

## LM-79 Test Report

### Relevant Standards

IES LM-79-2008  
IES TM-30-2015  
CIE 13.3-1995

### Product SKU

VIP-24CEL150-35-\*\*\*

### Test Conditions

Test Temperature: 26.5 °C  
Luminaire Sample Length: 12.0 in.  
Power Supply: Agilent E3634A DC Power Supply  
Voltage: 24.0 VDC  
Current: .057 A  
Power Consumption: 1.36 W

### Test Date

4/16/2019

### Prepared By



Olivia M. Tanguileg, Electrical Engineer

### Approved By



Andrew Lassen, Compliance Manager

The results contained in this report pertain only to the tested sample.  
Photometric & Colorimetry data measured in accordance to IES LM-79-2008 standards, at the Elemental LED, Inc. Innovation Lab.

Integrating Sphere Test

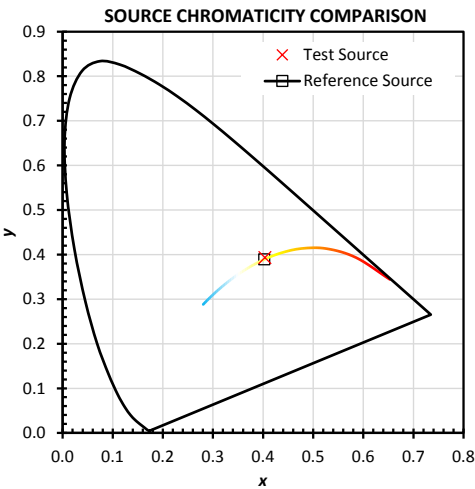
SUMMARY OF RESULTS

Metric	Test	Reference	Notes	Metric	Test	Reference	Notes
$R_f$	96	100	IES TM-30-15 Fidelity Index	$CCT$	3556	3556	Correlated Color Temperature
$R_g$	102	100	IES TM-30-15 Gamut Index	$D_{uv}$	0.0013	0.0000	Distance from the blackbody locus
$R_a$ (CRI)	98	100	CIE Test Color Method General Index	$x$	0.4036	0.4022	CIE 1931 chromaticity coordinate
$R_9$	100	100	CIE Test Color Method Sample Nine Score	$y$	0.3929	0.3892	CIE 1931 chromaticity coordinate
LER	268	182	Luminous Efficacy of Radiation	$u$	0.2337	0.2343	CIE 1960 chromaticity coordinate
Lumens	171	1852	Luminous Flux	$v$	0.3413	0.3401	CIE 1960 chromaticity coordinate
$R_{f,skin}$	97	100	Average of CES15 and CES18 (skin)	$u'$	0.2337	0.2343	CIE 1976 chromaticity coordinate
				$v'$	0.5119	0.5102	CIE 1976 chromaticity coordinate

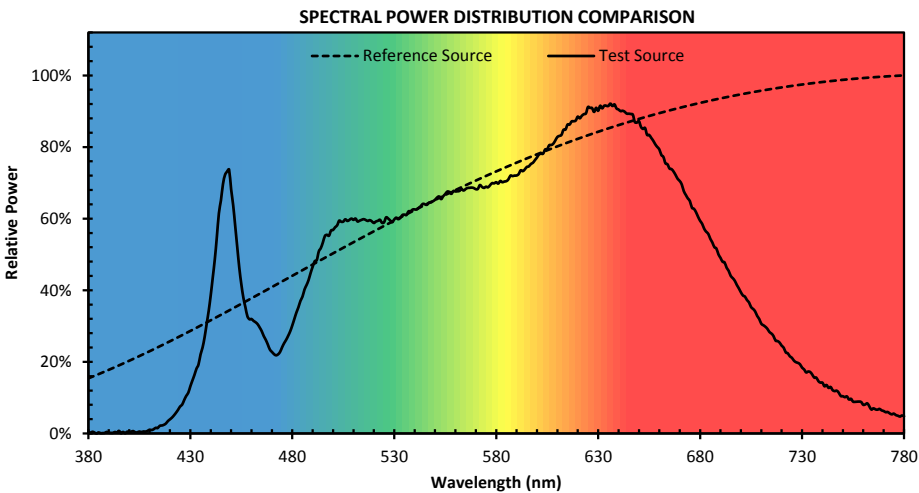
COLOR RENDERING INDEX

R 1	R 2	R 3	R 4	R 5	R 6	R 7	R 8	R 9	R 10	R 11	R 12	R 13	R 14
98.4	99.5	97.2	95.8	98.3	98.7	98.6	98.9	99.5	99.4	93.0	92.0	98.8	98.1

SOURCE PROPERTIES

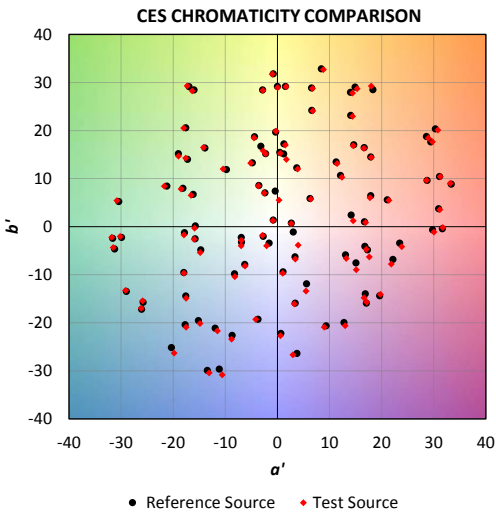


This chart plots the chromaticity of the test and reference sources in the CIE 1931 chromaticity

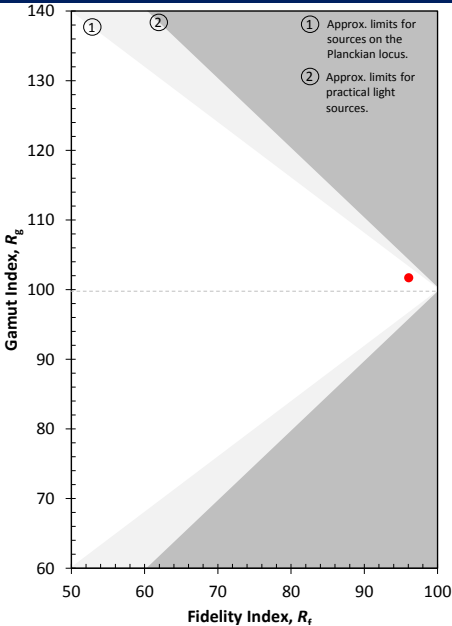


This chart displays the spectral power distributions for the test and reference source. Each SPD has been normalized so that the maximum values is 100%.

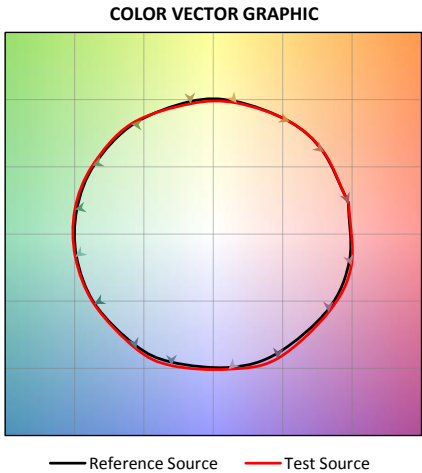
GENERAL COLOR RENDITION



This plot shows the shift in chromaticity for each individual CES.



This plot shows the  $R_f$  and  $R_g$  values relative to possible values.



This plot shows the average chromaticity shift for the samples within each of 16 hue bins. The values are normalized so that the reference is a circle.

# COLOR SAMPLE COMPARISON (APPROXIMATION)

CES 1	CES 2	CES 3	CES 4	CES 5	CES 6	CES 7	CES 8
Type C	Type C	Type A	Type A	Type D	Type C	Type E	Type D
CES 9	CES 10	CES 11	CES 12	CES 13	CES 14	CES 15	CES 16
Type F	Type G	Type C	Type A	Type F	Type E	Type B	Type C
CES 17	CES 18	CES 19	CES 20	CES 21	CES 22	CES 23	CES 24
Type C	Type B	Type E	Type F	Type D	Type D	Type G	Type E
CES 25	CES 26	CES 27	CES 28	CES 29	CES 30	CES 31	CES 32
Type A	Type C	Type A	Type G	Type C	Type A	Type D	Type C
CES 33	CES 34	CES 35	CES 36	CES 37	CES 38	CES 39	CES 40
Type D	Type G	Type G	Type A	Type A	Type A	Type F	Type F
CES 41	CES 42	CES 43	CES 44	CES 45	CES 46	CES 47	CES 48
Type C	Type F	Type C	Type F	Type G	Type E	Type C	Type D
CES 49	CES 50	CES 51	CES 52	CES 53	CES 54	CES 55	CES 56
Type D	Type F	Type F	Type F	Type E	Type F	Type G	Type G
CES 57	CES 58	CES 59	CES 60	CES 61	CES 62	CES 63	CES 64
Type C	Type D	Type E	Type G	Type F	Type C	Type F	Type E
CES 65	CES 66	CES 67	CES 68	CES 69	CES 70	CES 71	CES 72
Type F	Type E	Type E	Type F	Type F	Type F	Type F	Type F
CES 73	CES 74	CES 75	CES 76	CES 77	CES 78	CES 79	CES 80
Type F	Type C	Type F	Type F	Type A	Type F	Type C	Type G
CES 81	CES 82	CES 83	CES 84	CES 85	CES 86	CES 87	CES 88
Type A	Type C	Type C	Type F	Type A	Type C	Type F	Type F
CES 89	CES 90	CES 91	CES 92	CES 93	CES 94	CES 95	CES 96
Type A	Type E	Type A	Type A	Type D	Type C	Type A	Type A
CES 97	CES 98	CES 99					
Type F	Type A	Type E					

NOTE: CES stands for "Color Evaluation Sample", these 99 samples are used in place of the 16 R values. The colors shown are approximate and depend on proper monitor calibration. Some colors may be outside of the gamut of the monitor, and will not be displayed accurately. For each sample, the color on the left represents the reference source, and the color on the right represents the test source.

Sample Type:

- A - Nature
- B - Skin
- C - Textiles
- D - Paints



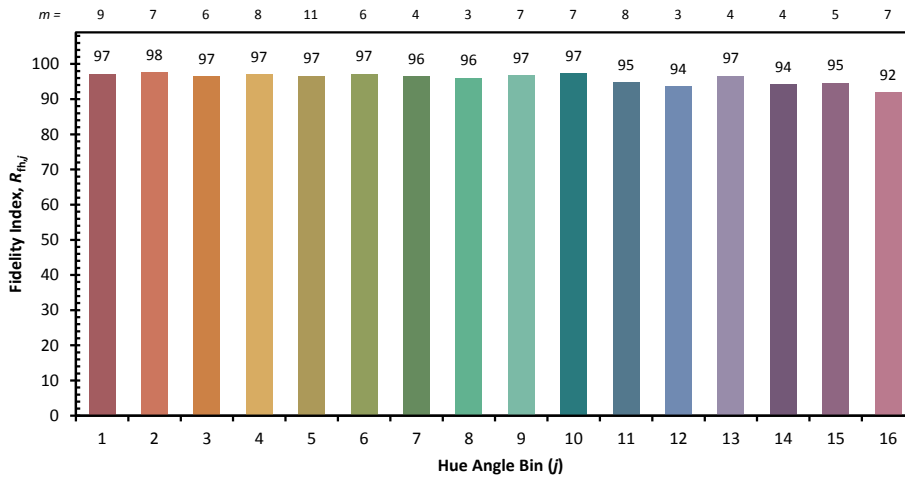
Elemental



Competitor



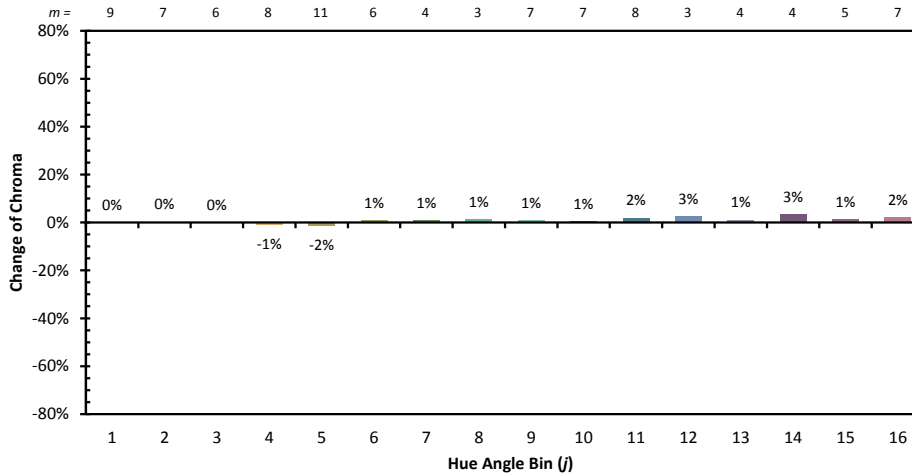
## COLOR RENDITION BY HUE



$j$	Hue Angle
1	0.0°-22.5°
2	22.5° - 45.0°
3	45.0° - 67.5°
4	67.5° - 90.0°
5	90.0°-112.5°
6	112.5°-135.0°
7	135.0°-157.5°
8	157.5°-180.0°
9	180.0°-202.5°
10	202.5°-225.0°
11	225.0°-247.5°
12	247.5°-270.0°
13	270.0°-292.5°
14	292.5°-315.0°
15	315.0°-337.5°
16	337.5°-360.0°

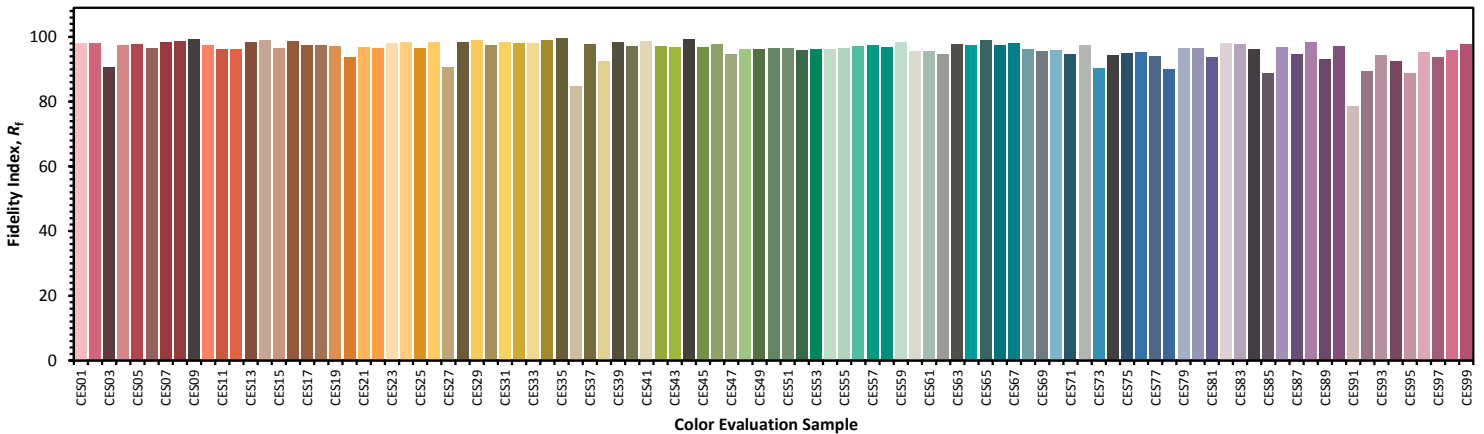
$m$  = Samples per Angle Bin

This chart displays the average Fidelity Index for all samples within the hue bin. The number of samples per bin, which can vary based on the CCT used for the calculation, is shown at the top. The color of the bar is based on the average chromaticity under the 5000 K reference illuminant; the colors may not display accurately depending on the calibration of the monitor, and should be used for orientation only.



This chart displays the change in chroma for the average sample within each hue bin. The number of samples per bin, which can vary based on the CCT used for the calculation, is shown at the top. The color of the bar is based on the average chromaticity under the 5000 K reference illuminant; the colors may not display accurately depending on the calibration of the monitor, and should be used for orientation only.

## COLOR FIDELITY BY SAMPLE



This chart displays the Fidelity Index for each of the 99 CES. The CES are arranged by their hue angle under the 5000 K reference source, which was also used to determine the color of each bar. The colors are approximate and depend on proper monitor calibration. Some colors may be outside of the gamut of the monitor, and will not be displayed accurately.

## Goniophotometer Test

### SUMMARY OF RESULTS

Luminaire: Celeste 150 3500K  
 SKU: VIP-24CEL150-35-\*\*\*  
 Luminous Flux: 171 Lumens  
 Power Consumption: 1.36 Watts  
 Efficacy: 125.73 Lumens/Watt  
 Spacing Criterion (0-180): 1.28  
 Spacing Criterion (90-270): 1.28

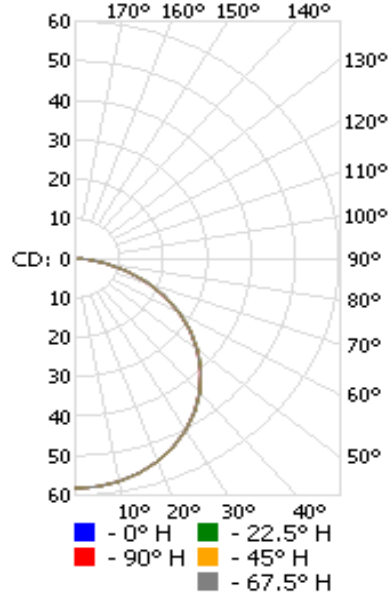
\*Graphs below are for reference, full IES files are available on Diode LED website\*

### DISTRIBUTION CHARTS AND TABLES

#### Zonal Lumen Data

Zone	Lumens	%Luminaire
0-20	21.27	12.40
0-30	45.40	26.50
0-40	74.80	43.70
0-60	133.91	78.20
0-80	167.85	98.00
0-90	171.30	100.00
20-40	53.52	31.20
20-50	84.40	49.30
40-70	80.78	47.20
60-80	33.93	19.80
70-80	12.27	7.20
80-90	3.45	2.00
90-180	0.00	0.00
0-180	171.30	100.00

#### Polar Candela Distribution



#### Illuminance at a Distance

	Center Beam fc	Beam Width	
1.5R	25.7 fc	4.8 ft	4.8 ft
3.0R	6.43 fc	9.5 ft	9.5 ft
4.5R	2.86 fc	14.3 ft	14.3 ft
6.0R	1.61 fc	19.1 ft	19.0 ft
7.5R	1.03 fc	23.8 ft	23.8 ft
9.0R	0.71 fc	28.6 ft	28.6 ft

■ Vert. Spread: 115.6°  
 ■ Horiz. Spread: 115.6°

**LUCETTA™**  
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 a division of elemental LED

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