

# LM-79 Test Report

## Relevant Standards

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

## Product SKU

FENCER® SABER™ SELECT 24" (3500K)  
SKU: DI-120V-SBRSEL-24-WH

## Test Conditions

Test Temperature: 26.5 °C  
Luminaire Sample Length: 24.0 in.  
Power Supply: Agilent E3634A DC Power Supply  
Voltage: 120 VDC  
Current: 0.12 A  
Power Consumption: 14.39 W

## Test Date

11/14/2019

### Prepared By



Olivia M. Tanguileg, Electrical Engineer

### Approved By



Andrew Lassen, Compliance Manager

# Integrating Sphere

## SUMMARY OF RESULTS

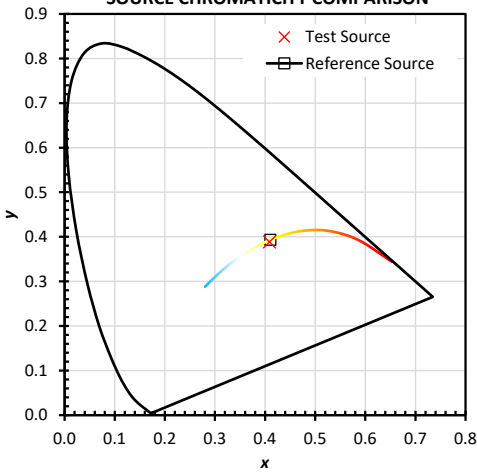
| Metric       | Test | Reference | Notes                                   | Metric   | Test    | Reference | Notes                             |
|--------------|------|-----------|---|----------|---------|-----------|-----------------------------------|
| $R_f$        | 89   | 100       | IES TM-30-15 Fidelity Index             | CCT      | 3405    | 3405      | Correlated Color Temperature      |
| $R_g$        | 97   | 100       | IES TM-30-15 Gamut Index                | $D_{uv}$ | -0.0017 | 0.0000    | Distance from the blackbody locus |
| $R_a$ (CRI)  | 94   | 100       | CIE Test Color Method General Index     | $x$      | 0.4089  | 0.4108    | CIE 1931 chromaticity coordinate  |
| $R_9$        | 65   | 100       | CIE Test Color Method Sample Nine Score | $y$      | 0.3885  | 0.3934    | CIE 1931 chromaticity coordinate  |
| LER          | 293  | 178       | Luminous Efficacy of Radiation          | $u$      | 0.2389  | 0.2382    | CIE 1960 chromaticity coordinate  |
| Lumens       | 980  | 1852      | Luminous Flux                           | $v$      | 0.3406  | 0.3421    | CIE 1960 chromaticity coordinate  |
| $R_{f,skin}$ | 93   | 100       | Average of CES15 and CES18 (skin)       | $u'$     | 0.2389  | 0.2382    | CIE 1976 chromaticity coordinate  |
|              |      |           |   | $v'$     | 0.5109  | 0.5132    | CIE 1976 chromaticity coordinate  |

## COLOR RENDERING INDEX

| R1   | R2   | R3   | R4   | R5   | R6   | R7   | R8   | R9   | R10  | R11  | R12  | R13  | R14  |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 95.8 | 99.4 | 96.7 | 93.1 | 95.1 | 95.5 | 90.6 | 83.5 | 65.2 | 98.9 | 95.0 | 78.0 | 97.8 | 99.1 |

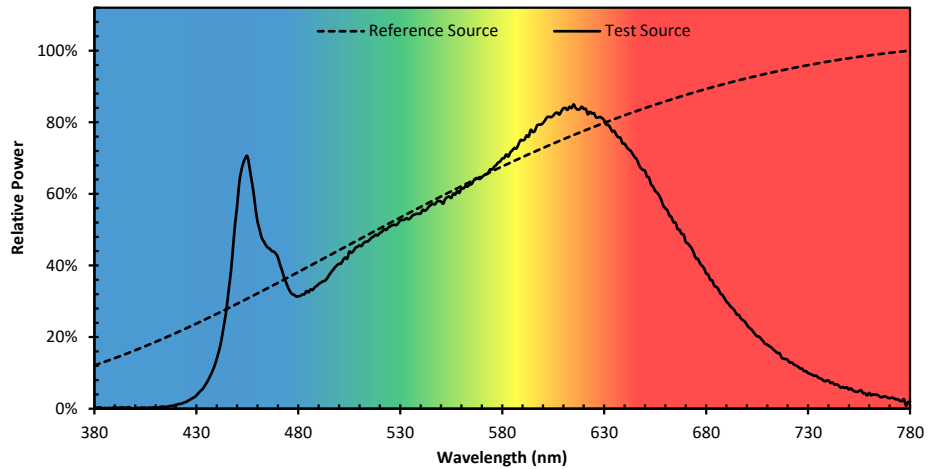
## SOURCE PROPERTIES

### SOURCE CHROMATICITY COMPARISON



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

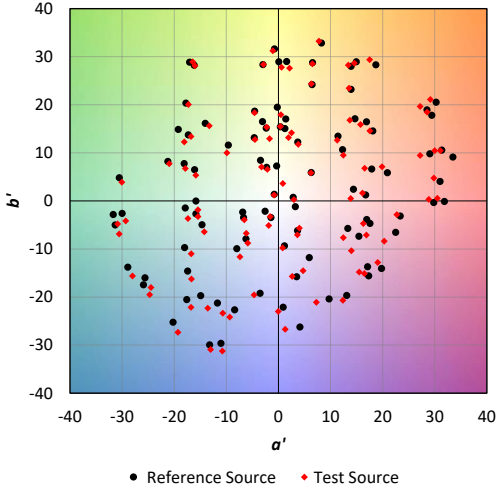
### SPECTRAL POWER DISTRIBUTION COMPARISON



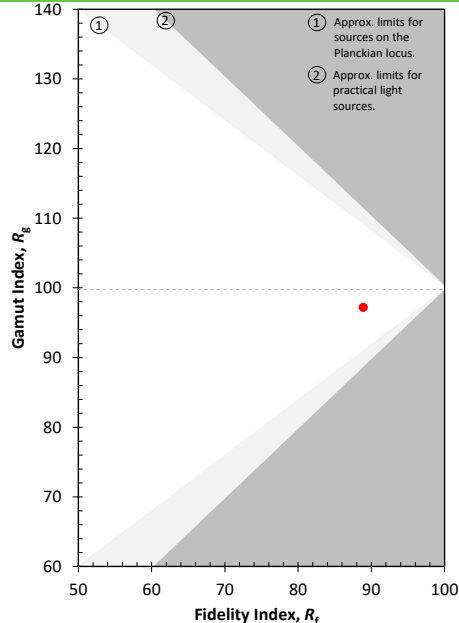
This chart displays the spectral power distributions for the test and reference source. Each SPD has been normalized so that the maximum values is 100%.

## GENERAL COLOR RENDITION

### CES CHROMATICITY COMPARISON

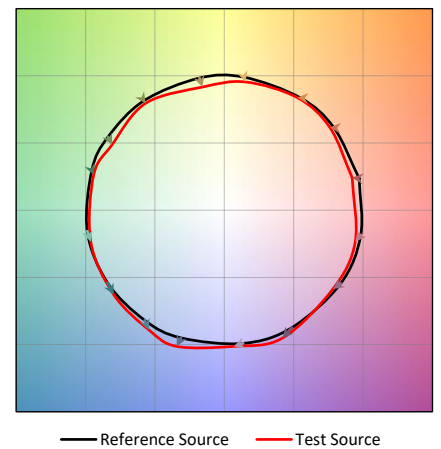


This plot shows the shift in chromaticity for each individual CES.



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

### COLOR VECTOR GRAPHIC



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

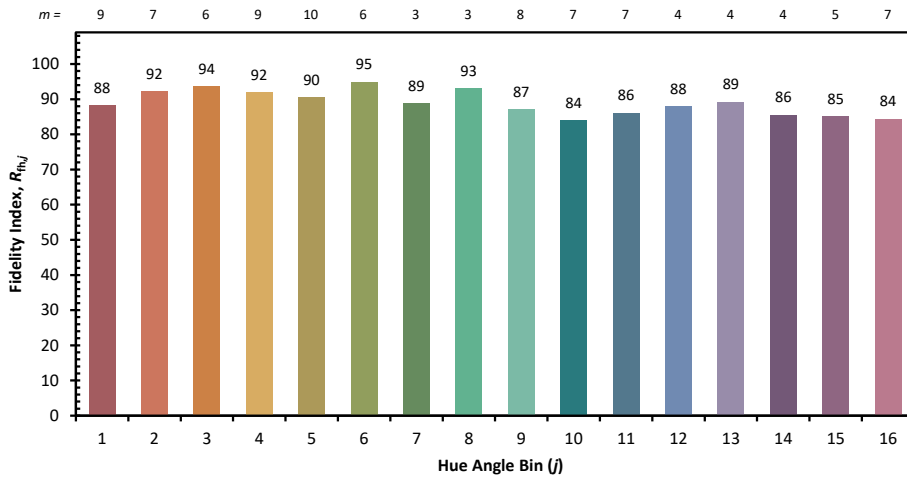


Elemental

Competitor



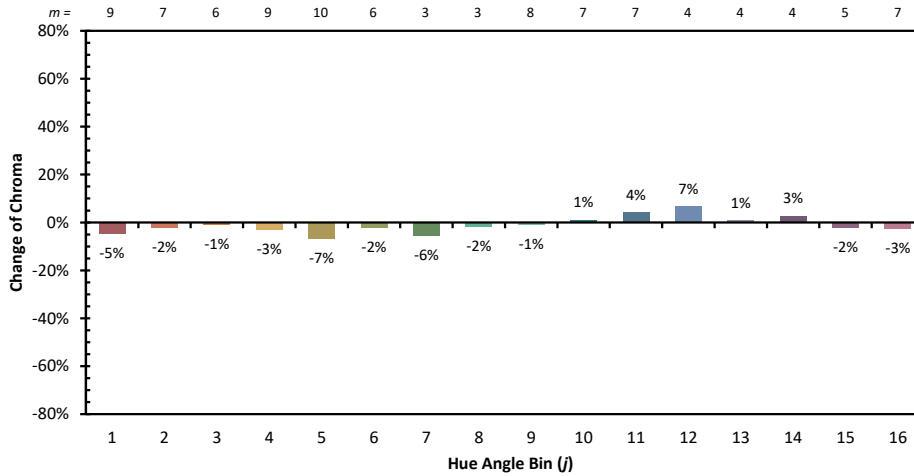
## COLOR RENDITION BY HUE



| 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° |

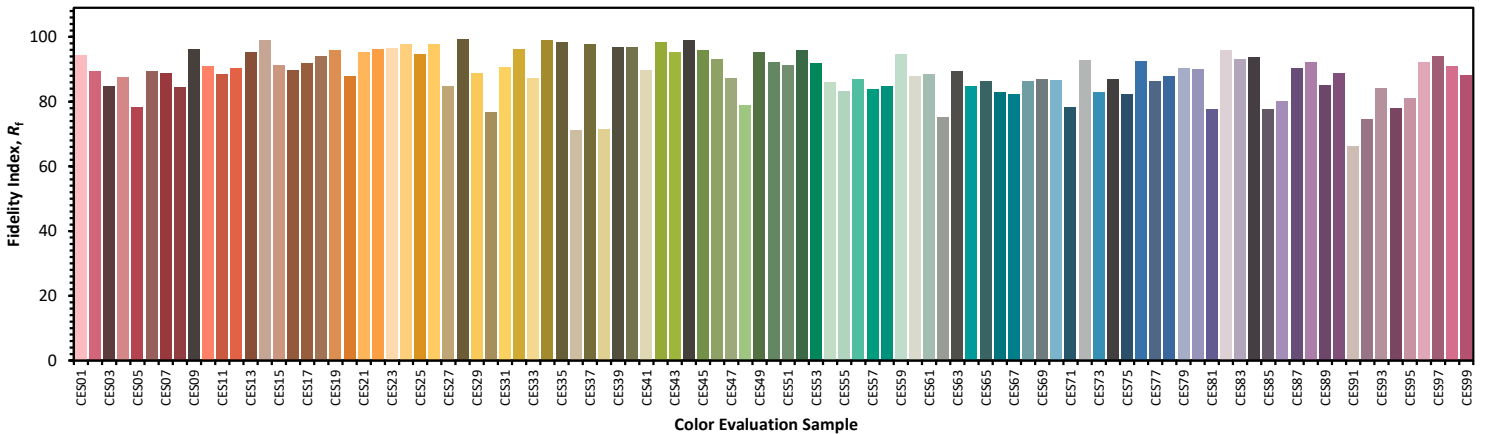
This chart displays the average Fidelity Index for all samples within the hue bin. The number of samples per bin, which can vary based on the CCT used for the calculation, is shown at the top. The color of the bar is based on the average chromaticity under the 5000 K reference illuminant; the colors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

m = Samples per Angle Bin



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: FENCER® SABER™ SELECT 24" (3500K)  
 SKU: DI-120V-SBRSEL-24-WH  
 Luminous Flux: 1022 Lumens  
 Power Consumption: 14.39 Watts  
 Efficacy: 71.02 Lumens/Watt  
 Spacing Criterion (0-180): 1.1  
 Spacing Criterion (90-270): 1.18

\*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   | 155.15  | 15.20      |
| 0-30   | 320.42  | 31.30      |
| 0-40   | 507.47  | 49.60      |
| 0-60   | 839.03  | 82.10      |
| 0-80   | 1005.92 | 98.40      |
| 0-90   | 1022.32 | 100.00     |
| 20-40  | 352.31  | 34.50      |
| 20-50  | 532.68  | 52.10      |
| 40-70  | 439.42  | 43.00      |
| 60-80  | 166.89  | 16.30      |
| 70-80  | 59.03   | 5.80       |
| 80-90  | 16.40   | 1.60       |
| 90-180 | 0.00    | 0.00       |
| 0-180  | 1022.32 | 100.00     |

