



UL Verification Services Inc.
7036 Snowdrift Road
Allentown, PA 18106
610-774-1300



Photometric Test Report

Relevant Standards
IES LM-79-2008
ANSI C82.77-2002

Prepared For
Elemental LED Inc, DBA Diode LED

Wes Buck
Suite 211, 1195 Park Ave.
Emeryville, CA 94608
United States

Catalog Number
DI-12V-1VA42-9016

Order Number
10648765
Test Number
872634

Revised
2015-04-03
Test Date

2015-01-16 - 2015-01-22

Prepared By

Javier Caban, Technician

Approved By

Eric Gaudreau, Engineering Project Handler

The results contained in this report pertain only to the tested sample.
This report shall not be reproduced, except in full, without written approval of Underwriters Laboratories.
This report must not be used by the client to claim product certification, approval, or endorsement by
NVLAP, NIST, or any agency of the Federal Government.



Table of Contents

| | |
|--|--------|
| Summary of Results | Page 3 |
| Integrating Sphere Results | Page 4 |
| Distribution Results | Page 5 |
| Conditions / Summary of Results / Polar Plot / Zonal / Luminance | Page 5 |
| Candela Tabulation | Page 6 |
| Coefficients of Utilization | Page 7 |

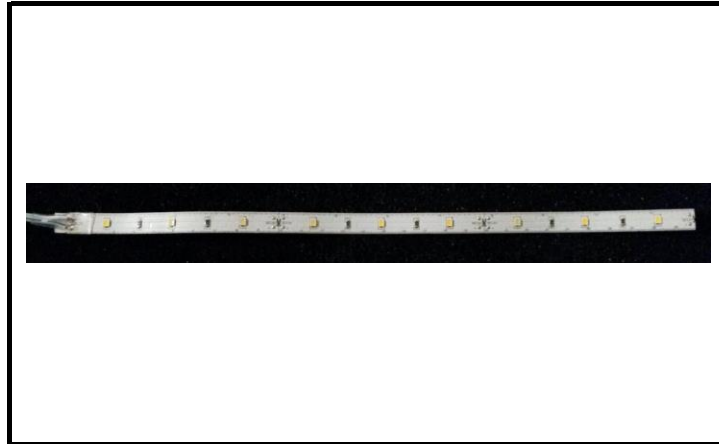
Laboratory results may not be representative of field performance
Ballast factors have not been applied

Testing was performed in a 2-meter integrating sphere using the 4π geometry method.
Absorption correction was employed for Sphere measurement



Luminaire Description: LED strip
Lamp: Nine white LEDs
Mounting: Surface

Luminaire



Luminaire Characteristics

Luminous Length: 11.88 in.
Luminous Width: 0.3800 in.

Summary of Results

Integrating Sphere

Total Output: 167 Lumens
Efficacy: 77.3 lm/w
CCT: 4043 K
CRI (Ra): 94.7

Distribution

Total Luminaire Output: 169.6 Lumens
Luminaire Efficacy: 77.6 lm/w
Maximum Candela: 58 Candela

Electrical Data at 12 VDC

Test Temperature: 25.0 °C
Voltage: 12.00 VDC
Current: 0.1801 A
Power: 2.161 W



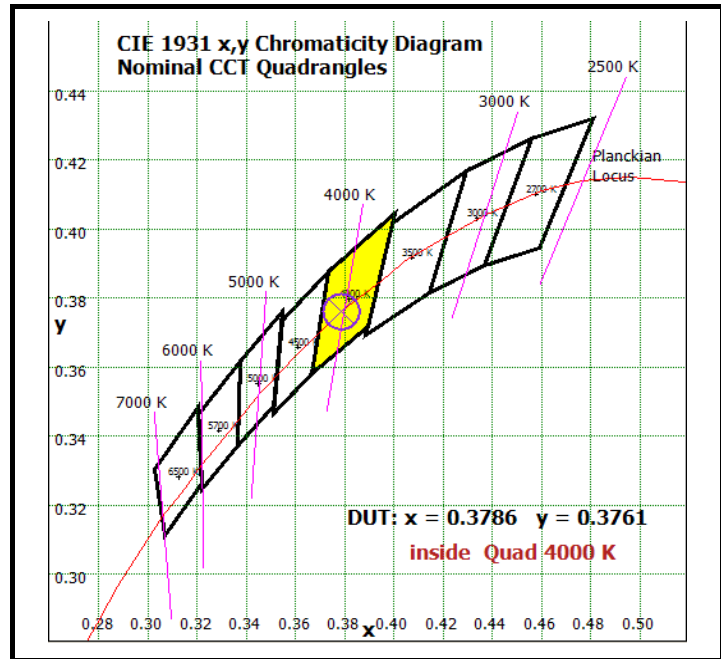
Color Quality - Integrating Sphere

Integrating Sphere Test Conditions

| Temperature | Voltage | Current | Power | Power Factor | Frequency | Current THD |
|-------------|-----------|----------|---------|--------------|-----------|-------------|
| 25.0 °C | 12.00 VDC | 0.1801 A | 2.161 W | N / A | N / A | N / A |

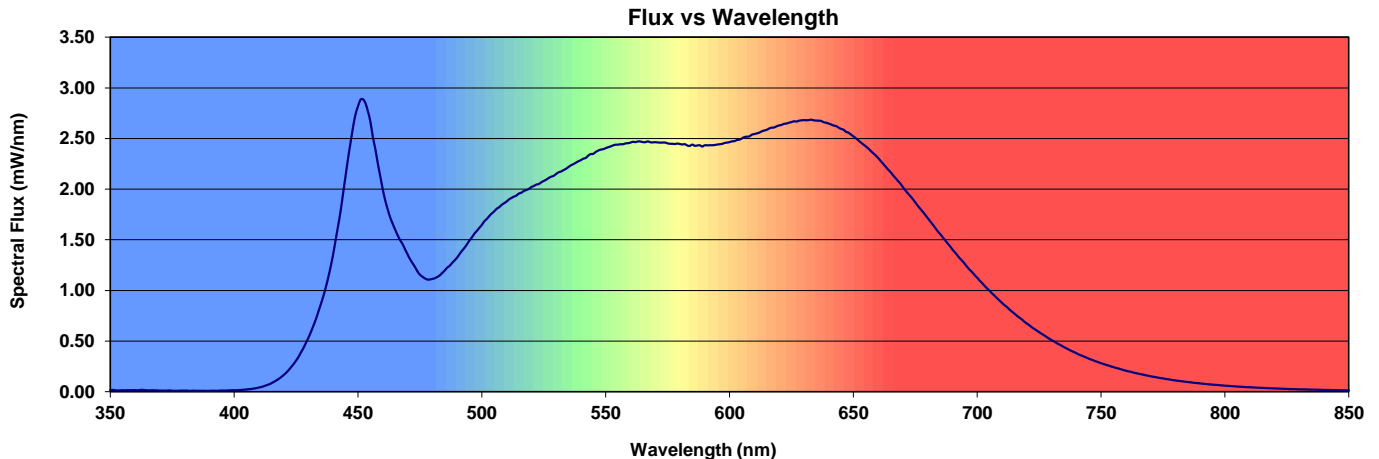
Summary of Results

| | |
|-----------------------|------------|
| Luminous Flux: | 167 Lumens |
| Efficacy: | 77.3 lm/w |
| CCT: | 4043 K |
| CRI (Ra): | 94.7 |
| CRI (R9): | 84.6 |
| Chromaticity (x): | 0.3786 |
| Chromaticity (y): | 0.3761 |
| Chromaticity (u): | 0.2242 |
| Chromaticity (v): | 0.3340 |
| Chromaticity (u'): | 0.2242 |
| Chromaticity (v'): | 0.5010 |
| Duv: | 0.0004 |



Color Rendering Index Detail

| Ra (CRI) | R1 | R2 | R3 | R4 | R5 | R6 | R7 | R8 | R9 | R10 | R11 | R12 | R13 | R14 |
|----------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 94.7 | 95.1 | 95.6 | 94.1 | 94.8 | 93.9 | 92.1 | 97.6 | 94.4 | 84.6 | 88.3 | 93.9 | 74.3 | 95.1 | 96.3 |





Distribution - Goniophotometer

Distribution Test Conditions

| Temperature | Voltage | Current | Power | Power Factor | Frequency | Current THD |
|-------------|-----------|----------|---------|--------------|-----------|-------------|
| 24.8 °C | 12.00 VDC | 0.1822 A | 2.185 W | N / A | N / A | N / A |

Summary of Results

Spacing Criteria

0-180: 1.22
90-270: 1.29

Total Lumen Output:

170 Lumens

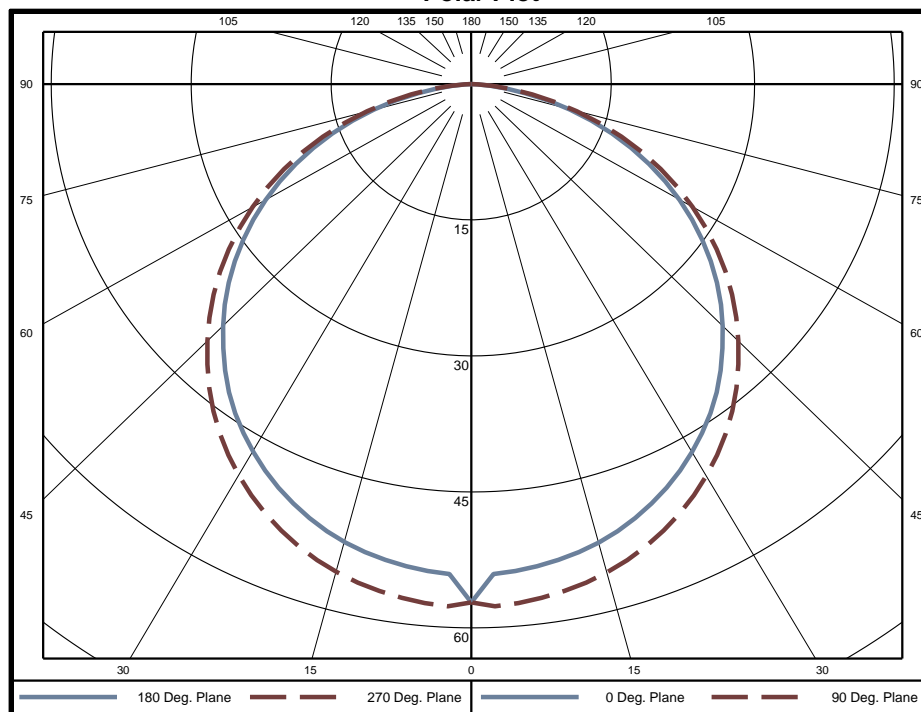
Luminaire Efficacy:

77.6 lm/w

Maximum Candela:

58 Candela

Polar Plot



Zonal Lumen Summary

| Zone | Lumens | % of Luminaire | Zone | Lumens | % of Luminaire | Zone | Lumens | % of Luminaire |
|-------|--------|----------------|---------|--------|----------------|---------|--------|----------------|
| 0-5 | 1.4 | 0.9% | 60-65 | 11.9 | 7.0% | 120-125 | 0.0 | 0.0% |
| 5-10 | 4.0 | 2.4% | 65-70 | 9.8 | 5.8% | 125-130 | 0.0 | 0.0% |
| 10-15 | 6.6 | 3.9% | 70-75 | 7.3 | 4.3% | 130-135 | 0.0 | 0.0% |
| 15-20 | 9.0 | 5.3% | 75-80 | 4.7 | 2.8% | 135-140 | 0.0 | 0.0% |
| 20-25 | 11.1 | 6.5% | 80-85 | 2.3 | 1.4% | 140-145 | 0.0 | 0.0% |
| 25-30 | 12.8 | 7.6% | 85-90 | 0.5 | 0.3% | 145-150 | 0.0 | 0.0% |
| 30-35 | 14.2 | 8.3% | 90-95 | 0.0 | 0.0% | 150-155 | 0.0 | 0.0% |
| 35-40 | 15.0 | 8.9% | 95-100 | 0.0 | 0.0% | 155-160 | 0.0 | 0.0% |
| 40-45 | 15.4 | 9.1% | 100-105 | 0.0 | 0.0% | 160-165 | 0.0 | 0.0% |
| 45-50 | 15.3 | 9.0% | 105-110 | 0.0 | 0.0% | 165-170 | 0.0 | 0.0% |
| 50-55 | 14.6 | 8.6% | 110-115 | 0.0 | 0.0% | 170-175 | 0.0 | 0.0% |
| 55-60 | 13.5 | 8.0% | 115-120 | 0.0 | 0.0% | 175-180 | 0.0 | 0.0% |

| Zone | Lumens | % of Luminaire |
|--------|--------|----------------|
| 0-40 | 74.2 | 43.7% |
| 0-60 | 133.0 | 78.4% |
| 0-90 | 169.6 | 100.0% |
| 90-180 | 0.0 | 0.0% |



Candela Tabulation
Horizontal Angle (Degrees)

| | 0 | 22.5 | 45 | 67.5 | 90 | 112.5 | 135 | 157.5 | 180 | 202.5 | 225 | 247.5 | 270 | 292.5 | 315 | 337.5 |
|-----|----|------|----|------|----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|
| 0 | 57 | 57 | 57 | 57 | 57 | 57 | 57 | 57 | 57 | 57 | 57 | 57 | 57 | 57 | 57 | 57 |
| 5 | 54 | 57 | 58 | 58 | 57 | 58 | 58 | 57 | 54 | 57 | 58 | 58 | 57 | 58 | 58 | 57 |
| 10 | 53 | 56 | 57 | 57 | 57 | 57 | 57 | 56 | 53 | 56 | 57 | 57 | 57 | 57 | 57 | 56 |
| 15 | 52 | 55 | 56 | 56 | 56 | 56 | 56 | 55 | 52 | 55 | 56 | 56 | 56 | 56 | 56 | 55 |
| 20 | 51 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 51 | 54 | 54 | 54 | 54 | 54 | 54 | 54 |
| 25 | 49 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 49 | 52 | 52 | 52 | 52 | 52 | 52 | 52 |
| 30 | 47 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 47 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| 35 | 44 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 44 | 47 | 47 | 47 | 47 | 47 | 47 | 47 |
| 40 | 41 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 41 | 44 | 44 | 44 | 44 | 44 | 44 | 44 |
| 45 | 38 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 38 | 40 | 40 | 40 | 40 | 40 | 40 | 40 |
| 50 | 34 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 34 | 36 | 36 | 36 | 36 | 36 | 36 | 36 |
| 55 | 30 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 30 | 32 | 32 | 32 | 32 | 32 | 32 | 32 |
| 60 | 26 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 26 | 27 | 27 | 27 | 27 | 27 | 27 | 27 |
| 65 | 21 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 21 | 22 | 22 | 22 | 22 | 22 | 22 | 22 |
| 70 | 16 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 16 | 17 | 17 | 17 | 17 | 17 | 17 | 17 |
| 75 | 11 | 11 | 11 | 12 | 12 | 12 | 11 | 11 | 11 | 11 | 11 | 12 | 12 | 12 | 11 | 11 |
| 80 | 6 | 6 | 6 | 7 | 7 | 7 | 6 | 6 | 6 | 6 | 6 | 7 | 7 | 7 | 6 | 6 |
| 85 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 90 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 100 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 105 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 110 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 115 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 120 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 125 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 130 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 135 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 140 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 145 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 150 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 155 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 160 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 165 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 170 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 175 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 180 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Average Luminance (cd/m²)
Horizontal Angle (Degrees)

| | 0 | 45 | 90 |
|----|-------|-------|-------|
| 0 | 19640 | 19640 | 19640 |
| 45 | 18350 | 19540 | 19460 |
| 55 | 17950 | 19080 | 19020 |
| 65 | 16940 | 17980 | 18020 |
| 75 | 14410 | 15250 | 15390 |
| 85 | 7854 | 9260 | 9140 |



Utilization of Lumens - Zonal Cavity Method

Effective Floor Cavity Reflectance 20%

| Ceiling Cavity Reflectance | 80 | | | | 70 | | | | 50 | | | 30 | | | 10 | | | 0 |
|----------------------------|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Wall Reflectance | 70 | 50 | 30 | 10 | 70 | 50 | 30 | 10 | 50 | 30 | 10 | 50 | 30 | 10 | 50 | 30 | 10 | 0 |
| Room Cavity Ratio (RCR) | ** Values are expressed as Lumens delivered to the task surface ** | | | | | | | | | | | | | | | | | |
| 0 | 202 | 202 | 202 | 202 | 197 | 197 | 197 | 197 | 188 | 188 | 188 | 180 | 180 | 180 | 173 | 173 | 173 | 170 |
| 1 | 184 | 176 | 169 | 162 | 180 | 172 | 166 | 160 | 165 | 160 | 155 | 159 | 154 | 150 | 152 | 149 | 145 | 142 |
| 2 | 167 | 153 | 142 | 132 | 163 | 150 | 139 | 130 | 144 | 135 | 127 | 138 | 131 | 124 | 133 | 127 | 121 | 118 |
| 3 | 152 | 134 | 120 | 109 | 148 | 132 | 119 | 108 | 126 | 115 | 106 | 122 | 112 | 104 | 117 | 109 | 102 | 99 |
| 4 | 139 | 119 | 104 | 92 | 135 | 116 | 102 | 91 | 112 | 100 | 90 | 108 | 97 | 89 | 104 | 95 | 88 | 84 |
| 5 | 128 | 106 | 90 | 79 | 124 | 104 | 89 | 79 | 100 | 87 | 78 | 97 | 86 | 77 | 94 | 84 | 76 | 72 |
| 6 | 118 | 95 | 80 | 69 | 115 | 93 | 79 | 68 | 90 | 77 | 68 | 88 | 76 | 67 | 85 | 75 | 67 | 63 |
| 7 | 109 | 86 | 71 | 61 | 106 | 85 | 70 | 60 | 82 | 69 | 60 | 80 | 68 | 59 | 77 | 67 | 59 | 56 |
| 8 | 102 | 78 | 64 | 54 | 99 | 77 | 63 | 54 | 75 | 62 | 53 | 73 | 61 | 53 | 71 | 60 | 53 | 49 |
| 9 | 95 | 72 | 58 | 48 | 93 | 71 | 57 | 48 | 69 | 57 | 48 | 67 | 56 | 48 | 65 | 55 | 47 | 44 |
| 10 | 89 | 66 | 53 | 44 | 87 | 65 | 52 | 44 | 64 | 52 | 43 | 62 | 51 | 43 | 61 | 50 | 43 | 40 |

Cone of Light Tabulation

| Mounting Height | Footcandles at Nadir | Diameter (Feet) |
|-----------------|----------------------|-----------------|
| 4.00 | 3.57 | 5.14 |
| 6.00 | 1.59 | 7.71 |
| 8.00 | 0.894 | 10.3 |
| 10.0 | 0.572 | 12.9 |
| 12.0 | 0.397 | 15.4 |
| 14.0 | 0.292 | 18.0 |
| 16.0 | 0.223 | 20.6 |

Cone of Light Plot

