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## Indoor Distribution Test Report

Relevant Standards  
IES LM-79-2019, ANSI C82.77-10-2014

Prepared For  
**CATHODE LIGHTING SYSTEMS INC**

8020 Queenair Dr  
Gaithersburg, MD 20879-4173  
United States

Catalog Number

**Curvable Grazer-Low**

Order Number  
15890586  
Test Number  
15890586.01

Test Date

2025-07-24

Prepared By

Bhavik Shah, Operations Leader

Approved By

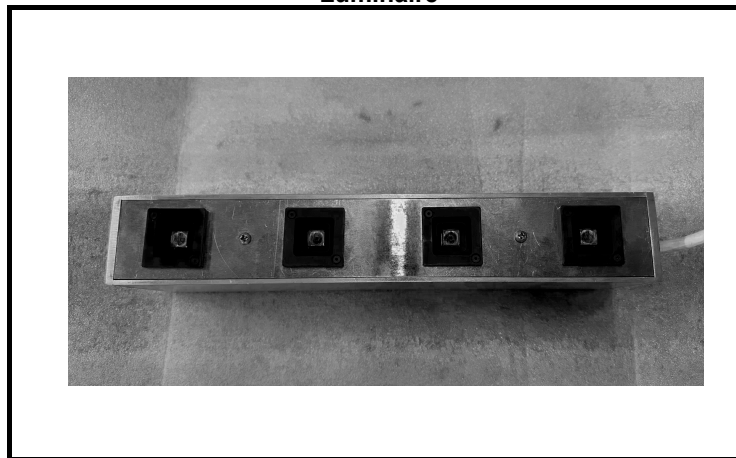
Shivani Vyas, Engineering Project Handler

The results contained in this report pertain only to the tested sample.  
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**Luminaire Description:** Silver aluminum housing with black reflectors and textured optics  
**Lamp:** 4 LEDs  
**Mounting:** Surface – Ceiling  
**Ballast/Driver:** Unmarked

**Luminaire**



**Luminaire Characteristics**

Luminous Length: 12.00 in.  
Luminous Width: 1.000 in.

**Summary of Results**

Total Luminaire Output: 386.1 Lumens  
Luminaire Efficacy: 78 lm/w  
Maximum Candela: 1003 Candela

**Test Conditions**

Test Temperature: 24.4 °C  
Voltage: 24.00 VDC  
Current: 0.2060 A  
Power: 4.950 W

The device under test emits no detectable uplight, as defined by ANSI/IES LM-75-19.  
For the purpose of this report, certain non-zero uplight readings have been assigned a zero value, in accordance with the requirements of  
ANSI/IES LM-75-19

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

## Distribution - Goniophotometer

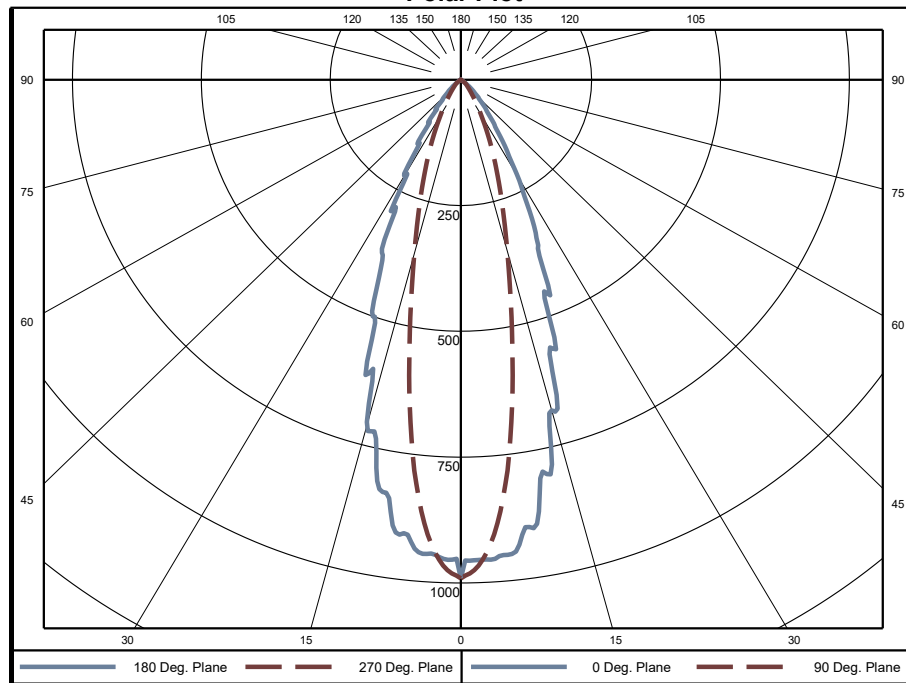
### Distribution Test Conditions

| Temperature | Voltage   | Current  | Power   | Power Factor | Frequency | Current THD |
|-------------|-----------|----------|---------|--------------|-----------|-------------|
| 24.4 °C     | 24.00 VDC | 0.2060 A | 4.950 W | N/A          | N/A       | N/A         |

### Summary of Results

|                                                                                    |                            |              |
|------------------------------------------------------------------------------------|----------------------------|--------------|
| <b>Spacing Criteria</b>                                                            | <b>Total Lumen Output:</b> | 386.1 Lumens |
| 0-180: 0.63                                                                        | <b>Luminaire Efficacy:</b> | 78.0 lm/w    |
| 90-270: 0.38                                                                       | <b>Maximum Candela:</b>    | 1003 Candela |
| <b>Corrected UGR (Room Dimension: X=4H, Y=8H, Reflectances: 70/50/20%, S/H: 1)</b> |                            |              |
| <b>Crosswise:</b> 2.4                                                              | <b>Endwise:</b> 1.7        |              |

### Polar Plot



### Zonal Lumen Summary

| Zone  | Lumens | % of Luminaire | Zone    | Lumens | % of Luminaire | Zone    | Lumens | % of Luminaire |
|-------|--------|----------------|---------|--------|----------------|---------|--------|----------------|
| 0-5   | 22.88  | 5.9%           | 60-65   | 0.86   | 0.2%           | 120-125 | 0      | 0.0%           |
| 5-10  | 58.47  | 15.1%          | 65-70   | 0.34   | 0.1%           | 125-130 | 0      | 0.0%           |
| 10-15 | 70.87  | 18.4%          | 70-75   | 0.04   | 0.0%           | 130-135 | 0      | 0.0%           |
| 15-20 | 65.98  | 17.1%          | 75-80   | 0.01   | 0.0%           | 135-140 | 0      | 0.0%           |
| 20-25 | 53.82  | 13.9%          | 80-85   | 0.00   | 0.0%           | 140-145 | 0      | 0.0%           |
| 25-30 | 39.59  | 10.3%          | 85-90   | 0.00   | 0.0%           | 145-150 | 0      | 0.0%           |
| 30-35 | 27.38  | 7.1%           | 90-95   | 0      | 0.0%           | 150-155 | 0      | 0.0%           |
| 35-40 | 18.41  | 4.8%           | 95-100  | 0      | 0.0%           | 155-160 | 0      | 0.0%           |
| 40-45 | 12.33  | 3.2%           | 100-105 | 0      | 0.0%           | 160-165 | 0      | 0.0%           |
| 45-50 | 8.16   | 2.1%           | 105-110 | 0      | 0.0%           | 165-170 | 0      | 0.0%           |
| 50-55 | 4.80   | 1.2%           | 110-115 | 0      | 0.0%           | 170-175 | 0      | 0.0%           |
| 55-60 | 2.18   | 0.6%           | 115-120 | 0      | 0.0%           | 175-180 | 0      | 0.0%           |

| Zone   | Lumens | % of Luminaire |
|--------|--------|----------------|
| 0-40   | 357    | 92.6%          |
| 0-60   | 385    | 99.7%          |
| 0-90   | 386    | 100.0%         |
| 90-180 | 0      | 0.0%           |

### Candela Tabulation

Horizontal Angle (Degrees)

| Vertical 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   | 991  | 991 | 991  | 991 | 991   | 991 | 991   | 991 | 991   | 991 | 991   | 991 | 991   | 991 | 991   |
|                          | 5   | 948  | 968 | 939  | 891 | 861   | 884 | 928   | 955 | 942   | 955 | 928   | 884 | 861   | 891 | 939   |
|                          | 10  | 871  | 852 | 730  | 609 | 564   | 601 | 711   | 841 | 833   | 841 | 711   | 601 | 564   | 609 | 730   |
|                          | 15  | 680  | 643 | 474  | 364 | 334   | 360 | 460   | 632 | 704   | 632 | 460   | 360 | 334   | 364 | 474   |
|                          | 20  | 499  | 444 | 287  | 219 | 205   | 215 | 278   | 451 | 500   | 451 | 278   | 215 | 205   | 219 | 287   |
|                          | 25  | 347  | 266 | 172  | 135 | 123   | 134 | 167   | 257 | 350   | 257 | 167   | 134 | 123   | 135 | 172   |
|                          | 30  | 217  | 157 | 106  | 79  | 70    | 77  | 106   | 161 | 220   | 161 | 106   | 77  | 70    | 79  | 106   |
|                          | 35  | 121  | 91  | 64   | 46  | 40    | 45  | 62    | 90  | 116   | 90  | 62    | 45  | 40    | 46  | 64    |
|                          | 40  | 75   | 57  | 41   | 27  | 25    | 26  | 40    | 56  | 76    | 56  | 40    | 26  | 25    | 27  | 41    |
|                          | 45  | 42   | 34  | 24   | 17  | 16    | 17  | 23    | 33  | 38    | 33  | 23    | 17  | 16    | 17  | 24    |
|                          | 50  | 22   | 20  | 15   | 12  | 11    | 12  | 14    | 19  | 21    | 19  | 14    | 12  | 11    | 12  | 15    |
|                          | 55  | 7    | 8   | 9    | 6   | 5     | 6   | 9     | 8   | 6     | 8   | 9     | 6   | 5     | 6   | 9     |
|                          | 60  | 2    | 2   | 4    | 2   | 2     | 2   | 4     | 2   | 2     | 2   | 4     | 2   | 2     | 2   | 4     |
|                          | 65  | 1    | 1   | 1    | 1   | 1     | 1   | 1     | 1   | 1     | 1   | 1     | 1   | 1     | 1   | 1     |
|                          | 70  | 0    | 0   | 0    | 0   | 0     | 0   | 0     | 0   | 0     | 0   | 0     | 0   | 0     | 0   | 0     |
|                          | 75  | 0    | 0   | 0    | 0   | 0     | 0   | 0     | 0   | 0     | 0   | 0     | 0   | 0     | 0   | 0     |
|                          | 80  | 0    | 0   | 0    | 0   | 0     | 0   | 0     | 0   | 0     | 0   | 0     | 0   | 0     | 0   | 0     |
|                          | 85  | 0    | 0   | 0    | 0   | 0     | 0   | 0     | 0   | 0     | 0   | 0     | 0   | 0     | 0   | 0     |
|                          | 90  | 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     |
|                          | 100 | 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     |
|                          | 110 | 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     |
|                          | 120 | 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     |
|                          | 130 | 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     |
|                          | 140 | 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     |
|                          | 150 | 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     |
|                          | 160 | 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     |
|                          | 170 | 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     |
|                          | 180 | 0    | 0   | 0    | 0   | 0     | 0   | 0     | 0   | 0     | 0   | 0     | 0   | 0     | 0   | 0     |

### Average Luminance (cd/m<sup>2</sup>)

Horizontal Angle (Degrees)

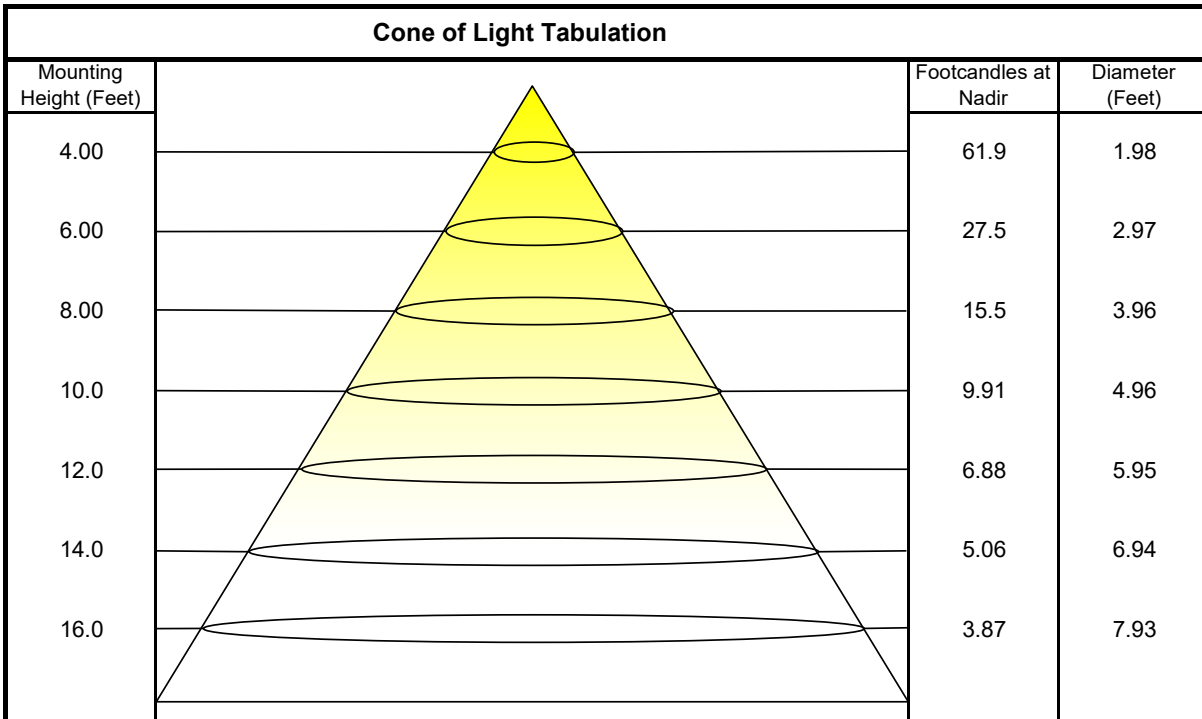
| Vertical Angle (Degrees) | 0  | 45     | 90     |
|--------------------------|----|--------|--------|
|                          | 0  | 128000 | 128000 |
|                          | 45 | 7678   | 4345   |
|                          | 55 | 1603   | 2039   |
|                          | 65 | 286    | 291    |
|                          | 75 | 12     | 8      |
|                          | 85 | 0      | 12     |



### Coefficients of Utilization - Zonal Cavity Method

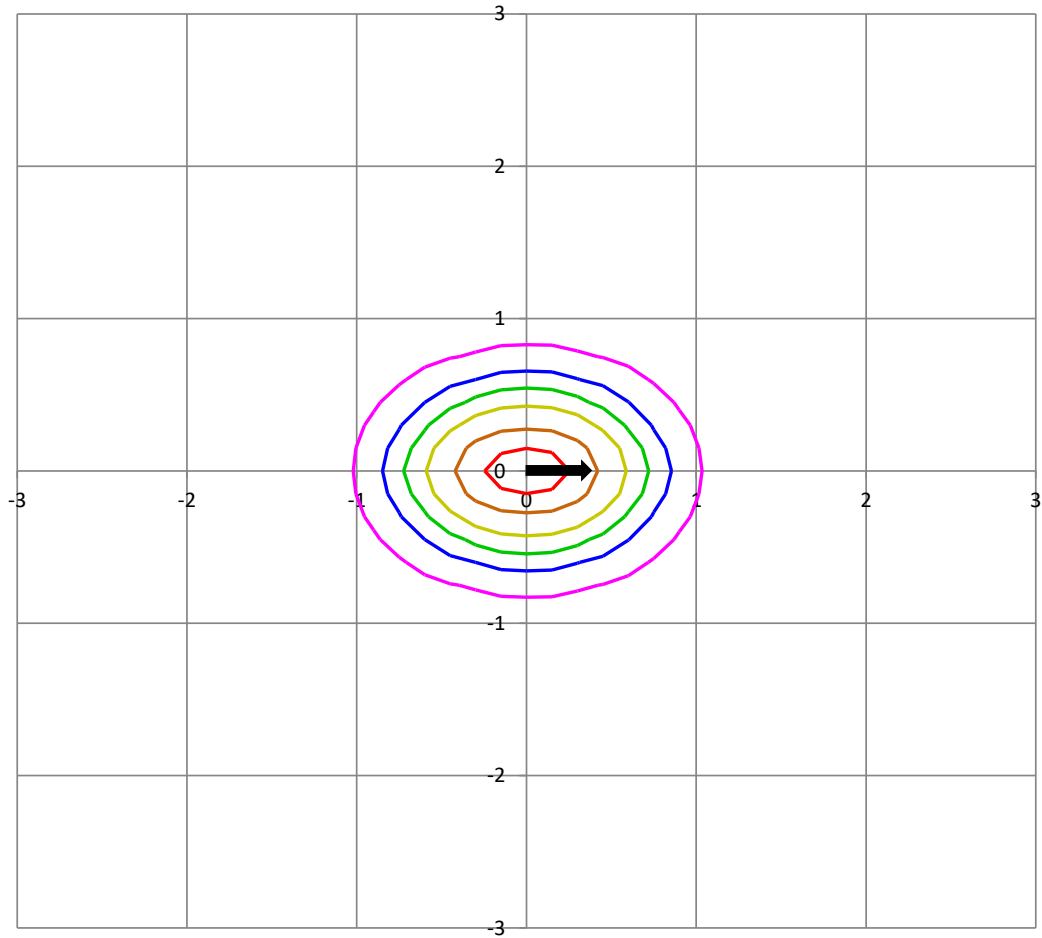
| Effective Floor Cavity Reflectance 20% |                                                                                           |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|----------------------------------------|-------------------------------------------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 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 percent of total lumen output delivered to the task surface ** |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 0                                      | 119                                                                                       | 119 | 119 | 119 | 116 | 116 | 116 | 116 | 111 | 111 | 111 | 106 | 106 | 106 | 102 | 102 | 102 | 100 |
| 1                                      | 114                                                                                       | 112 | 109 | 107 | 112 | 109 | 107 | 106 | 105 | 104 | 102 | 102 | 100 | 99  | 98  | 97  | 96  | 95  |
| 2                                      | 109                                                                                       | 105 | 101 | 98  | 107 | 103 | 100 | 97  | 100 | 97  | 95  | 97  | 95  | 93  | 94  | 93  | 91  | 89  |
| 3                                      | 104                                                                                       | 99  | 94  | 91  | 103 | 97  | 93  | 90  | 95  | 91  | 89  | 92  | 90  | 87  | 90  | 88  | 86  | 84  |
| 4                                      | 100                                                                                       | 93  | 88  | 85  | 98  | 92  | 88  | 84  | 90  | 86  | 83  | 88  | 85  | 82  | 86  | 84  | 81  | 80  |
| 5                                      | 96                                                                                        | 88  | 83  | 80  | 94  | 88  | 83  | 79  | 86  | 82  | 78  | 84  | 81  | 78  | 83  | 80  | 77  | 76  |
| 6                                      | 92                                                                                        | 84  | 79  | 75  | 91  | 83  | 78  | 75  | 82  | 78  | 74  | 81  | 77  | 74  | 79  | 76  | 73  | 72  |
| 7                                      | 88                                                                                        | 80  | 75  | 71  | 87  | 79  | 74  | 71  | 78  | 74  | 71  | 77  | 73  | 70  | 76  | 73  | 70  | 69  |
| 8                                      | 85                                                                                        | 76  | 71  | 68  | 84  | 76  | 71  | 68  | 75  | 70  | 67  | 74  | 70  | 67  | 73  | 69  | 67  | 65  |
| 9                                      | 82                                                                                        | 73  | 68  | 65  | 81  | 73  | 68  | 64  | 72  | 67  | 64  | 71  | 67  | 64  | 70  | 67  | 64  | 63  |
| 10                                     | 79                                                                                        | 70  | 65  | 62  | 78  | 70  | 65  | 62  | 69  | 65  | 61  | 68  | 64  | 61  | 68  | 64  | 61  | 60  |

| Beam and Field Information |              |
|----------------------------|--------------|
| CIE Type:                  | Direct       |
| Center Beam Intensity:     | 991 Candela  |
| Central Cone Intensity:    | 966 Candela  |
| Beam Flux:                 | 165.0 Lumens |
| Beam Angle (0-180):        | 40.3 Degrees |
| Beam Angle (90-270):       | 22.5 Degrees |
| Field Angle (0-180):       | 74.5 Degrees |
| Field Angle (90-270):      | 53.8 Degrees |



## ISOFootcandle Plot

Mounting Height - 8 Feet



Grid Lines in Units of Mounting Height

