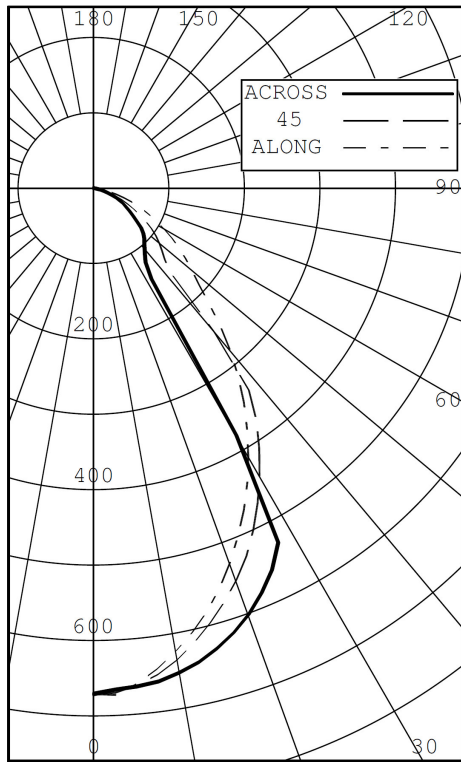




### INDEPENDENT TEST LABORATORY REPORT No. 28333

ELECTRIX INC - LINEAR LED W/60 DEGREE OPTIC LUMINAIRE, CAT# L140-10-48-W3-60M  
WITH WHITE BOARD AND 160 CELL LOUVER INSIDE CLEAR FLAT PLASTIC LENS  
510 LEDS. LUMINAIRE OUTPUT = 932 LMS.  
ONE DRIVER OPERATING AT 24.0 VDC AND 39.2 WATTS



| INTENSITY (CANDLEPOWER) SUMMARY |       |      |     |      |        | OUTPUT LUMENS |
|---------------------------------|-------|------|-----|------|--------|---------------|
| ANGLE                           | ALONG | 22.5 | 45  | 67.5 | ACROSS |               |
| 0                               | 671   | 671  | 671 | 671  | 671    |               |
| 5                               | 660   | 655  | 662 | 665  | 664    | 63            |
| 10                              | 624   | 622  | 636 | 648  | 653    |               |
| 15                              | 581   | 581  | 597 | 619  | 633    | 168           |
| 20                              | 528   | 529  | 553 | 580  | 601    |               |
| 25                              | 471   | 474  | 501 | 531  | 559    | 230           |
| 30                              | 410   | 415  | 440 | 466  | 379    |               |
| 35                              | 347   | 353  | 376 | 145  | 120    | 184           |
| 40                              | 282   | 290  | 246 | 121  | 105    |               |
| 45                              | 216   | 222  | 133 | 106  | 95     | 121           |
| 50                              | 170   | 163  | 114 | 92   | 82     |               |
| 55                              | 138   | 126  | 94  | 73   | 64     | 88            |
| 60                              | 108   | 94   | 71  | 55   | 50     |               |
| 65                              | 80    | 67   | 51  | 41   | 38     | 54            |
| 70                              | 54    | 44   | 33  | 27   | 26     |               |
| 75                              | 32    | 24   | 18  | 15   | 14     | 22            |
| 80                              | 14    | 9    | 6   | 6    | 6      |               |
| 85                              | 2     | 1    | 1   | 1    | 1      | 2             |
| 90                              | 0     | 0    | 0   | 0    | 0      |               |

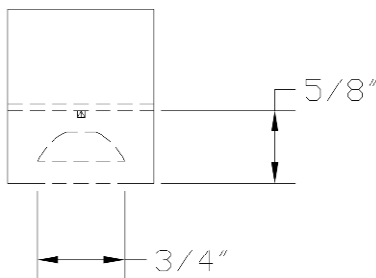
#### ZONAL LUMENS AND PERCENTAGES

| ZONE   | LUMENS | % LUMINAIRE |
|--------|--------|-------------|
| 0-30   | 461    | 49.48       |
| 0-40   | 645    | 69.17       |
| 0-60   | 854    | 91.64       |
| 0-90   | 932    | 100.00      |
| 40-90  | 287    | 30.83       |
| 60-90  | 78     | 8.36        |
| 90-180 | 0      | 0.00        |
| 0-180  | 932    | 100.00      |

EFFICACY (LUMENS PER WATT): 23.8

\*\*\* THIS IS AN ABSOLUTE TEST \*\*\*

LUMINOUS LENGTH: 50.000 INS  
WIDTH: 0.750 INS



#### LUMINANCE SUMMARY CD./SQ.M.

| ANGLE | ALONG | 45   | ACROSS |
|-------|-------|------|--------|
| 45    | 12640 | 7812 | 5586   |
| 55    | 9962  | 6770 | 4647   |
| 65    | 7834  | 4961 | 3715   |
| 75    | 5030  | 2806 | 2308   |
| 85    | 877   | 309  | 428    |

S/MH: 1.1  
SC (ALONG): 1.0, SC (ACROSS): 1.1

CERTIFIED BY:  
*Rupel Turney* DATE: FEB 17, 2011  
PREPARED FOR:  
ELECTRIX INC  
NEW HAVEN, CT

TESTED IN ACCORDANCE WITH IES PROCEDURES.

LIGHTING SCIENCES, INC.  
 7826 E. EVANS RD.  
 SCOTTSDALE, AZ, USA 85260

INDEPENDENT TEST LABORATORY REPORT No. 28333

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 510 LEDS. LUMINAIRE OUTPUT = 932 LMS.  
 ONE DRIVER OPERATING AT 24.0 VDC AND 39.2 WATTS

INTENSITY (CANDLEPOWER) DATA  
 IN 2.5 DEGREE STEPS

| ANGLE | PLANE |      |     |      |        |         | OUTPUT<br>LUMENS |
|-------|-------|------|-----|------|--------|---------|------------------|
|       | ALONG | 22.5 | 45  | 67.5 | ACROSS | AVERAGE |                  |
| 0.0   | 671   | 671  | 671 | 671  | 671    | 671     |                  |
| 2.5   | 673   | 666  | 670 | 668  | 666    | 668     |                  |
| 5.0   | 660   | 655  | 662 | 665  | 664    | 661     | 63               |
| 7.5   | 644   | 639  | 651 | 658  | 660    | 650     |                  |
| 10.0  | 624   | 622  | 636 | 648  | 653    | 636     |                  |
| 12.5  | 604   | 602  | 617 | 635  | 644    | 620     |                  |
| 15.0  | 581   | 581  | 597 | 619  | 633    | 601     | 168              |
| 17.5  | 556   | 556  | 576 | 600  | 619    | 580     |                  |
| 20.0  | 528   | 529  | 553 | 580  | 601    | 557     |                  |
| 22.5  | 500   | 501  | 529 | 556  | 581    | 532     |                  |
| 25.0  | 471   | 474  | 501 | 531  | 559    | 505     | 230              |
| 27.5  | 441   | 445  | 471 | 503  | 529    | 476     |                  |
| 30.0  | 410   | 415  | 440 | 466  | 379    | 429     |                  |
| 32.5  | 378   | 384  | 409 | 312  | 143    | 341     |                  |
| 35.0  | 347   | 353  | 376 | 145  | 120    | 277     | 184              |
| 37.5  | 315   | 322  | 338 | 129  | 112    | 251     |                  |
| 40.0  | 282   | 290  | 246 | 121  | 105    | 213     |                  |
| 42.5  | 248   | 256  | 149 | 113  | 100    | 173     |                  |
| 45.0  | 216   | 222  | 133 | 106  | 95     | 154     | 121              |
| 47.5  | 189   | 189  | 124 | 99   | 90     | 138     |                  |
| 50.0  | 170   | 163  | 114 | 92   | 82     | 124     |                  |
| 52.5  | 154   | 144  | 104 | 83   | 73     | 111     |                  |
| 55.0  | 138   | 126  | 94  | 73   | 64     | 99      | 88               |
| 57.5  | 123   | 110  | 82  | 64   | 57     | 86      |                  |
| 60.0  | 108   | 94   | 71  | 55   | 50     | 75      |                  |
| 62.5  | 94    | 80   | 61  | 48   | 44     | 64      |                  |
| 65.0  | 80    | 67   | 51  | 41   | 38     | 54      | 54               |
| 67.5  | 67    | 55   | 41  | 34   | 32     | 45      |                  |
| 70.0  | 54    | 44   | 33  | 27   | 26     | 36      |                  |
| 72.5  | 42    | 33   | 25  | 21   | 20     | 27      |                  |
| 75.0  | 32    | 24   | 18  | 15   | 14     | 20      | 22               |
| 77.5  | 22    | 16   | 11  | 10   | 10     | 13      |                  |
| 80.0  | 14    | 9    | 6   | 6    | 6      | 8       |                  |
| 82.5  | 7     | 4    | 3   | 3    | 3      | 4       |                  |
| 85.0  | 2     | 1    | 1   | 1    | 1      | 1       | 2                |
| 87.5  | 0     | 0    | 0   | 0    | 0      | 0       |                  |
| 90.0  | 0     | 0    | 0   | 0    | 0      | 0       |                  |

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INDEPENDENT TEST LABORATORY REPORT No. 28333

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WITH WHITE BOARD AND 160 CELL LOUVER INSIDE CLEAR FLAT PLASTIC LENS  
510 LEDS. LUMINAIRE OUTPUT = 932 LMS.  
ONE DRIVER OPERATING AT 24.0 VDC AND 39.2 WATTS

AVERAGE LUMINANCE DATA

CD./SQ.M (FOOTLAMBERTS)

| ANGLE | ALONG         | 22.5          | 45            | 67.5          | ACROSS        |
|-------|---------------|---------------|---------------|---------------|---------------|
| 0     | 27735 ( 8094) | 27735 ( 8094) | 27735 ( 8094) | 27735 ( 8094) | 27735 ( 8094) |
| 30    | 19556 ( 5707) | 19864 ( 5797) | 21042 ( 6141) | 22282 ( 6503) | 18067 ( 5273) |
| 40    | 15226 ( 4444) | 15672 ( 4574) | 13302 ( 3882) | 6522 ( 1903)  | 5689 ( 1660)  |
| 45    | 12640 ( 3689) | 12993 ( 3792) | 7812 ( 2280)  | 6205 ( 1811)  | 5586 ( 1630)  |
| 50    | 10950 ( 3196) | 10517 ( 3069) | 7322 ( 2137)  | 5899 ( 1721)  | 5295 ( 1545)  |
| 55    | 9962 ( 2907)  | 9125 ( 2663)  | 6770 ( 1976)  | 5269 ( 1537)  | 4647 ( 1356)  |
| 60    | 8956 ( 2614)  | 7809 ( 2279)  | 5904 ( 1723)  | 4583 ( 1337)  | 4141 ( 1208)  |
| 65    | 7834 ( 2286)  | 6573 ( 1918)  | 4961 ( 1448)  | 3988 ( 1164)  | 3715 ( 1084)  |
| 70    | 6556 ( 1913)  | 5287 ( 1543)  | 3963 ( 1156)  | 3282 ( 957)   | 3117 ( 910)   |
| 75    | 5030 ( 1468)  | 3831 ( 1118)  | 2806 ( 819)   | 2387 ( 696)   | 2308 ( 673)   |
| 80    | 3225 ( 941)   | 2186 ( 638)   | 1541 ( 449)   | 1418 ( 413)   | 1475 ( 430)   |
| 85    | 877 ( 256)    | 285 ( 83)     | 309 ( 90)     | 380 ( 111)    | 428 ( 125)    |

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 WITH WHITE BOARD AND 160 CELL LOUVER INSIDE CLEAR FLAT PLASTIC LENS  
 510 LEDS. LUMINAIRE OUTPUT = 932 LMS.  
 ONE DRIVER OPERATING AT 24.0 VDC AND 39.2 WATTS

COEFFICIENTS OF UTILIZATION

ZONAL CAVITY METHOD

EFFECTIVE FLOOR CAVITY REFLECTANCE = .20

| CC<br>WALL | 90 |       |      |      | 80  |       |      |      | 70  |       |      |      | 50  |       |      |      | 30    |       |      |       | 10   |       |      |      | 0   |      |
|------------|----|-------|------|------|-----|-------|------|------|-----|-------|------|------|-----|-------|------|------|-------|-------|------|-------|------|-------|------|------|-----|------|
|            | 70 | 50    | 30   | 10   | 70  | 50    | 30   | 10   | 70  | 50    | 30   | 10   | 50  | 30    | 10   | 50   | 30    | 10    | 50   | 30    | 10   | 50    | 30   | 10   | 0   |      |
| RCR        | 0  | 1.221 | .221 | .221 | .22 | 1.191 | .191 | .191 | .19 | 1.161 | .161 | .161 | .16 | 1.111 | .111 | .111 | .11   | 1.061 | .061 | .061  | .06  | 1.021 | .021 | .021 | .02 | 1.00 |
|            | 1  | 1.151 | .111 | .081 | .05 | 1.121 | .091 | .061 | .04 | 1.101 | .071 | .041 | .02 | 1.031 | .010 | .99  | 0.990 | .970  | .96  | 0.960 | .940 | .93   | 0.91 |      |     |      |
|            | 2  | 1.081 | .020 | .970 | .93 | 1.061 | .000 | .960 | .92 | 1.040 | .980 | .940 | .91 | 0.950 | .920 | .88  | 0.920 | .890  | .87  | 0.890 | .870 | .85   | 0.83 |      |     |      |
|            | 3  | 1.010 | .930 | .870 | .82 | 0.990 | .920 | .860 | .82 | 0.970 | .900 | .850 | .81 | 0.880 | .830 | .80  | 0.850 | .820  | .78  | 0.830 | .800 | .77   | 0.76 |      |     |      |
|            | 4  | 0.950 | .860 | .790 | .75 | 0.940 | .850 | .790 | .74 | 0.920 | .840 | .780 | .73 | 0.820 | .770 | .73  | 0.800 | .750  | .72  | 0.780 | .740 | .71   | 0.69 |      |     |      |
|            | 5  | 0.900 | .800 | .720 | .67 | 0.880 | .790 | .720 | .67 | 0.860 | .780 | .710 | .67 | 0.760 | .700 | .66  | 0.740 | .690  | .65  | 0.720 | .680 | .65   | 0.63 |      |     |      |
|            | 6  | 0.850 | .740 | .670 | .62 | 0.830 | .730 | .660 | .61 | 0.810 | .720 | .650 | .61 | 0.700 | .650 | .60  | 0.690 | .640  | .60  | 0.680 | .630 | .60   | 0.58 |      |     |      |
|            | 7  | 0.790 | .680 | .610 | .56 | 0.780 | .670 | .600 | .56 | 0.760 | .670 | .600 | .55 | 0.650 | .590 | .55  | 0.640 | .590  | .55  | 0.630 | .580 | .54   | 0.53 |      |     |      |
|            | 8  | 0.750 | .630 | .560 | .52 | 0.730 | .630 | .560 | .51 | 0.720 | .620 | .560 | .51 | 0.610 | .550 | .51  | 0.600 | .540  | .50  | 0.590 | .540 | .50   | 0.49 |      |     |      |
|            | 9  | 0.700 | .590 | .520 | .47 | 0.690 | .580 | .520 | .47 | 0.680 | .580 | .510 | .47 | 0.570 | .510 | .47  | 0.560 | .500  | .46  | 0.550 | .500 | .46   | 0.45 |      |     |      |
|            | 10 | 0.660 | .550 | .480 | .43 | 0.650 | .540 | .480 | .43 | 0.640 | .540 | .480 | .43 | 0.530 | .470 | .43  | 0.520 | .470  | .43  | 0.510 | .460 | .43   | 0.41 |      |     |      |

THE ABOVE COEFFICIENTS HAVE BEEN CALCULATED BASED ON LUMINAIRE LUMENS  
 BECAUSE IN AN ABSOLUTE TEST THE BARE LAMP LUMENS ARE UNKNOWN.  
 LIGHTING DESIGN CALCULATIONS MADE USING THESE COEFFICIENTS SHOULD  
 THEREFORE USE THE LUMINAIRE LUMENS IN THE CALCULATION FORMULA

LUMINAIRE INPUT WATTS 39.2

LABORATORY RESULTS MAY NOT BE REPRESENTATIVE OF FIELD PERFORMANCE.  
 BALLAST AND FIELD FACTORS HAVE NOT BEEN APPLIED.

TEST DISTANCE EXCEEDS FIVE TIMES THE GREATEST  
 LUMINOUS OPENING OF LUMINAIRE.

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WITH WHITE BOARD AND 160 CELL LOUVER INSIDE CLEAR FLAT PLASTIC LENS  
510 LEDS. LUMINAIRE OUTPUT = 932 LMS.  
ONE DRIVER OPERATING AT 24.0 VDC AND 39.2 WATTS

**ELECTRICAL MEASUREMENTS**

|                            |       |          |
|----------------------------|-------|----------|
| INPUT VOLTAGE:             | 24.0  | VOLTS DC |
| INPUT CURRENT:             | 1.633 | AMPS     |
| INPUT POWER:               | 39.2  | WATTS    |
| POWER FACTOR:              | N/A   | PERCENT  |
| TOTAL HARMONIC DISTORTION: | N/A   | PERCENT  |
| OFF STATE POWER:           | 0.00  | WATTS    |

**LIGHT OUTPUT**

|           |      |      |
|-----------|------|------|
| LUMENS:   | 932  | lm   |
| EFFICACY: | 23.8 | lm/W |

**SPECTRAL MEASUREMENTS**

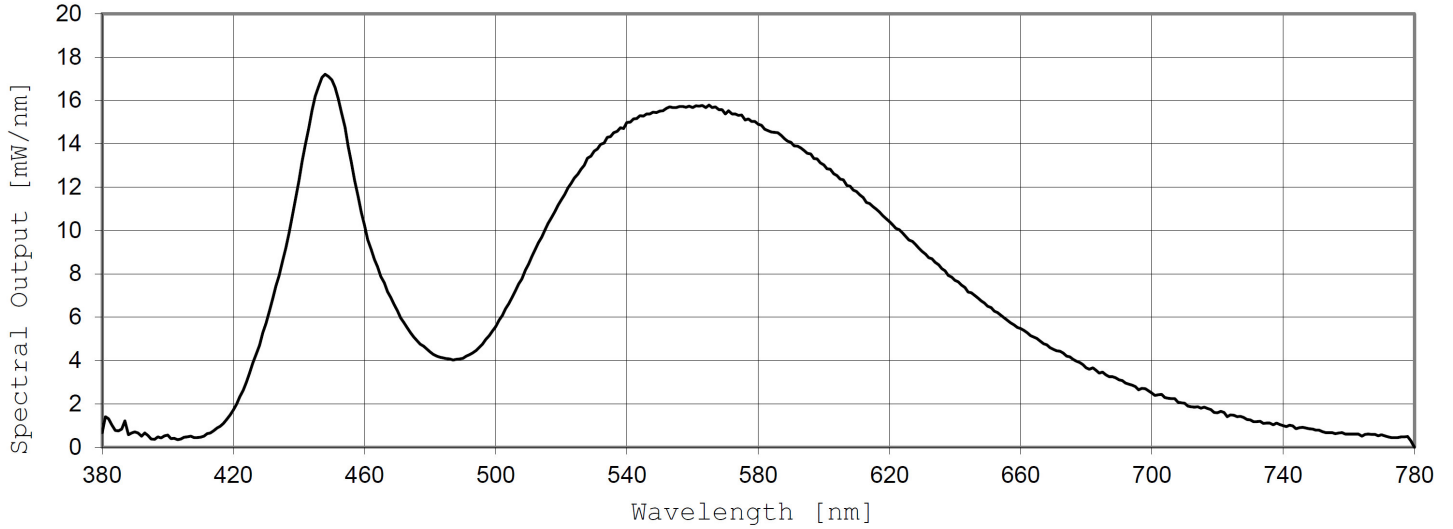
|                        |        |    |
|------------------------|--------|----|
| X:                     | 0.4324 |    |
| y:                     | 0.3992 |    |
| u/u':                  | 0.2497 |    |
| v:                     | 0.3458 |    |
| v':                    | 0.5188 |    |
| Duv:                   | 0.0014 |    |
| CRI (R <sub>a</sub> ): | 86.8   |    |
| CRI (R <sub>g</sub> ): | 56.3   |    |
| CCT:                   | 3036   | K  |
| RADIANT FLUX:          | 2797   | mW |

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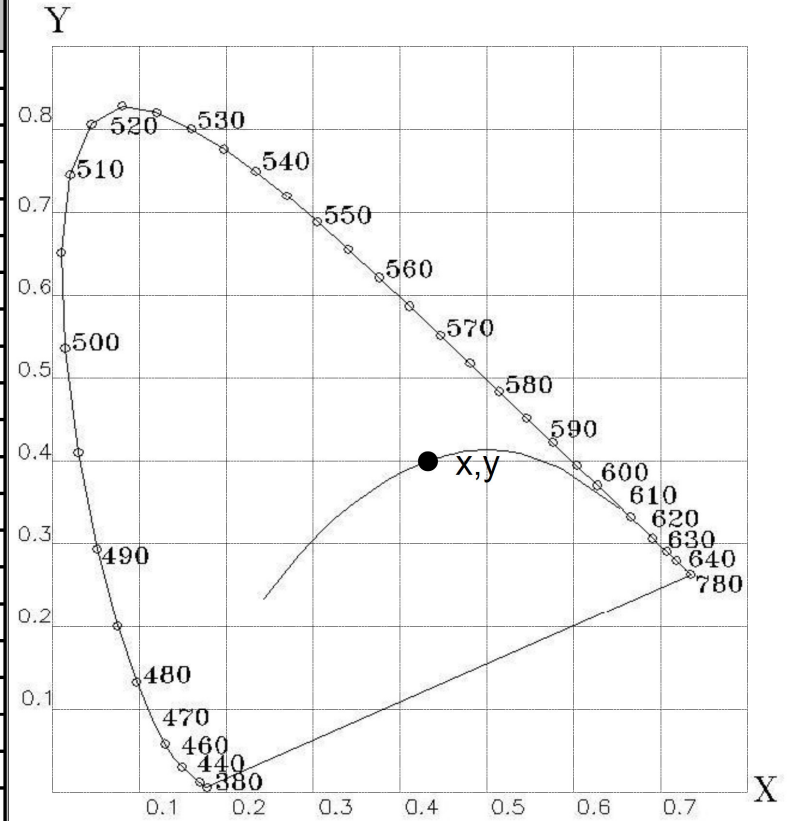
Spectral Power Distribution



Tabulated Spectral Power Distribution

| Wavelength [nm] | [mW/nm]  | Wavelength [nm] | [mW/nm]  |
|-----------------|----------|-----------------|----------|
| 380             | 0.67414  | 590             | 14.06435 |
| 390             | 0.70106  | 600             | 13.03407 |
| 400             | 0.55412  | 610             | 11.80358 |
| 410             | 0.45877  | 620             | 10.40539 |
| 420             | 1.71899  | 630             | 9.04029  |
| 430             | 5.70213  | 640             | 7.70323  |
| 440             | 12.28422 | 650             | 6.50245  |
| 450             | 16.95495 | 660             | 5.47835  |
| 460             | 10.24330 | 670             | 4.50752  |
| 470             | 6.29438  | 680             | 3.65896  |
| 480             | 4.39760  | 690             | 3.10709  |
| 490             | 4.11157  | 700             | 2.50138  |
| 500             | 5.56640  | 710             | 2.03026  |
| 510             | 8.45644  | 720             | 1.59168  |
| 520             | 11.41379 | 730             | 1.26022  |
| 530             | 13.66278 | 740             | 1.00616  |
| 540             | 14.99031 | 750             | 0.79416  |
| 550             | 15.50236 | 760             | 0.60235  |
| 560             | 15.66781 | 770             | 0.57206  |
| 570             | 15.37841 | 780             | 0.00000  |
| 580             | 14.90057 |                 |          |

CIE 1931 Chromaticity Diagram

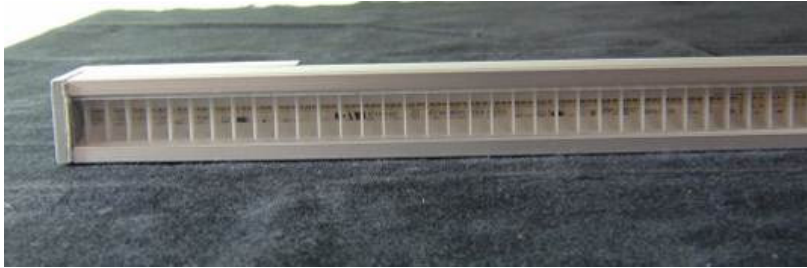


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PARTIAL LUMINOUS OPENING



END VIEW



**All testing was conducted in accordance with LM-79-08,**

Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products as published by the Illuminating Engineering Society of North America (IESNA).

The condition of the item tested was new. Stabilization time before testing exceeded 16 hours.

The test results (luminous distribution and flux) were obtained by using a Lighting Sciences series 6000 Type C Moving Mirror Goniophotometer

- The photometric reference standard used is a set of three incandescent luminous intensity standard lamps calibrated and traceable to the U.S. National Institute of Standards and Technology.

The test results (colorimetric and luminous flux) were obtained by using a Lighting Sciences model 4000 Integrating Sphere of either 1 or 2 meters diameter, having an internal reflectance exceeding 0.80.  $4\pi$  geometry was used. Correction factors were applied for spectral mismatch and self-absorption. The spectroradiometer employed was a LSC model 500E having a bandwidth of .84.

- The photometric reference standard used is a set of three incandescent luminous flux standard lamps calibrated and traceable to the U.S. National Institute of Standards and Technology.
- The colorimetric reference standard used is an incandescent spectral standard lamp calibrated and traceable to the U.S. National Institute of Standards and Technology.

Power measurements were obtained with a Yokogawa WT210 power analyzer.

Ambient temperature during testing was  $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$ , measured using an Omega model DP460.

Calibration certificates are on file at the laboratories of Lighting Sciences Inc.