



## IES INDOOR REPORT

PHOTOMETRIC FILENAME : MD4AERRG-4-L20-L50-8TW-A-DALI-UNV ALL ON 4000K\_.IES

### DESCRIPTION INFORMATION (From Photometric File)

IESNA:LM-63-2002

[TEST] GEN FROM BALLABS TEST NO. 20051.0

[TESTLAB] BUILDING ACOUSTICS & LIGHTING LABORATORIE, INC

[ISSUE DATE] 28-JUL-2020

[MANUFAC] WILLIAMS INDOOR

[OTHER] H.E. WILLIAMS, INC - CARTHAGE, MO

[LUMINAIRE] LED EXAM, AMBIENT, & READING (RIGHT) 4' MEDICAL ASYM TROFFER

[MORE] WHITE REFL w/FROSTED ACRYLIC RIBBED LENS IN DOOR & CLEAR

[MORE] ACRYLIC LENS

[LUMCAT] MD4AERRG-L20-L50-8TW-A-DALI-UNV ALL ON 4000k

### CHARACTERISTICS

|                                 |                 |
|---------------------------------|-----------------|
| Lumens Per Lamp                 | N.A. (absolute) |
| Total Lamp Lumens               | N.A. (absolute) |
| Luminaire Lumens                | 8001            |
| Total Luminaire Efficiency      | N.A.            |
| Luminaire Efficacy Rating (LER) | 89              |
| Total Luminaire Watts           | 90.2            |
| Ballast Factor                  | 1.00            |
| CIE Type                        | Direct          |
| Spacing Criterion (0-180)       | 1.48            |
| Spacing Criterion (90-270)      | 1.26            |
| Spacing Criterion (Diagonal)    | 1.28            |
| Basic Luminous Shape            | Rectangular     |
| Luminous Length (0-180)         | 0.44 ft         |
| Luminous Width (90-270)         | 3.77 ft         |
| Luminous Height                 | 0.00 ft         |

### LUMINANCE DATA (cd/sq.m)

| Angle In<br>Degrees | Average<br>0-Deg | Average<br>45-Deg | Average<br>90-Deg |
|---------------------|------------------|-------------------|-------------------|
| 45                  | 27093            | 25296             | 19398             |
| 55                  | 25759            | 23710             | 15947             |
| 65                  | 18266            | 19950             | 11797             |
| 75                  | 7941             | 10428             | 6555              |
| 85                  | 167              | 505               | 624               |

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## CANDELA TABULATION

|     | <u>0.0</u> | <u>22.5</u> | <u>45.0</u> | <u>67.5</u> | <u>90.0</u> | <u>112.5</u> | <u>135.0</u> | <u>157.5</u> | <u>180.0</u> | <u>202.5</u> |
|-----|------------|-------------|-------------|-------------|-------------|--------------|--------------|--------------|--------------|--------------|
| 0   | 3460.819   | 3460.819    | 3460.819    | 3460.819    | 3460.819    | 3460.819     | 3460.819     | 3460.819     | 3460.819     | 3460.819     |
| 5   | 3423.284   | 3440.807    | 3442.935    | 3484.541    | 3522.429    | 3480.846     | 3405.468     | 3347.490     | 3403.313     | 3304.329     |
| 10  | 3528.605   | 3540.793    | 3486.023    | 3460.580    | 3487.364    | 3389.458     | 3126.986     | 2856.102     | 2858.327     | 2787.722     |
| 15  | 3598.629   | 3595.026    | 3537.048    | 3428.883    | 3417.780    | 3231.108     | 2681.796     | 2542.122     | 2609.612     | 2527.369     |
| 20  | 3610.735   | 3603.151    | 3544.599    | 3381.289    | 3300.685    | 2908.797     | 2428.918     | 2266.534     | 2314.875     | 2253.974     |
| 25  | 3566.813   | 3556.732    | 3493.406    | 3286.669    | 3136.181    | 2559.344     | 2190.339     | 2004.096     | 2013.171     | 1993.430     |
| 30  | 3476.374   | 3464.932    | 3393.941    | 3157.936    | 2944.499    | 2328.869     | 1945.523     | 1745.892     | 1730.875     | 1736.522     |
| 35  | 3338.572   | 3339.855    | 3244.733    | 2961.323    | 2695.667    | 2083.711     | 1673.711     | 1466.682     | 1449.793     | 1459.903     |
| 40  | 3168.530   | 3167.630    | 3030.197    | 2739.744    | 2420.678    | 1829.123     | 1410.379     | 1216.740     | 1193.157     | 1211.328     |
| 45  | 2942.485   | 2946.857    | 2747.327    | 2481.188    | 2106.733    | 1564.180     | 1169.361     | 1007.206     | 966.196      | 1002.082     |
| 50  | 2652.592   | 2678.196    | 2431.121    | 2167.506    | 1763.446    | 1286.419     | 924.997      | 809.227      | 772.794      | 805.170      |
| 55  | 2269.283   | 2349.516    | 2088.789    | 1807.066    | 1404.877    | 1014.708     | 698.283      | 622.944      | 606.565      | 618.827      |
| 60  | 1755.545   | 1916.728    | 1725.866    | 1426.163    | 1072.377    | 744.405      | 513.782      | 450.346      | 440.378      | 446.040      |
| 65  | 1185.671   | 1361.120    | 1294.969    | 1068.393    | 765.725     | 488.831      | 348.165      | 287.317      | 272.156      | 282.921      |
| 70  | 705.830    | 827.552     | 829.759     | 727.172     | 491.639     | 293.083      | 192.263      | 149.446      | 143.457      | 145.120      |
| 75  | 315.693    | 390.467     | 414.527     | 372.127     | 260.571     | 145.427      | 82.911       | 70.669       | 76.037       | 67.938       |
| 80  | 65.871     | 89.391      | 119.765     | 107.577     | 89.710      | 43.454       | 30.831       | 29.988       | 30.463       | 28.204       |
| 85  | 2.233      | 5.823       | 6.759       | 7.312       | 8.347       | 4.826        | 5.094        | 5.043        | 5.963        | 4.336        |
| 90  | 0.000      | 0.000       | 0.000       | 0.000       | 0.000       | 0.000        | 0.000        | 0.000        | 0.000        | 0.000        |
| 95  | 0.000      | 0.000       | 0.000       | 0.000       | 0.000       | 0.000        | 0.000        | 0.000        | 0.000        | 0.000        |
| 100 | 0.000      | 0.000       | 0.000       | 0.000       | 0.000       | 0.000        | 0.000        | 0.000        | 0.000        | 0.000        |
| 105 | 0.000      | 0.000       | 0.000       | 0.000       | 0.000       | 0.000        | 0.000        | 0.000        | 0.000        | 0.000        |
| 110 | 0.000      | 0.000       | 0.000       | 0.000       | 0.000       | 0.000        | 0.000        | 0.000        | 0.000        | 0.000        |
| 115 | 0.000      | 0.000       | 0.000       | 0.000       | 0.000       | 0.000        | 0.000        | 0.000        | 0.000        | 0.000        |
| 120 | 0.000      | 0.000       | 0.000       | 0.000       | 0.000       | 0.000        | 0.000        | 0.000        | 0.000        | 0.000        |
| 125 | 0.000      | 0.000       | 0.000       | 0.000       | 0.000       | 0.000        | 0.000        | 0.000        | 0.000        | 0.000        |
| 130 | 0.000      | 0.000       | 0.000       | 0.000       | 0.000       | 0.000        | 0.000        | 0.000        | 0.000        | 0.000        |
| 135 | 0.000      | 0.000       | 0.000       | 0.000       | 0.000       | 0.000        | 0.000        | 0.000        | 0.000        | 0.000        |
| 140 | 0.000      | 0.000       | 0.000       | 0.000       | 0.000       | 0.000        | 0.000        | 0.000        | 0.000        | 0.000        |
| 145 | 0.000      | 0.000       | 0.000       | 0.000       | 0.000       | 0.000        | 0.000        | 0.000        | 0.000        | 0.000        |
| 150 | 0.000      | 0.000       | 0.000       | 0.000       | 0.000       | 0.000        | 0.000        | 0.000        | 0.000        | 0.000        |
| 155 | 0.000      | 0.000       | 0.000       | 0.000       | 0.000       | 0.000        | 0.000        | 0.000        | 0.000        | 0.000        |
| 160 | 0.000      | 0.000       | 0.000       | 0.000       | 0.000       | 0.000        | 0.000        | 0.000        | 0.000        | 0.000        |
| 165 | 0.000      | 0.000       | 0.000       | 0.000       | 0.000       | 0.000        | 0.000        | 0.000        | 0.000        | 0.000        |
| 170 | 0.000      | 0.000       | 0.000       | 0.000       | 0.000       | 0.000        | 0.000        | 0.000        | 0.000        | 0.000        |
| 175 | 0.000      | 0.000       | 0.000       | 0.000       | 0.000       | 0.000        | 0.000        | 0.000        | 0.000        | 0.000        |
| 180 | 0.000      | 0.000       | 0.000       | 0.000       | 0.000       | 0.000        | 0.000        | 0.000        | 0.000        | 0.000        |

## Vert. Horizontal Angles

|    | <u>225.0</u> | <u>247.5</u> | <u>270.0</u> | <u>292.5</u> | <u>315.0</u> | <u>337.5</u> | <u>360.0</u> |
|----|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| 0  | 3460.819     | 3460.819     | 3460.819     | 3460.819     | 3460.819     | 3460.819     | 3460.819     |
| 5  | 3357.123     | 3441.573     | 3518.143     | 3490.721     | 3444.031     | 3444.096     | 3423.284     |
| 10 | 2998.301     | 3328.753     | 3481.782     | 3465.963     | 3501.075     | 3556.044     | 3528.605     |
| 15 | 2662.259     | 3117.773     | 3409.108     | 3428.583     | 3547.016     | 3608.184     | 3598.629     |
| 20 | 2412.371     | 2764.163     | 3291.415     | 3375.408     | 3543.005     | 3613.418     | 3610.735     |
| 25 | 2176.085     | 2528.144     | 3130.699     | 3278.795     | 3486.429     | 3564.905     | 3566.813     |
| 30 | 1934.359     | 2316.110     | 2937.123     | 3147.569     | 3383.874     | 3467.922     | 3476.374     |
| 35 | 1667.332     | 2076.036     | 2698.657     | 2957.236     | 3231.974     | 3338.658     | 3338.572     |
| 40 | 1406.890     | 1824.040     | 2428.752     | 2727.782     | 3015.843     | 3156.067     | 3168.530     |
| 45 | 1164.846     | 1560.192     | 2127.565     | 2467.731     | 2739.951     | 2929.613     | 2942.485     |
| 50 | 921.498      | 1284.625     | 1788.565     | 2163.519     | 2419.260     | 2658.659     | 2652.592     |
| 55 | 696.468      | 1015.386     | 1443.552     | 1806.468     | 2080.515     | 2328.783     | 2269.283     |
| 60 | 513.114      | 746.757      | 1122.914     | 1431.745     | 1719.586     | 1898.387     | 1755.545     |

**IES INDOOR REPORT****PHOTOMETRIC FILENAME : MD4AERRG-4-L20-L50-8TW-A-DALI-UNV ALL ON 4000K\_.IES****CANDELA TABULATION - (Cont.)**

|            |         |         |         |          |          |          |          |
|------------|---------|---------|---------|----------|----------|----------|----------|
| <b>65</b>  | 347.986 | 492.659 | 820.150 | 1078.860 | 1291.879 | 1351.551 | 1185.671 |
| <b>70</b>  | 192.153 | 298.455 | 545.047 | 742.134  | 829.361  | 816.787  | 705.830  |
| <b>75</b>  | 81.974  | 151.448 | 301.648 | 388.754  | 418.165  | 380.200  | 315.693  |
| <b>80</b>  | 30.661  | 47.640  | 113.633 | 123.196  | 126.633  | 84.875   | 65.871   |
| <b>85</b>  | 5.264   | 6.501   | 15.963  | 15.984   | 8.005    | 5.514    | 2.233    |
| <b>90</b>  | 0.000   | 0.000   | 0.000   | 0.000    | 0.000    | 0.000    | 0.000    |
| <b>95</b>  | 0.000   | 0.000   | 0.000   | 0.000    | 0.000    | 0.000    | 0.000    |
| <b>100</b> | 0.000   | 0.000   | 0.000   | 0.000    | 0.000    | 0.000    | 0.000    |
| <b>105</b> | 0.000   | 0.000   | 0.000   | 0.000    | 0.000    | 0.000    | 0.000    |
| <b>110</b> | 0.000   | 0.000   | 0.000   | 0.000    | 0.000    | 0.000    | 0.000    |
| <b>115</b> | 0.000   | 0.000   | 0.000   | 0.000    | 0.000    | 0.000    | 0.000    |
| <b>120</b> | 0.000   | 0.000   | 0.000   | 0.000    | 0.000    | 0.000    | 0.000    |
| <b>125</b> | 0.000   | 0.000   | 0.000   | 0.000    | 0.000    | 0.000    | 0.000    |
| <b>130</b> | 0.000   | 0.000   | 0.000   | 0.000    | 0.000    | 0.000    | 0.000    |
| <b>135</b> | 0.000   | 0.000   | 0.000   | 0.000    | 0.000    | 0.000    | 0.000    |
| <b>140</b> | 0.000   | 0.000   | 0.000   | 0.000    | 0.000    | 0.000    | 0.000    |
| <b>145</b> | 0.000   | 0.000   | 0.000   | 0.000    | 0.000    | 0.000    | 0.000    |
| <b>150</b> | 0.000   | 0.000   | 0.000   | 0.000    | 0.000    | 0.000    | 0.000    |
| <b>155</b> | 0.000   | 0.000   | 0.000   | 0.000    | 0.000    | 0.000    | 0.000    |
| <b>160</b> | 0.000   | 0.000   | 0.000   | 0.000    | 0.000    | 0.000    | 0.000    |
| <b>165</b> | 0.000   | 0.000   | 0.000   | 0.000    | 0.000    | 0.000    | 0.000    |
| <b>170</b> | 0.000   | 0.000   | 0.000   | 0.000    | 0.000    | 0.000    | 0.000    |
| <b>175</b> | 0.000   | 0.000   | 0.000   | 0.000    | 0.000    | 0.000    | 0.000    |
| <b>180</b> | 0.000   | 0.000   | 0.000   | 0.000    | 0.000    | 0.000    | 0.000    |

**IES INDOOR REPORT****PHOTOMETRIC FILENAME : MD4AERRG-4-L20-L50-8TW-A-DALI-UNV ALL ON 4000K\_.IES****ZONAL LUMEN SUMMARY**

| Zone    | Lumens  | %Lamp | %Fixt  |
|---------|---------|-------|--------|
| 0-20    | 1221.08 | N.A.  | 15.30  |
| 0-30    | 2545.61 | N.A.  | 31.80  |
| 0-40    | 4096.28 | N.A.  | 51.20  |
| 0-60    | 6906.23 | N.A.  | 86.30  |
| 0-80    | 7977.7  | N.A.  | 99.70  |
| 0-90    | 8001.28 | N.A.  | 100.00 |
| 10-90   | 7677.82 | N.A.  | 96.00  |
| 20-40   | 2875.19 | N.A.  | 35.90  |
| 20-50   | 4411.43 | N.A.  | 55.10  |
| 40-70   | 3602.91 | N.A.  | 45.00  |
| 60-80   | 1071.47 | N.A.  | 13.40  |
| 70-80   | 278.51  | N.A.  | 3.50   |
| 80-90   | 23.58   | N.A.  | 0.30   |
| 90-110  | 0.00    | N.A.  | 0.00   |
| 90-120  | 0.00    | N.A.  | 0.00   |
| 90-130  | 0.00    | N.A.  | 0.00   |
| 90-150  | 0.00    | N.A.  | 0.00   |
| 90-180  | 0.00    | N.A.  | 0.00   |
| 110-180 | 0.00    | N.A.  | 0.00   |
| 0-180   | 8001.28 | N.A.  | 100.00 |

Total Luminaire Efficiency = N.A. %

**ZONAL LUMEN SUMMARY**

| Zone    | Lumens  |
|---------|---------|
| 0-10    | 323.46  |
| 10-20   | 897.62  |
| 20-30   | 1324.52 |
| 30-40   | 1550.67 |
| 40-50   | 1536.23 |
| 50-60   | 1273.72 |
| 60-70   | 792.96  |
| 70-80   | 278.51  |
| 80-90   | 23.58   |
| 90-100  | 0.00    |
| 100-110 | 0.00    |
| 110-120 | 0.00    |
| 120-130 | 0.00    |
| 130-140 | 0.00    |
| 140-150 | 0.00    |
| 150-160 | 0.00    |
| 160-170 | 0.00    |
| 170-180 | 0.00    |

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## COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

Effective Floor Cavity Reflectance 0.20

| RC | 80  |     |     |     | 70  |     |     |     | 50  |     |     | 30  |     |     | 10  |     |     | 0   |
|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| RW | 70  | 50  | 30  | 10  | 70  | 50  | 30  | 10  | 50  | 30  | 10  | 50  | 30  | 10  | 50  | 30  | 10  | 0   |
| 0  | 119 | 119 | 119 | 119 | 116 | 116 | 116 | 116 | 111 | 111 | 111 | 106 | 106 | 106 | 102 | 102 | 102 | 100 |
| 1  | 110 | 106 | 102 | 99  | 108 | 104 | 100 | 97  | 100 | 97  | 94  | 96  | 94  | 92  | 92  | 90  | 89  | 87  |
| 2  | 101 | 94  | 88  | 82  | 99  | 92  | 86  | 81  | 88  | 84  | 80  | 85  | 81  | 78  | 82  | 79  | 76  | 74  |
| 3  | 93  | 83  | 76  | 70  | 90  | 82  | 75  | 69  | 79  | 73  | 68  | 76  | 71  | 67  | 73  | 69  | 66  | 63  |
| 4  | 85  | 74  | 66  | 60  | 83  | 73  | 65  | 59  | 70  | 64  | 58  | 68  | 62  | 58  | 66  | 61  | 57  | 55  |
| 5  | 79  | 67  | 58  | 52  | 77  | 65  | 58  | 52  | 63  | 56  | 51  | 61  | 55  | 50  | 60  | 54  | 50  | 48  |
| 6  | 73  | 60  | 52  | 46  | 71  | 59  | 51  | 45  | 57  | 50  | 45  | 56  | 49  | 45  | 54  | 49  | 44  | 42  |
| 7  | 68  | 55  | 46  | 40  | 66  | 54  | 46  | 40  | 52  | 45  | 40  | 51  | 45  | 40  | 50  | 44  | 39  | 38  |
| 8  | 63  | 50  | 42  | 36  | 62  | 49  | 42  | 36  | 48  | 41  | 36  | 47  | 40  | 36  | 46  | 40  | 35  | 34  |
| 9  | 59  | 46  | 38  | 33  | 58  | 45  | 38  | 33  | 44  | 37  | 32  | 43  | 37  | 32  | 42  | 36  | 32  | 30  |
| 10 | 55  | 43  | 35  | 30  | 54  | 42  | 35  | 30  | 41  | 34  | 30  | 40  | 34  | 29  | 39  | 33  | 29  | 28  |

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## UGR TABLE - CORRECTED

### Reflectances

|                |    |    |    |    |    |    |    |    |    |    |
|----------------|----|----|----|----|----|----|----|----|----|----|
| Ceiling Cavity | 70 | 70 | 50 | 50 | 30 | 70 | 70 | 50 | 50 | 30 |
| Walls          | 50 | 30 | 50 | 30 | 30 | 50 | 30 | 50 | 30 | 30 |
| Floor Cavity   | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 |

### Room Size UGR Viewed Crosswise

| X=2H | Y=2H | 25.1 | 26.7 | 25.5 | 27.0 | 27.3 | 21.7 | 23.2 | 22.0 | 23.5 | 23.8 |
|------|------|------|------|------|------|------|------|------|------|------|------|
|      | 3H   | 26.1 | 27.5 | 26.5 | 27.8 | 28.1 | 22.8 | 24.1 | 23.1 | 24.5 | 24.8 |
|      | 4H   | 26.2 | 27.5 | 26.6 | 27.9 | 28.2 | 23.0 | 24.3 | 23.4 | 24.6 | 25.0 |
|      | 6H   | 26.2 | 27.4 | 26.6 | 27.8 | 28.2 | 23.0 | 24.2 | 23.5 | 24.6 | 25.0 |
|      | 8H   | 26.2 | 27.3 | 26.6 | 27.7 | 28.1 | 23.0 | 24.2 | 23.5 | 24.6 | 25.0 |
|      | 12H  | 26.1 | 27.2 | 26.6 | 27.6 | 28.1 | 23.0 | 24.1 | 23.4 | 24.5 | 24.9 |

### UGR Viewed Endwise

|    |     |      |      |      |      |      |      |      |      |      |      |
|----|-----|------|------|------|------|------|------|------|------|------|------|
| 4H | 2H  | 25.5 | 26.8 | 25.9 | 27.2 | 27.5 | 22.3 | 23.6 | 22.7 | 24.0 | 24.3 |
|    | 3H  | 26.6 | 27.7 | 27.1 | 28.1 | 28.5 | 23.5 | 24.6 | 24.0 | 25.0 | 25.4 |
|    | 4H  | 26.9 | 27.8 | 27.3 | 28.2 | 28.7 | 23.8 | 24.8 | 24.3 | 25.2 | 25.6 |
|    | 6H  | 26.9 | 27.7 | 27.3 | 28.1 | 28.6 | 23.9 | 24.8 | 24.4 | 25.2 | 25.7 |
|    | 8H  | 26.8 | 27.6 | 27.3 | 28.1 | 28.5 | 23.9 | 24.7 | 24.4 | 25.1 | 25.6 |
|    | 12H | 26.8 | 27.5 | 27.3 | 28.0 | 28.4 | 23.9 | 24.6 | 24.4 | 25.1 | 25.5 |

|    |     |      |      |      |      |      |      |      |      |      |      |
|----|-----|------|------|------|------|------|------|------|------|------|------|
| 8H | 4H  | 26.9 | 27.7 | 27.4 | 28.1 | 28.6 | 23.9 | 24.7 | 24.4 | 25.2 | 25.6 |
|    | 6H  | 26.9 | 27.6 | 27.4 | 28.1 | 28.5 | 24.0 | 24.7 | 24.5 | 25.2 | 25.6 |
|    | 8H  | 26.9 | 27.5 | 27.4 | 28.0 | 28.5 | 24.0 | 24.6 | 24.5 | 25.1 | 25.6 |
|    | 12H | 26.9 | 27.4 | 27.4 | 27.9 | 28.4 | 24.0 | 24.5 | 24.5 | 25.0 | 25.6 |

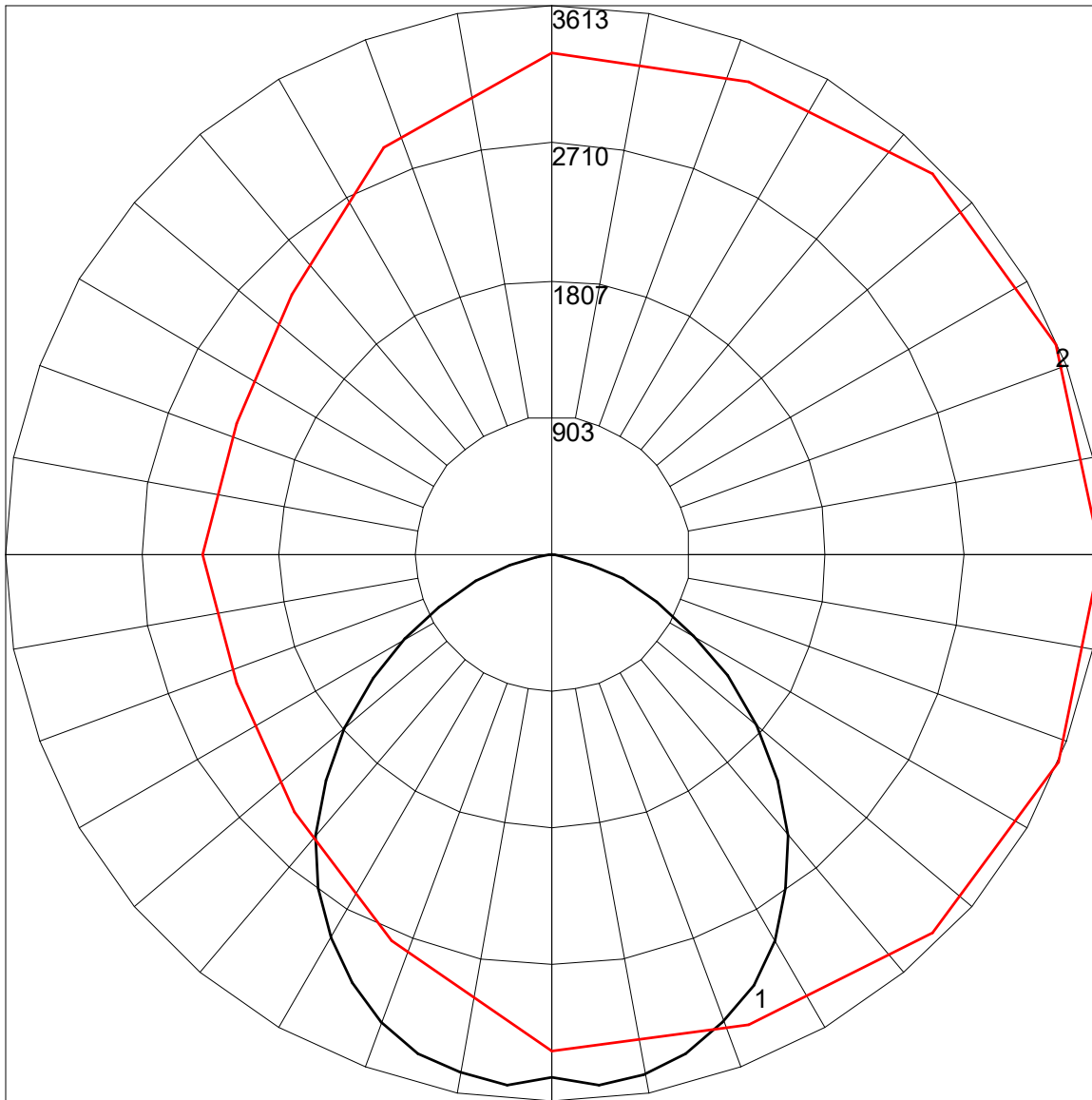
|     |    |      |      |      |      |      |      |      |      |      |      |
|-----|----|------|------|------|------|------|------|------|------|------|------|
| 12H | 4H | 26.9 | 27.6 | 27.4 | 28.1 | 28.5 | 23.9 | 24.6 | 24.4 | 25.1 | 25.6 |
|     | 6H | 26.9 | 27.5 | 27.4 | 27.9 | 28.5 | 24.0 | 24.6 | 24.5 | 25.0 | 25.6 |
|     | 8H | 26.9 | 27.4 | 27.4 | 27.9 | 28.4 | 24.0 | 24.5 | 24.5 | 25.0 | 25.6 |

Maximum UGR = 28.7

# IES INDOOR REPORT

PHOTOMETRIC FILENAME : MD4AERRG-4-L20-L50-8TW-A-DALI-UNV ALL ON 4000K\_.IES

## POLAR GRAPH



Maximum Candela = 3613.418 Located At Horizontal Angle = 337.5, Vertical Angle = 20

# 1 - Vertical Plane Through Horizontal Angles (90 - 270)

# 2 - Horizontal Cone Through Vertical Angle (20) (Through Max. Cd.)