT210	HZTE008-01	Aug. 01, 2023	Jul. 31, 2024
AC Power Supply	PCR 500L	HZTE001-07	Aug. 01, 2023	Jul. 31, 2024
DC Power Supply	IT6154	HZTE004-04	Aug. 01, 2023	Jul. 31, 2024
Temperature and humidity recorder	JR900	HZTE018-02	Aug. 04, 2023	Aug. 03, 2024
Standard source	SCL-1400	HZTE012-06	Nov. 04, 2021	-
Temperature Meter	TES1310	HZTE017-01	Aug. 04, 2023	Aug. 03, 2024

Table 4: Test Equipment List

TEST METHODS

Seasoning of SSL Product

For the purpose of rating new SSL products, SSL products shall be tested with no seasoning. Therefore, no seasoning was performed.

Sphere-Spectroradiometer Method- Photometric and Electrical Measurements

A Labsphere Model CDS 2100 Spectroradiometer and 3 Meter Sphere was used to measure correlated color temperature, chromaticity coordinates, and the color rendering index for each SSL unit. The coating reflectance of each sphere is 98%. The measure geometry is 4π . Self-absorption correction is conducted in testing. Bandwidth of spectroradiometer is 350nm-1050nm.

Ambient temperature was measured at a position inside the sphere. Each SSL unit was operated on the client provided driver at the rated input voltage in its designated orientation.

The stabilization time typically ranges from 30 min (small integrated LED lamps) to 2 or more hours for large SSL luminaires). It can be judged that stability is reached when the variation (maximum – minimum) of at least 3 readings of the light output and electrical power over a period of 20 min, taken 10 minutes apart, is less than 0.5 %.

Electrical measurements including voltage, current, and power were measured using the Yokogawa Power Analyzer.

The standard reference of the integrated sphere system is halogen incandescent lamp, the intensity distribution type is omni-directional, and is traceable to the National Institute of Standards and Technology.

The uncertainty of integrating sphere system reported in this document is expanded uncertainty is 2.1% with a coverage factor $k=2$.

*** End of Report ***

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