



# itl boulder

THE LIGHT CENTER OF THE INDUSTRY SINCE 1955

INDEPENDENT TESTING LABORATORIES, INC.  
3386 LONGHORN ROAD, BOULDER, CO 80302 USA

PHONE: (303)442-1255 • FAX: (303)449-5274 • E-MAIL: itl@itlboulder.com • WEBSITE: www.itlboulder.com

REPORT NUMBER: ITL59331

DATE: 10/20/07

PREPARED FOR: OXYGEN LIGHTING

CATALOG NUMBER: 16-6-24-F313

LUMINAIRE: FABRICATED WHITE PAINTED METAL REFLECTOR AND BALLAST HOUSING,  
FABRICATED WHITE PAINTED METAL LENS SPACER ASSEMBLY,  
FABRICATED SPECULAR GOLD FINISHED METAL BOTTOM PLATE AND TOP  
MOUNTING STEM, FROSTED TRANSLUCENT WHITE SEMI-HEMISPHERICAL  
GLASS DROP LENS.

LAMPS: THREE 13-WATT DOUBLE TWIN TUBE COMPACT  
FLUORESCENTS, SYLVANIA CF13DD/E/827,  
LAMPS HORIZONTAL WITH TUBES HORIZONTAL.

BALLASTS: TWO ANTRON ELECTRONICS CSD-UV18P

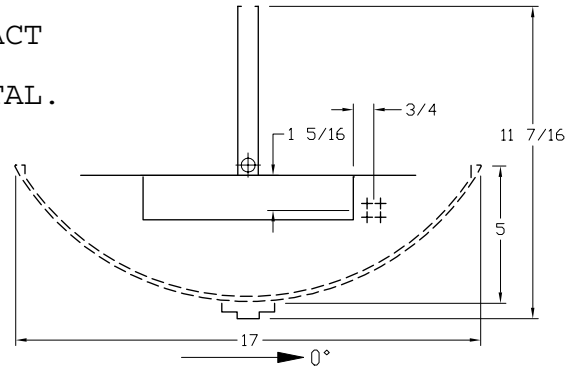
MOUNTING: PENDANT

TOTAL REFLECTANCE OF PAINT= 73.9 %

TOTAL INPUT WATTS= 45.0 AT 120.0 VOLTS

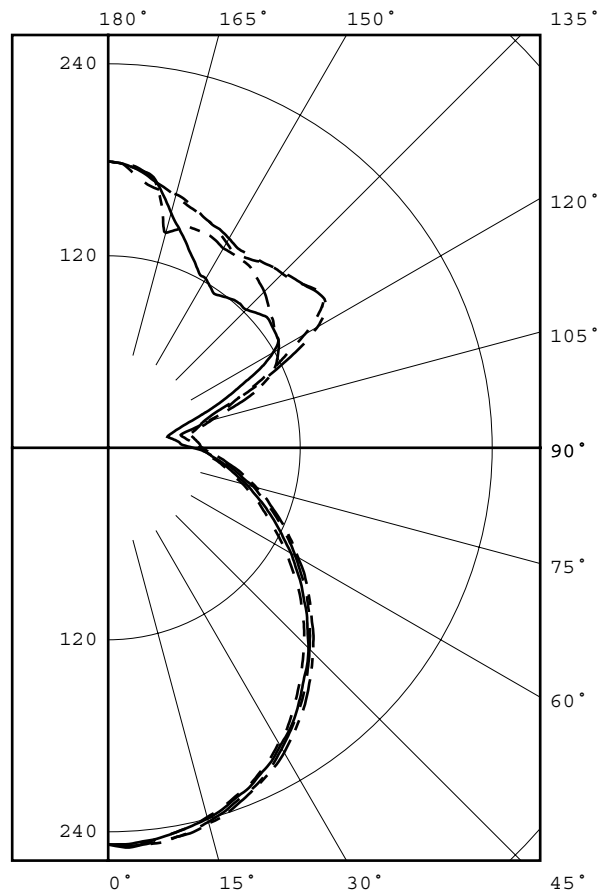
REPORT IS BASED ON 900 LUMENS PER LAMP.

\*\* (explanation follows) \*\*



### CANDELA DISTRIBUTION

|     | 0.0 | 90.0 | 180.0 | 270.0 | FLUX |
|-----|-----|------|-------|-------|------|
| 0   | 248 | 248  | 248   | 248   | 24   |
| 5   | 248 | 247  | 249   | 249   | 68   |
| 15  | 239 | 240  | 243   | 242   | 105  |
| 25  | 224 | 225  | 229   | 228   | 128  |
| 35  | 201 | 204  | 208   | 205   | 137  |
| 45  | 173 | 177  | 181   | 178   | 133  |
| 55  | 143 | 147  | 152   | 150   | 118  |
| 65  | 113 | 117  | 123   | 121   | 97   |
| 75  | 87  | 90   | 96    | 94    | 74   |
| 85  | 64  | 66   | 70    | 67    | 57   |
| 90  | 56  | 51   | 56    | 56    | 66   |
| 95  | 55  | 44   | 51    | 55    | 111  |
| 105 | 67  | 45   | 65    | 61    | 131  |
| 115 | 111 | 91   | 114   | 116   | 112  |
| 125 | 164 | 127  | 127   | 164   | 90   |
| 135 | 154 | 122  | 138   | 155   | 68   |
| 145 | 146 | 117  | 144   | 149   | 44   |
| 155 | 154 | 128  | 147   | 154   | 17   |
| 165 | 164 | 152  | 139   | 163   |      |
| 175 | 173 | 176  | 177   | 176   |      |
| 180 | 179 | 179  | 179   | 179   |      |



### ZONAL LUMEN SUMMARY

| ZONE   | LUMENS | %LAMP | %FIXT |
|--------|--------|-------|-------|
| 0- 30  | 196    | 7.3   | 12.4  |
| 0- 40  | 324    | 12.0  | 20.5  |
| 0- 60  | 595    | 22.0  | 37.7  |
| 0- 90  | 884    | 32.7  | 56.0  |
| 90-120 | 234    | 8.7   | 14.8  |
| 90-130 | 364    | 13.5  | 23.1  |
| 90-150 | 566    | 21.0  | 35.8  |
| 90-180 | 695    | 25.7  | 44.0  |
| 0-180  | 1579   | 58.5  | 100.0 |

TOTAL LUMINAIRE EFFICIENCY = 58.5 %

CIE TYPE - DIRECT-INDIRECT

PLANE : 0-DEG 90-DEG 180-DEG

SPACING CRITERIA : 1.3 1.3 1.3

Checked B. HYRE

Approved R. BEATTIE



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CANDELA DISTRIBUTION

|       | 0.0 | 22.5 | 45.0 | 67.5 | 90.0 | 112.5 | 135.0 | 157.5 | 180.0 | 202.5 |
|-------|-----|------|------|------|------|-------|-------|-------|-------|-------|
| 0.0   | 248 | 248  | 248  | 248  | 248  | 248   | 248   | 248   | 248   | 248   |
| 5.0   | 248 | 248  | 249  | 248  | 247  | 246   | 248   | 248   | 249   | 248   |
| 10.0  | 244 | 244  | 246  | 245  | 244  | 244   | 245   | 246   | 247   | 246   |
| 15.0  | 239 | 240  | 241  | 240  | 240  | 240   | 241   | 242   | 243   | 242   |
| 20.0  | 232 | 233  | 234  | 234  | 233  | 233   | 235   | 237   | 237   | 236   |
| 25.0  | 224 | 225  | 225  | 226  | 225  | 226   | 228   | 229   | 229   | 228   |
| 30.0  | 213 | 214  | 215  | 216  | 215  | 217   | 218   | 220   | 220   | 219   |
| 35.0  | 201 | 202  | 202  | 204  | 204  | 205   | 206   | 208   | 208   | 207   |
| 40.0  | 187 | 189  | 188  | 191  | 190  | 193   | 193   | 196   | 195   | 195   |
| 45.0  | 173 | 175  | 174  | 178  | 177  | 179   | 179   | 183   | 181   | 182   |
| 50.0  | 158 | 161  | 160  | 163  | 162  | 165   | 165   | 168   | 166   | 166   |
| 55.0  | 143 | 146  | 146  | 148  | 147  | 149   | 150   | 154   | 152   | 152   |
| 60.0  | 128 | 131  | 131  | 134  | 132  | 133   | 135   | 139   | 137   | 137   |
| 65.0  | 113 | 118  | 118  | 119  | 117  | 119   | 120   | 125   | 123   | 122   |
| 70.0  | 100 | 103  | 104  | 106  | 103  | 105   | 106   | 112   | 109   | 108   |
| 75.0  | 87  | 91   | 91   | 93   | 90   | 92    | 93    | 98    | 96    | 94    |
| 80.0  | 75  | 78   | 78   | 80   | 77   | 80    | 80    | 85    | 83    | 82    |
| 85.0  | 64  | 66   | 65   | 67   | 66   | 69    | 69    | 71    | 70    | 70    |
| 90.0  | 56  | 55   | 54   | 55   | 51   | 57    | 57    | 58    | 56    | 57    |
| 95.0  | 55  | 54   | 52   | 49   | 44   | 51    | 56    | 54    | 51    | 50    |
| 100.0 | 53  | 54   | 48   | 43   | 38   | 49    | 55    | 52    | 46    | 47    |
| 105.0 | 67  | 61   | 54   | 59   | 45   | 56    | 69    | 57    | 65    | 69    |
| 110.0 | 83  | 75   | 71   | 94   | 65   | 67    | 79    | 77    | 94    | 104   |
| 115.0 | 111 | 105  | 97   | 116  | 91   | 99    | 109   | 111   | 114   | 129   |
| 120.0 | 142 | 136  | 124  | 120  | 119  | 135   | 139   | 142   | 123   | 135   |
| 125.0 | 164 | 156  | 137  | 121  | 127  | 152   | 164   | 155   | 127   | 137   |
| 130.0 | 159 | 157  | 140  | 122  | 128  | 147   | 163   | 154   | 132   | 139   |
| 135.0 | 154 | 153  | 140  | 129  | 122  | 145   | 158   | 152   | 138   | 138   |
| 140.0 | 151 | 151  | 141  | 136  | 121  | 144   | 157   | 150   | 142   | 139   |
| 145.0 | 146 | 149  | 143  | 139  | 117  | 141   | 154   | 149   | 144   | 143   |
| 150.0 | 148 | 152  | 146  | 139  | 122  | 144   | 149   | 152   | 144   | 145   |
| 155.0 | 154 | 156  | 150  | 134  | 128  | 151   | 134   | 155   | 147   | 148   |
| 160.0 | 159 | 160  | 151  | 132  | 139  | 157   | 154   | 143   | 147   | 150   |
| 165.0 | 164 | 161  | 155  | 143  | 152  | 165   | 165   | 154   | 139   | 152   |
| 170.0 | 165 | 164  | 162  | 164  | 170  | 174   | 174   | 174   | 169   | 172   |
| 175.0 | 173 | 173  | 172  | 175  | 176  | 178   | 180   | 179   | 177   | 178   |
| 180.0 | 179 | 179  | 179  | 179  | 179  | 179   | 179   | 179   | 179   | 179   |



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CANDELA DISTRIBUTION

|       | 225.0 | 247.5 | 270.0 | 292.5 | 315.0 | 337.5 | 360.0 |
|-------|-------|-------|-------|-------|-------|-------|-------|
| 0.0   | 248   | 248   | 248   | 248   | 248   | 248   | 248   |
| 5.0   | 248   | 247   | 249   | 249   | 249   | 247   | 248   |
| 10.0  | 246   | 245   | 247   | 246   | 245   | 244   | 244   |
| 15.0  | 242   | 242   | 242   | 242   | 240   | 239   | 239   |
| 20.0  | 236   | 235   | 235   | 235   | 233   | 232   | 232   |
| 25.0  | 228   | 228   | 228   | 228   | 224   | 224   | 224   |
| 30.0  | 218   | 218   | 217   | 217   | 212   | 214   | 213   |
| 35.0  | 206   | 207   | 205   | 206   | 200   | 201   | 201   |
| 40.0  | 193   | 194   | 192   | 193   | 187   | 188   | 187   |
| 45.0  | 180   | 181   | 178   | 179   | 173   | 175   | 173   |
| 50.0  | 165   | 166   | 164   | 165   | 159   | 160   | 158   |
| 55.0  | 149   | 151   | 150   | 150   | 144   | 144   | 143   |
| 60.0  | 134   | 137   | 135   | 136   | 129   | 129   | 128   |
| 65.0  | 119   | 122   | 121   | 122   | 116   | 114   | 113   |
| 70.0  | 104   | 108   | 107   | 108   | 102   | 101   | 100   |
| 75.0  | 91    | 94    | 94    | 94    | 89    | 88    | 87    |
| 80.0  | 79    | 82    | 80    | 81    | 76    | 76    | 75    |
| 85.0  | 68    | 70    | 67    | 68    | 64    | 65    | 64    |
| 90.0  | 56    | 57    | 56    | 55    | 55    | 55    | 56    |
| 95.0  | 53    | 56    | 55    | 51    | 51    | 51    | 55    |
| 100.0 | 51    | 58    | 53    | 46    | 44    | 47    | 53    |
| 105.0 | 67    | 78    | 61    | 61    | 53    | 57    | 67    |
| 110.0 | 95    | 98    | 81    | 89    | 93    | 79    | 83    |
| 115.0 | 131   | 129   | 116   | 114   | 119   | 111   | 111   |
| 120.0 | 164   | 160   | 151   | 130   | 128   | 143   | 142   |
| 125.0 | 163   | 168   | 164   | 136   | 127   | 150   | 164   |
| 130.0 | 156   | 160   | 159   | 137   | 130   | 147   | 159   |
| 135.0 | 152   | 156   | 155   | 139   | 132   | 146   | 154   |
| 140.0 | 144   | 153   | 151   | 142   | 135   | 140   | 151   |
| 145.0 | 140   | 148   | 149   | 144   | 140   | 136   | 146   |
| 150.0 | 146   | 150   | 151   | 146   | 143   | 141   | 148   |
| 155.0 | 152   | 155   | 154   | 149   | 145   | 147   | 154   |
| 160.0 | 157   | 159   | 158   | 151   | 145   | 152   | 159   |
| 165.0 | 162   | 165   | 163   | 157   | 150   | 158   | 164   |
| 170.0 | 171   | 171   | 169   | 168   | 161   | 163   | 165   |
| 175.0 | 178   | 177   | 176   | 175   | 173   | 173   | 173   |
| 180.0 | 179   | 179   | 179   | 179   | 179   | 179   | 179   |



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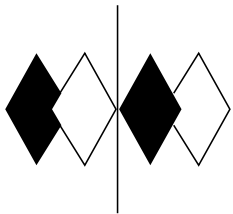
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ZONAL LUMEN SUMMARY

|         |     |
|---------|-----|
| 0- 5    | 6.  |
| 5- 10   | 18. |
| 10- 15  | 29. |
| 15- 20  | 39. |
| 20- 25  | 48. |
| 25- 30  | 56. |
| 30- 35  | 62. |
| 35- 40  | 66. |
| 40- 45  | 68. |
| 45- 50  | 69. |
| 50- 55  | 68. |
| 55- 60  | 65. |
| 60- 65  | 61. |
| 65- 70  | 57. |
| 70- 75  | 52. |
| 75- 80  | 46. |
| 80- 85  | 40. |
| 85- 90  | 34. |
| 90- 95  | 30. |
| 95-100  | 27. |
| 100-105 | 29. |
| 105-110 | 37. |
| 110-115 | 50. |
| 115-120 | 61. |
| 120-125 | 67. |
| 125-130 | 64. |
| 130-135 | 58. |
| 135-140 | 53. |
| 140-145 | 48. |
| 145-150 | 42. |
| 150-155 | 37. |
| 155-160 | 31. |
| 160-165 | 25. |
| 165-170 | 19. |
| 170-175 | 12. |
| 175-180 | 4.  |



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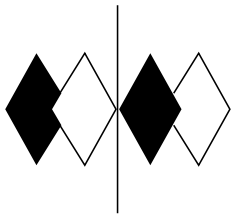
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COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

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  | 64 | 64 | 64 | 64 | 59 | 59 | 59 | 59 | 51 | 51 | 51 | 43 | 43 | 43 | 36 | 36 | 36 | 33 | 0 |
| 1  | 57 | 54 | 51 | 49 | 53 | 50 | 48 | 45 | 43 | 41 | 39 | 36 | 35 | 33 | 30 | 29 | 28 | 25 | 0 |
| 2  | 51 | 46 | 42 | 39 | 47 | 43 | 39 | 36 | 37 | 34 | 32 | 31 | 29 | 27 | 26 | 24 | 23 | 20 | 0 |
| 3  | 47 | 40 | 36 | 32 | 43 | 38 | 33 | 30 | 32 | 29 | 26 | 27 | 25 | 22 | 22 | 21 | 19 | 17 | 0 |
| 4  | 42 | 36 | 30 | 27 | 39 | 33 | 29 | 25 | 28 | 25 | 22 | 24 | 21 | 19 | 20 | 18 | 16 | 14 | 0 |
| 5  | 39 | 32 | 26 | 23 | 36 | 29 | 25 | 21 | 25 | 22 | 19 | 21 | 19 | 16 | 18 | 16 | 14 | 12 | 0 |
| 6  | 36 | 28 | 23 | 20 | 33 | 26 | 22 | 18 | 23 | 19 | 16 | 19 | 16 | 14 | 16 | 14 | 12 | 10 | 0 |
| 7  | 33 | 25 | 20 | 17 | 30 | 24 | 19 | 16 | 21 | 17 | 14 | 17 | 15 | 12 | 15 | 12 | 11 | 9  | 0 |
| 8  | 31 | 23 | 18 | 15 | 28 | 22 | 17 | 14 | 19 | 15 | 13 | 16 | 13 | 11 | 13 | 11 | 9  | 8  | 0 |
| 9  | 29 | 21 | 16 | 13 | 26 | 20 | 15 | 13 | 17 | 14 | 11 | 15 | 12 | 10 | 12 | 10 | 9  | 7  | 0 |
| 10 | 27 | 19 | 15 | 12 | 25 | 18 | 14 | 11 | 16 | 12 | 10 | 14 | 11 | 9  | 11 | 9  | 8  | 7  | 0 |

ALL CANDELA, LUMENS, LUMINANCE, COEFFICIENT OF UTILIZATION AND VCP VALUES IN THIS REPORT ARE BASED ON RELATIVE PHOTOMETRY WHICH ASSUMES A BALLAST FACTOR OF 1.000. ANY CALCULATIONS PREPARED FROM THESE DATA SHOULD INCLUDE AN APPROPRIATE BALLAST FACTOR.



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#### ADDENDUM

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The compact fluorescent lamps of the type used in this report require special attention in photometry and luminaire application. Specifically, the lamps generate lower flux output when operated in the horizontal position than when operated in the vertical position. Unfortunately, at the time of this report, only the vertical flux output (lumens) is available from lamp manufacturers.

It is critical to note that, all else equal, a horizontal lamp calibration will yield higher luminaire candela and efficiency than a vertical lamp calibration. However, for a report which was generated using a horizontal lamp calibration, any application calculations should use the actual flux output (lumens) from a horizontal lamp -- at this time, no such published lumen figures are available. For a report which was generated using a vertical lamp calibration, the flux output from a vertical lamp should be used. The published lamp lumen figure given on this report is for a vertical lamp. The lamp calibration for this report was performed with the lamp in the same orientation as when the lamp is in the luminaire.

CFL.DIS