



# TEST REPORT IES LM-79-08

## TÜV SÜD Test Report for Electrical and Photometric Measurements of Solid-State Lighting Products

|  |  |
|--|--|
| Report reference No. ....  | 70.402.17.014.42-08  |
| Date of issue .....  | 2018-09-01   |
| Project handler .....  | Mr. Kaishuang LI   |
| Testing laboratory .....   | TÜV SÜD Certification and Testing (China) Co., Ltd.<br>Shanghai Branch   |
| Address .....  | No. 151 Hengtong Road, 200070, Shanghai, P.R.China.  |
| Testing procedure .....  | <input type="checkbox"/> TMP <input type="checkbox"/> WMTL <input type="checkbox"/> SMTL <input type="checkbox"/> LTR  |
| Testing location .....   | No. 1999, Duhui Road, Shanghai, 201108, P. R. China  |
| Client .....   | Everlite LED Lighting Co., Limited   |
| Client number .....  | 91783  |
| Address .....  | Room 2105, Trend Centre, 29-31, Cheung Lee Street, Chaiwan,<br>Hong Kong   |
| Contact person .....   | Jackie ZHANG   |
| Standard .....   | This TÜV SÜD test program is based on the following requirements:<br>IES LM-79-08  |
| TRF originated by .....  | TÜV SÜD Product Service GmbH, Mr. Kenneth Lau  |
| Copyright blank test report .....  | This test report is based on the content of the standard (see above).<br>The test report considered selected clauses of the a.m. standard(s)<br>and experience gained with product testing. It was prepared by TÜV<br>SÜD Product Service GmbH.<br><br>TUV SUD Group takes no responsibility for and will not assume liability for<br>damages resulting from the reader's interpretation of the reproduced material due to its<br>placement and context. |
| Test procedure .....   | <input type="checkbox"/> TÜV Mark <input checked="" type="checkbox"/> without certification  |
| Non-standard test method .....   | N/A  |
| National deviations .....  | N/A  |
| Number of pages (Report) .....   | 18   |
| Number of pages (Attachments) .....  | N/A  |
| Compiled by .....  | Approved by .....  |
| (+ signature)  Mr. Kaishuang LI | (+ signature)  Ms. Lucy LU  |



|                                       |  |   |  |
|---------------------------------------|--|---|--|
| Test sample .....                     | LED Luminaire (LED Street Light)   |   |  |
| Type of test object .....             | Fixed  |   |  |
| Trade mark .....                      | N/A  |   |  |
| Model and/or type reference .....     | EL-SL18MA-60W-4000K  |   |  |
| Lens type .....                       | TYPE II  |   |  |
| Rating(s) .....                       | 90-305V AC, 50/60Hz, 60W, Class I, IP66  |   |  |
| Manufacturer .....                    | Ningbo Shishang Photoelectricity Technology Co., Ltd.                            |   |  |
| Manufacturer number .....             | 92974  |   |  |
| Address .....                         | No.19, KeSan Road, Ninghai, 315600, Ningbo, Zhejiang, People's Republic of China |   |  |
| Sub-contractors/ tests (clause) ..... | N/A  |   |  |
| Name .....                            | N/A  |   |  |
| Order description .....               | <input type="checkbox"/>   | Complete test according to TRF                          |  |
|                                       | <input checked="" type="checkbox"/>  | Partial test according to manufacturer's specifications |  |
|                                       | <input type="checkbox"/>   | Preliminary test  |  |
|                                       | <input type="checkbox"/>   | Spot check  |  |
|                                       | <input type="checkbox"/>   | Other:  |  |
| Date of order .....                   | 2017-12-29   |   |  |
| Date of receipt of test item .....    | 2018-08-27   |   |  |
| Date(s) of performance of test .....  | 2018-09-01   |   |  |
| Test item particulars (delared):      |  |   |  |
| Lamp type :                           | <input type="checkbox"/>   | Bare lamp   |  |
|                                       | <input type="checkbox"/>   | Covered lamp, no reflector                              |  |
|                                       | <input type="checkbox"/>   | Lamp with reflector                                     |  |
|                                       | <input checked="" type="checkbox"/>  | other: LED Street Light                                 |  |
| Lamp cap installed :                  | N/A  |   |  |
| Rated Votage (V) :                    | 90-305   |   |  |
| Rated Power (W) :                     | 60   |   |  |
| Rated Power Factor :                  | N/A  |   |  |
| Rated Luminous Flux (lm) :            | N/A  |   |  |
| Rated CCT (K) :                       | 4000   |   |  |
| Rated CRI :                           | N/A  |   |  |



Attachments:

1. Test Equipment List

General remarks:

"(see remark #)" refers to a remark appended to the report.

"(see appended table)" refers to a table appended to the report.

Throughout this report a comma is used as the decimal separator.

The test results presented in this report relate only to the object tested.

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Summary of testing:

☐ deviation(s) found

☒ no deviations found

The test was operated at 230V, 50Hz, in accordance with the applicant's instruction.

| Model               | Luminous Efficacy<br>(Lumens/Watt) | Total Luminous Flux<br>(Lumens) | Input Power<br>(Watts)          |
|---------------------|------------------------------------|---------------------------------|---------------------------------|
| EL-SL18MA-60W-4000K | 148,05                             | 9231,2                          | 62,35                           |
| Power Factor        | CCT (K)                            | CRI                             | Stabilisation Time<br>(minutes) |
| 0,9743              | 4003                               | 72,2                            | 90                              |

Copy of marking plate:

Not provide

Picture of the product:



Characteristic data

Dimension (mm, Height x Width x Length): 249mm\*273mm\*675mm

Weight: approximately : 6,8Kg

Purpose of the product

LED Street light for generally lighting purpose.

Possible test case verdicts:

- test case does not apply to the test object: .....: N(A.) / not included in the order
- test object does meet the requirement.....: P(ass)
- test object does not meet the requirement: .....: F(ail)

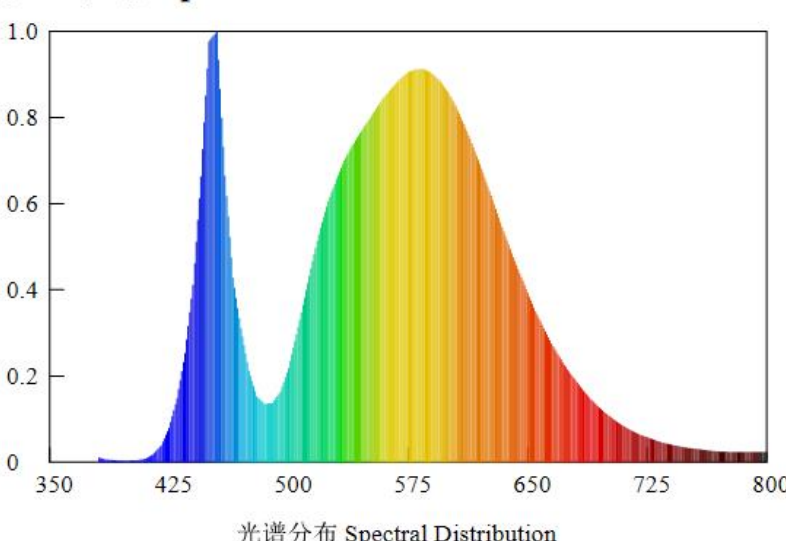
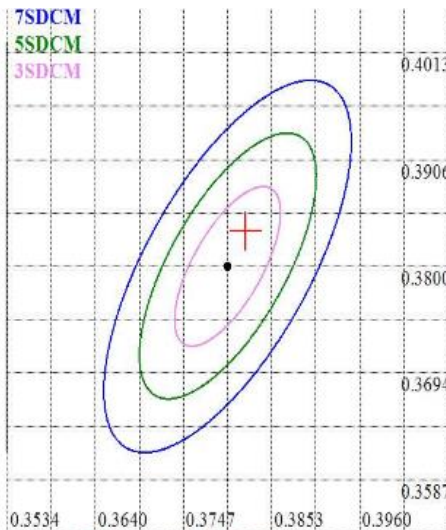
Possible suffixes to the verdicts:

- suffix for detailed information for the client.....: - C(omment)
- suffix for important information for factory inspection...: - M(anufacturing)

| Clause | Requirement   | Test | Measuring result                          | Remark | Verdict |
|--------|---|------|---|--------|---------|
| 2.0    | Ambient Conditions  |      |   |        | P       |
| 2.1    | General   |      |   |        | P       |
| 2.2    | Air Temperature   |      |   |        | P       |
| 2.3    | Thermal Condition for Mounting SSL Products                                     |      |   |        | P       |
| 2.4    | Air Movement  |      |   |        | P       |
| 3.0    | Power Supply Characteristics  |      |   |        | P       |
| 3.1    | Waveshape of AC power supply  |      |   |        | P       |
| 3.2    | Voltage regulation  |      |   |        | P       |
| 4.0    | Seasoning of SSL Product  |      | No seasoning of SSL product               |        | P       |
| 5.0    | Stabilisation of SSL Product  |      | Sufficiently satbilised before measurment |        | P       |
| 6.0    | Operation Orientation   |      |   |        | P       |
|        | SSL product shall be stabilized and measured in intended operating orientation  |      |   |        | P       |
| 7.0    | Electrical Settings   |      |   |        | P       |
|        | SSL product shall be operated at rated voltage                                  |      |   |        | P       |
|        | SSL product with dimming capability are tested at maximum input power condition |      |   |        | N/A     |
|        | SSL product with different modes are measured in all relvant modes              |      |   |        | N/A     |
| 8.0    | Electrical Instrumentations   |      |   |        | P       |
| 8.1    | Circuits  |      |   |        | P       |
| 8.2    | Uncertainties   |      |   |        | P       |
| 9.0    | Test methodes for Luminous Flux measurment                                      |      |   |        | P       |
| 9.1    | Integrating sphere with a spectroradiometer (Sphere-spectroradiometer system)   |      |   |        | N/A     |
| 9.2    | Integrating sphere with a photometer head (Sphere-photometer system)            |      |   |        | N/A     |
| 9.3    | Goniophotometer   |      |   |        | P       |
| 10.0   | Luminous Intensity Distribution   |      |   |        | P       |
|        | Reporting acc. to IEC LM-63   |      | See table 3                               |        | P       |
| 11.0   | Luminous Efficay  |      | See table 1                               |        | P       |
| 12.0   | Test Methodes for Color Characteristics of SSL Products                         |      |   |        | P       |
|        | Measurments   |      | See table 1                               |        | P       |
| 13.0   | Uncertainty statement   |      |   |        | P       |

| Table 1   | Test data                              |                                   |                              |
|---|--|-----------------------------------|------------------------------|
| Model   | EL-SL18MA-60W-4000K                    |                                   |                              |
| Rated Voltage (V):  | AC 90-305                              | Rated Power (W):                  | 60                           |
| Rated luminous flux (lm):   | N/A                                    | Ambient temperature 25 ±1°C (°C): | 25,3                         |
| Test item   |  | Measured Value                    |                              |
|   |  | Integrating Sphere                | Goniophotometer              |
| Key Photometric Results   |  |                                   |                              |
| Luminous Efficacy (Lumens/Watt)   | -                                      |                                   | 148,05                       |
| Total Luminous Flux (Lumens)  | -                                      |                                   | 9231,2                       |
| Correlated Color Temperature (CCT)  | 4003                                   |                                   | -                            |
| Color Rendering Index (CRI)   | 72,2                                   |                                   | -                            |
| Chromaticity (Chroma x / Chroma y)  | 0,3822/0,3835                          |                                   | -                            |
| Chromaticity (Chroma u / Chroma v)  | -                                      |                                   | -                            |
| Chromaticity (Chroma u' / Chroma v')  | 0,2236/0,5048                          |                                   | -                            |
| Duv Value   | 0,0026                                 |                                   | -                            |
| SDCM  | 1,34                                   |                                   | -                            |
| Color Angular Uniformity (Max. du'v')   | -                                      |                                   | -                            |
| Stabilization Time (Light and Power) (Minutes)  | 90                                     |                                   |                              |
| Total Run Time – Goniophotometer (Minutes)  | 150                                    |                                   |                              |
| Spacing Criteria  |  | C=15° / γ=1°                      |                              |
| Electrical Input Results  |  |                                   |                              |
| Input Power (Watts)   | -                                      |                                   | 62,35                        |
| Input Voltage (Volts AC)  | -                                      |                                   | 230,0                        |
| Input Current (Amps)  | -                                      |                                   | 0,2781                       |
| Input Frequency (Hertz)   | -                                      |                                   | 50,0                         |
| Power Factor  | -                                      |                                   | 0,9743                       |
| A-THD (Current – Total Harmonic Distortion)   | -                                      |                                   | -                            |
| Additional Information  |  |                                   |                              |
| Ambient Temperature (°C):   | 25,3                                   |                                   | 25,3                         |
| Photometric measurement condition   | -                                      |                                   | Photometric distance:<br>26m |
| Number of hours operated prior to measurement   | 0h                                     |                                   |                              |
| Orientation (burning position)  | Base up, center of the Goniophotometer |                                   |                              |
| Supplementary Information:  |  |                                   |                              |
| - Absorbtion Correction used: Yes   |  |                                   |                              |
| Stabilisation was considered reached by: the variation (maximum-minimum) of at least 3 readings |  |                                   |                              |
| - of the light output and electrical power over a period of 30 minutes is less than 0.5%.       |  |                                   |                              |

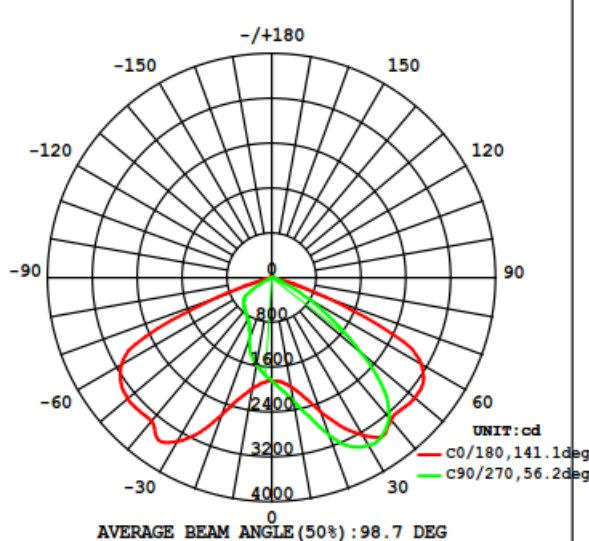


|  |   |
|--|---|
| <b>Table 2</b>   | <b>SPECTRAL DISTRIBUTION and CHROMATICITY DIAGRAM- CIE 1931</b> |
| <b>Model</b>   | EL-SL18MA-60W-4000K   |
| <p>The following graph shows the spectral response curve of the radiant flux for the sample: (350nm to 780nm – calibrated range of the Spectroradiometer)</p>  |   |
| <div>  <p>光谱分布 Spectral Distribution</p> </div> <div>  <p>7SDCM<br/>5SDCM<br/>3SDCM</p> <p>Nominal CCT:IEC_F4000<br/>x0=0.3822 v0=0.3835</p> </div> |   |

| Table 3           |        | LIGHT DISTRIBUTION DIAGRAM        |         |                   |      |
|-------------------|--------|-----------------------------------|---------|-------------------|------|
| Model:            |        | EL-SL18MA-60W-4000K               |         |                   |      |
| DATA OF LAMP      |        | PHOTOMETRIC DATA Eff: 148.05 lm/W |         |                   |      |
| MODEL             |        | I <sub>max</sub> (cd)             | 4860    | η street_up (%)   | 0.0  |
| NOMINAL POWER (W) | 60     | LOR (%)                           | 100     | η street_down (%) | 70.2 |
| RATED VOLTAGE (V) |        | TOTAL FLUX (lm)                   | 9231.2  | η house_up (%)    | 0.0  |
| NOMINAL FLUX (lm) | 9231.2 | MAXIMUM @ (C, γ )                 | 30,55.0 | η house_down (%)  | 29.6 |
| LAMPS INSIDE      | 1      | η up (%)                          | 0.0     | 76 FLASHAREA (m2) |      |
| TEST VOLTAGE (V)  | 230    | η down (%)                        | 100     | SLI               |      |

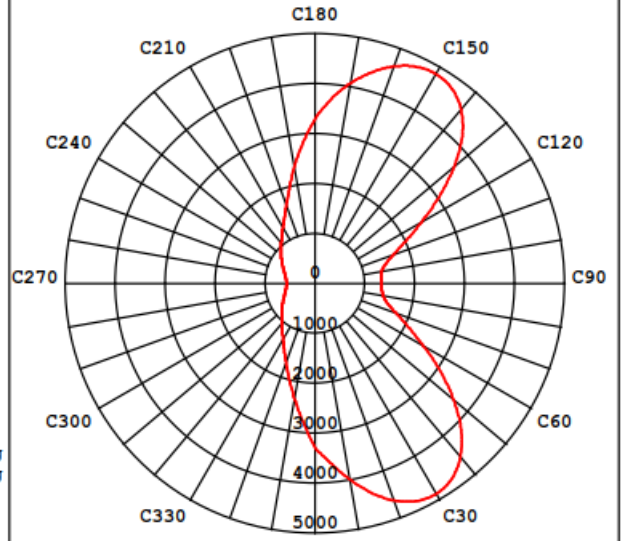
  

**INTENSITY DISTRIBUTION DIAGRAM  
IN C PLANS**



UNIT: cd  
— C0/180, 141.1deg  
— C90/270, 56.2deg  
AVERAGE BEAM ANGLE (50%): 98.7 DEG

**MAX INTENSITY CONE SURFACE  
DISTRIBUTION DIAGRAM**



C0  
HOUSE SIDE Max @ γ = 55.0DEG STREET SIDE

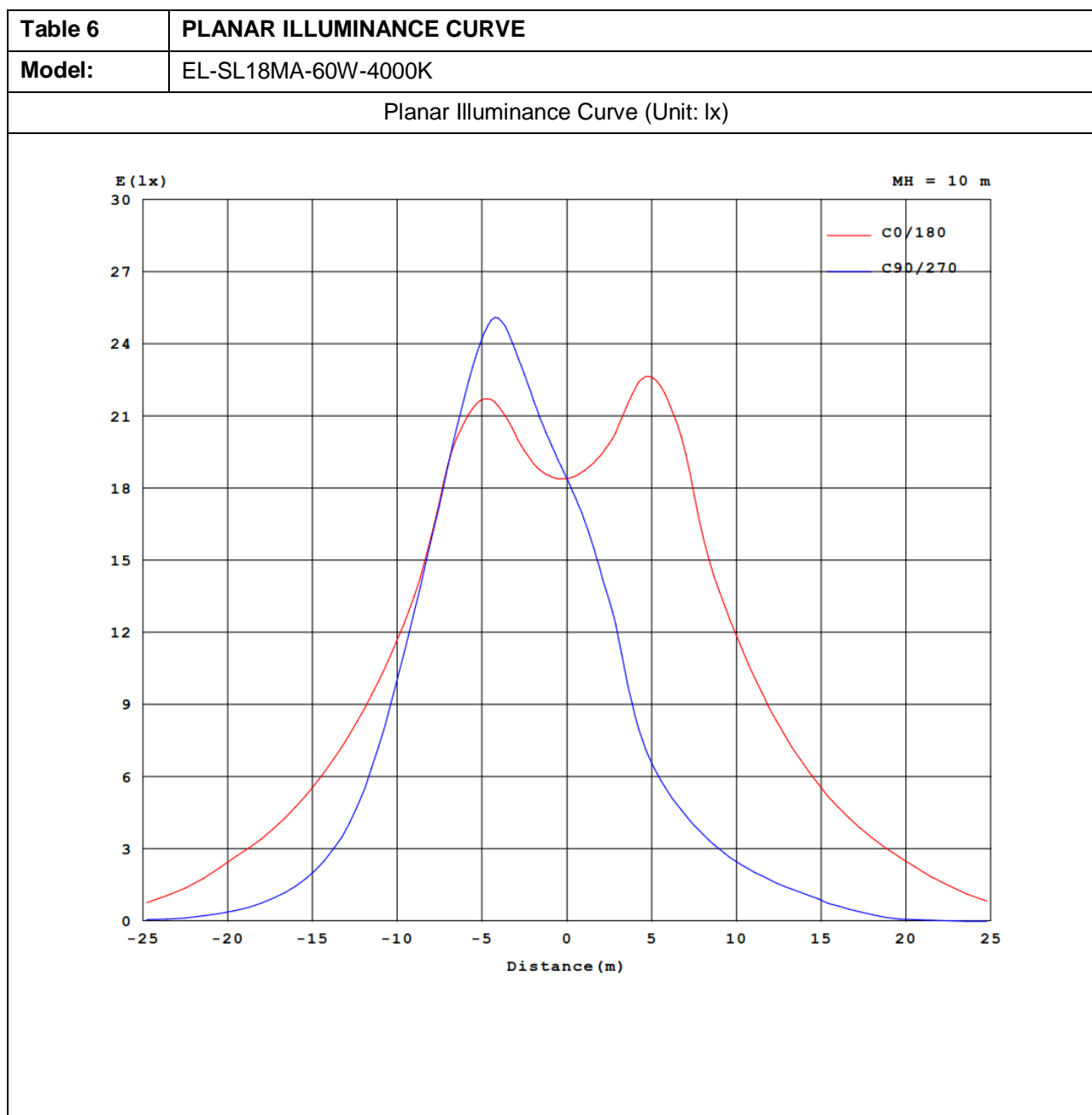


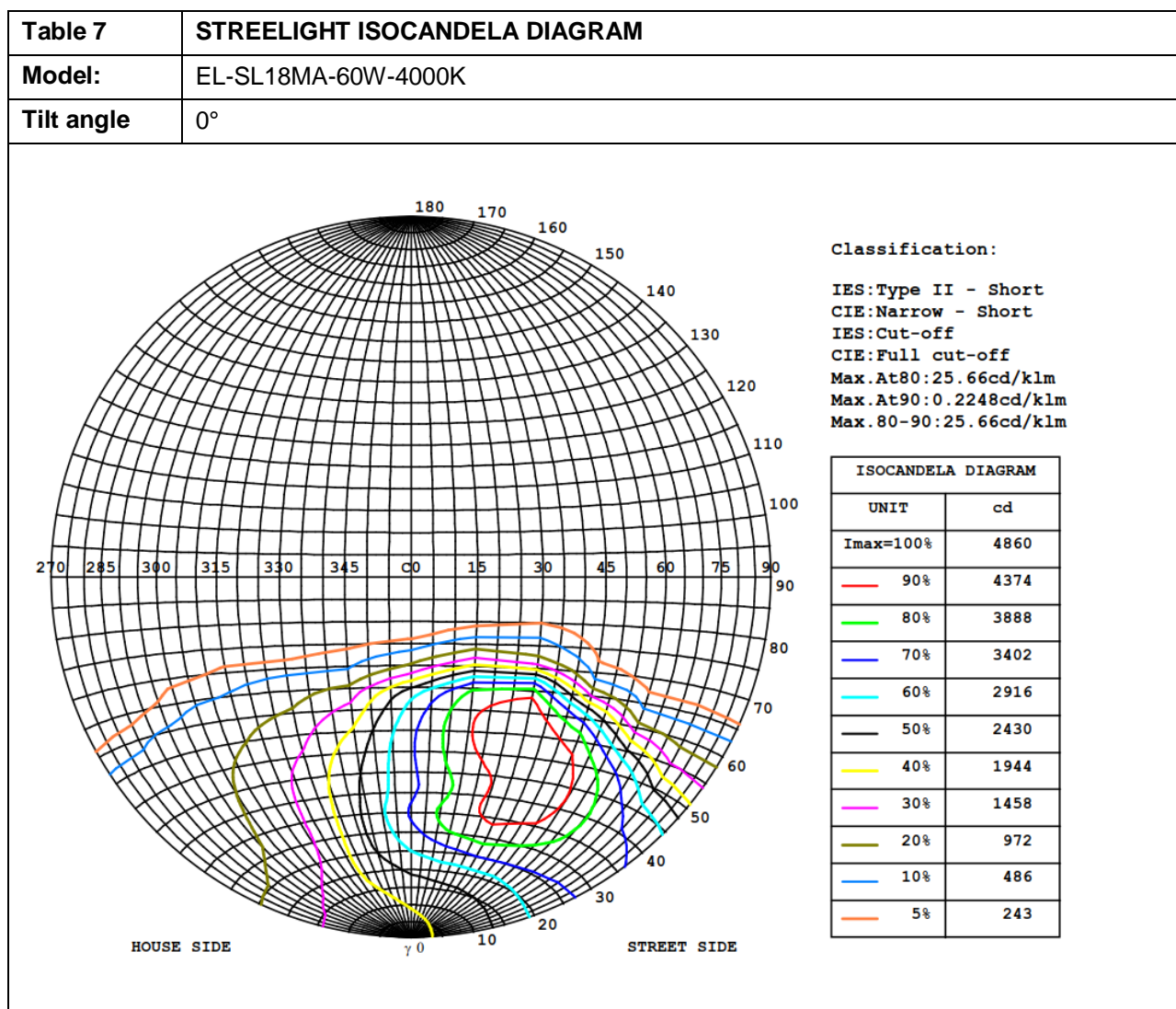
| Table 4a |  | LUMINOUS DISTRIBUTION INTENSITY DATA (unit: cd) |         |         |         |         |         |         |         |
|----------|--|---|---------|---------|---------|---------|---------|---------|---------|
| Model:   |  | EL-SL18MA-60W-4000K                             |         |         |         |         |         |         |         |
| y \ C    |  | 0   | 15      | 30      | 45      | 60      | 75      | 90      | 105     |
| 0        |  | 1840.43   | 1840.43 | 1840.43 | 1840.43 | 1840.43 | 1840.43 | 1840.43 | 1840.43 |
| 5        |  | 1998.13   | 1996.98 | 1987.16 | 1970.90 | 1949.49 | 1921.38 | 1887.47 | 1853.25 |
| 10       |  | 2229.42   | 2223.98 | 2200.14 | 2162.59 | 2122.31 | 2072.29 | 2008.24 | 1930.17 |
| 15       |  | 2563.74   | 2546.45 | 2492.26 | 2432.74 | 2383.58 | 2330.96 | 2226.01 | 2076.17 |
| 20       |  | 2980.74   | 2948.88 | 2879.02 | 2803.67 | 2793.22 | 2749.92 | 2598.69 | 2325.55 |
| 25       |  | 3326.59   | 3337.91 | 3379.79 | 3455.14 | 3487.33 | 3352.30 | 3041.34 | 2560.74 |
| 30       |  | 3457.29   | 3511.79 | 3666.72 | 3980.58 | 4204.91 | 3983.80 | 3376.22 | 2656.59 |
| 35       |  | 3442.39   | 3554.28 | 3875.79 | 4370.73 | 4560.03 | 4216.62 | 3537.19 | 2635.22 |
| 40       |  | 3258.80   | 3418.33 | 3926.25 | 4596.78 | 4614.92 | 3973.09 | 3342.10 | 2552.91 |
| 45       |  | 2843.10   | 3038.40 | 3804.42 | 4596.55 | 4629.27 | 4108.73 | 3359.17 | 2462.37 |
| 50       |  | 2085.24   | 2336.88 | 3411.27 | 4481.57 | 4804.03 | 4286.15 | 3358.72 | 2277.82 |
| 55       |  | 1346.10   | 1449.53 | 2458.23 | 4174.69 | 4842.70 | 4373.93 | 3291.47 | 1993.73 |
| 60       |  | 766.48  | 765.40  | 1144.91 | 3143.72 | 4741.72 | 4243.93 | 3098.52 | 1588.78 |
| 65       |  | 306.83  | 325.91  | 380.65  | 1381.33 | 3874.37 | 3780.17 | 2492.91 | 1069.95 |
| 70       |  | 135.22  | 135.86  | 165.22  | 331.87  | 1676.79 | 2027.73 | 1026.65 | 412.64  |
| 75       |  | 92.96   | 81.56   | 88.20   | 178.26  | 524.88  | 612.13  | 282.57  | 172.14  |
| 80       |  | 31.22   | 34.03   | 33.45   | 60.88   | 178.07  | 133.33  | 51.21   | 33.14   |
| 85       |  | 0.70  | 0.75    | 1.34    | 4.45    | 4.62    | 3.46    | 1.75    | 1.21    |
| 90       |  | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 95       |  | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 100      |  | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 105      |  | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 110      |  | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 115      |  | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 120      |  | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 125      |  | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 130      |  | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 135      |  | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 140      |  | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 145      |  | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 150      |  | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 155      |  | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 160      |  | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 165      |  | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 170      |  | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 175      |  | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 180      |  | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |

| Table 4b |  | LUMINOUS DISTRIBUTION INTENSITY DATA (unit: cd) |         |         |         |         |         |         |         |
|----------|--|---|---------|---------|---------|---------|---------|---------|---------|
| Model:   |  | EL-SL18MA-60W-4000K                             |         |         |         |         |         |         |         |
| y \ C    |  | 120   | 135     | 150     | 165     | 180     | 195     | 210     | 225     |
| 0        |  | 1840.43   | 1840.43 | 1840.43 | 1840.43 | 1840.43 | 1840.43 | 1840.43 | 1840.43 |
| 5        |  | 1817.72   | 1780.94 | 1750.85 | 1727.67 | 1717.92 | 1720.28 | 1737.67 | 1762.64 |
| 10       |  | 1842.90   | 1749.89 | 1667.00 | 1606.44 | 1581.03 | 1594.19 | 1643.48 | 1713.84 |
| 15       |  | 1897.73   | 1721.78 | 1573.00 | 1470.77 | 1430.35 | 1450.85 | 1536.39 | 1672.08 |
| 20       |  | 1962.59   | 1628.59 | 1380.07 | 1226.35 | 1171.66 | 1206.04 | 1342.15 | 1578.61 |
| 25       |  | 1937.59   | 1432.33 | 1139.93 | 1004.55 | 958.98  | 990.26  | 1115.43 | 1392.85 |
| 30       |  | 1893.12   | 1283.68 | 1017.43 | 900.43  | 860.31  | 889.49  | 1001.43 | 1250.17 |
| 35       |  | 1848.81   | 1256.30 | 960.02  | 842.94  | 803.41  | 835.06  | 947.17  | 1204.17 |
| 40       |  | 1807.39   | 1245.22 | 931.22  | 792.06  | 751.89  | 786.73  | 910.14  | 1185.64 |
| 45       |  | 1711.79   | 1198.51 | 903.40  | 744.49  | 703.72  | 740.03  | 875.93  | 1153.03 |
| 50       |  | 1540.16   | 1115.12 | 851.83  | 699.08  | 658.86  | 696.36  | 828.45  | 1082.09 |
| 55       |  | 1298.96   | 973.80  | 759.60  | 623.74  | 574.84  | 620.33  | 748.65  | 959.41  |
| 60       |  | 1018.00   | 780.24  | 566.50  | 432.85  | 313.91  | 430.31  | 573.94  | 790.33  |
| 65       |  | 711.35  | 492.44  | 346.92  | 130.93  | 61.12   | 126.87  | 356.57  | 519.76  |
| 70       |  | 351.65  | 263.40  | 166.26  | 37.52   | 15.19   | 35.61   | 167.13  | 283.03  |
| 75       |  | 121.86  | 84.35   | 28.50   | 5.04    | 0.37    | 5.39    | 29.07   | 88.73   |
| 80       |  | 19.15   | 6.82    | 0.67    | 0.08    | 0.07    | 0.16    | 0.94    | 9.81    |
| 85       |  | 1.05  | 0.40    | 0.15    | 0.11    | 0.09    | 0.16    | 0.27    | 0.51    |
| 90       |  | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 95       |  | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 100      |  | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 105      |  | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 110      |  | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 115      |  | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 120      |  | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 125      |  | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 130      |  | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 135      |  | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 140      |  | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 145      |  | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 150      |  | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 155      |  | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 160      |  | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 165      |  | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 170      |  | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 175      |  | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 180      |  | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |

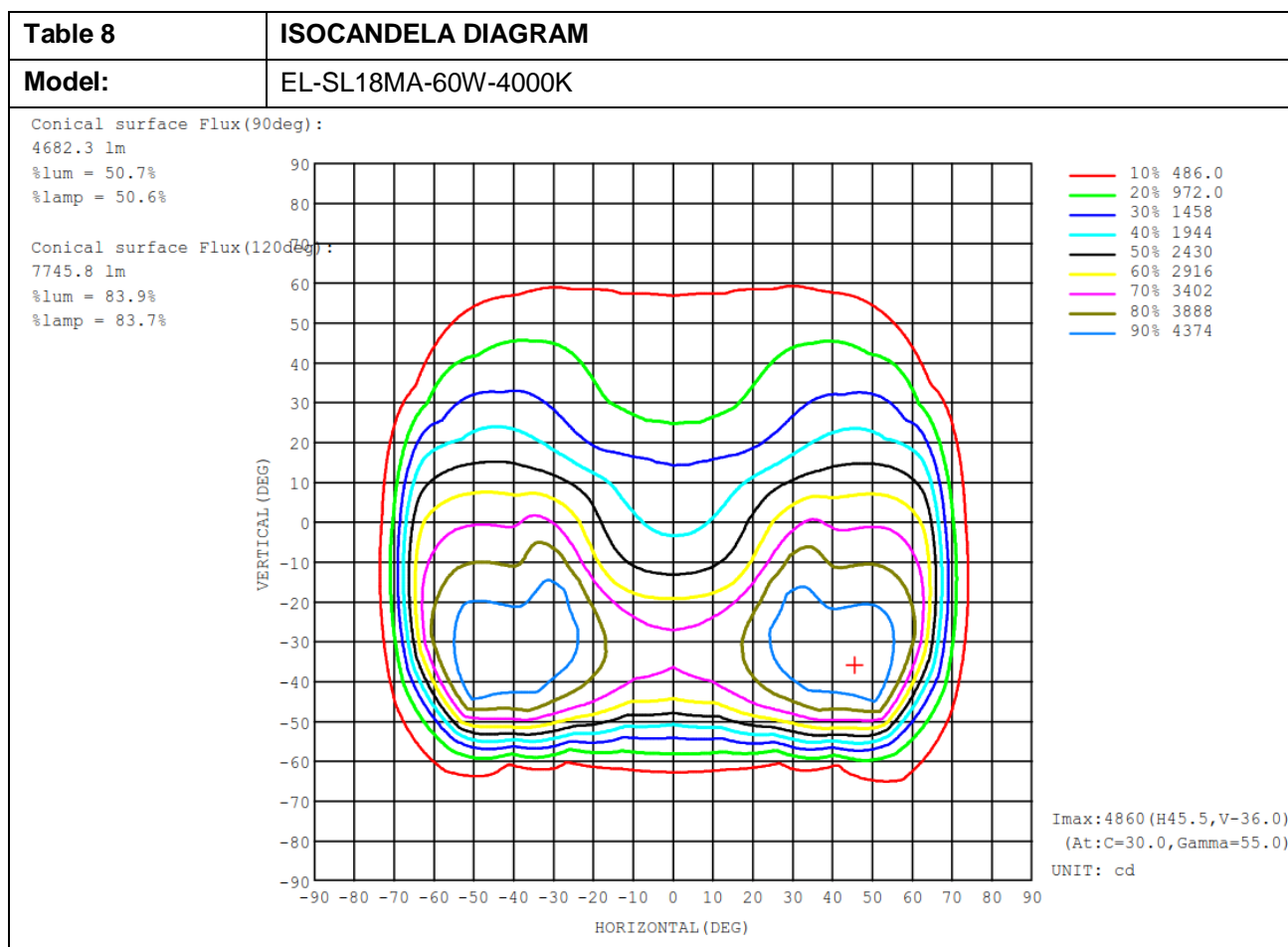
| Table 4c |   | LUMINOUS DISTRIBUTION INTENSITY DATA (unit: cd) |         |         |         |         |         |         |         |
|----------|---|---|---------|---------|---------|---------|---------|---------|---------|
| Model:   |   | EL-SL18MA-60W-4000K                             |         |         |         |         |         |         |         |
| y \ C    | C | 240   | 255     | 270     | 285     | 300     | 315     | 330     | 345     |
| 0        |   | 1840.43   | 1840.43 | 1840.43 | 1840.43 | 1840.43 | 1840.43 | 1840.43 | 1840.43 |
| 5        |   | 1793.46   | 1829.88 | 1867.22 | 1900.75 | 1930.59 | 1958.24 | 1980.05 | 1993.89 |
| 10       |   | 1800.51   | 1889.80 | 1976.92 | 2043.02 | 2093.25 | 2141.37 | 2183.37 | 2218.45 |
| 15       |   | 1844.53   | 2027.69 | 2194.73 | 2289.84 | 2352.10 | 2416.12 | 2483.67 | 2543.86 |
| 20       |   | 1893.07   | 2235.15 | 2533.02 | 2680.16 | 2736.24 | 2780.67 | 2880.09 | 2960.44 |
| 25       |   | 1868.04   | 2441.42 | 2917.70 | 3216.48 | 3387.54 | 3396.30 | 3359.47 | 3334.29 |
| 30       |   | 1804.31   | 2553.84 | 3243.73 | 3849.21 | 4071.10 | 3901.89 | 3642.74 | 3510.91 |
| 35       |   | 1768.88   | 2563.62 | 3454.50 | 4173.21 | 4472.73 | 4330.80 | 3846.61 | 3569.12 |
| 40       |   | 1739.37   | 2502.21 | 3318.45 | 4007.30 | 4619.28 | 4556.68 | 3906.12 | 3446.83 |
| 45       |   | 1660.62   | 2424.27 | 3306.51 | 4064.28 | 4599.66 | 4603.13 | 3813.31 | 3084.63 |
| 50       |   | 1505.87   | 2268.80 | 3335.46 | 4246.66 | 4771.36 | 4475.06 | 3455.74 | 2393.85 |
| 55       |   | 1291.62   | 2006.49 | 3294.29 | 4332.00 | 4859.77 | 4141.56 | 2516.03 | 1494.21 |
| 60       |   | 1030.32   | 1619.65 | 3078.67 | 4270.52 | 4742.62 | 3178.66 | 1193.99 | 789.14  |
| 65       |   | 737.29  | 1079.31 | 2370.51 | 3767.05 | 4015.31 | 1445.15 | 374.76  | 342.22  |
| 70       |   | 350.46  | 440.05  | 1028.65 | 2050.12 | 1818.12 | 363.20  | 170.07  | 139.63  |
| 75       |   | 133.56  | 191.65  | 329.42  | 727.83  | 646.51  | 182.72  | 93.95   | 86.95   |
| 80       |   | 24.69   | 42.61   | 58.31   | 155.00  | 237.40  | 70.34   | 37.05   | 36.24   |
| 85       |   | 1.06  | 1.55    | 1.79    | 4.05    | 9.82    | 7.20    | 1.95    | 0.82    |
| 90       |   | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 95       |   | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 100      |   | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 105      |   | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 110      |   | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 115      |   | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 120      |   | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 125      |   | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 130      |   | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 135      |   | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 140      |   | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 145      |   | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 150      |   | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 155      |   | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 160      |   | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 165      |   | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 170      |   | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 175      |   | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| 180      |   | 0   | 0       | 0       | 0       | 0       | 0       | 0       | 0       |

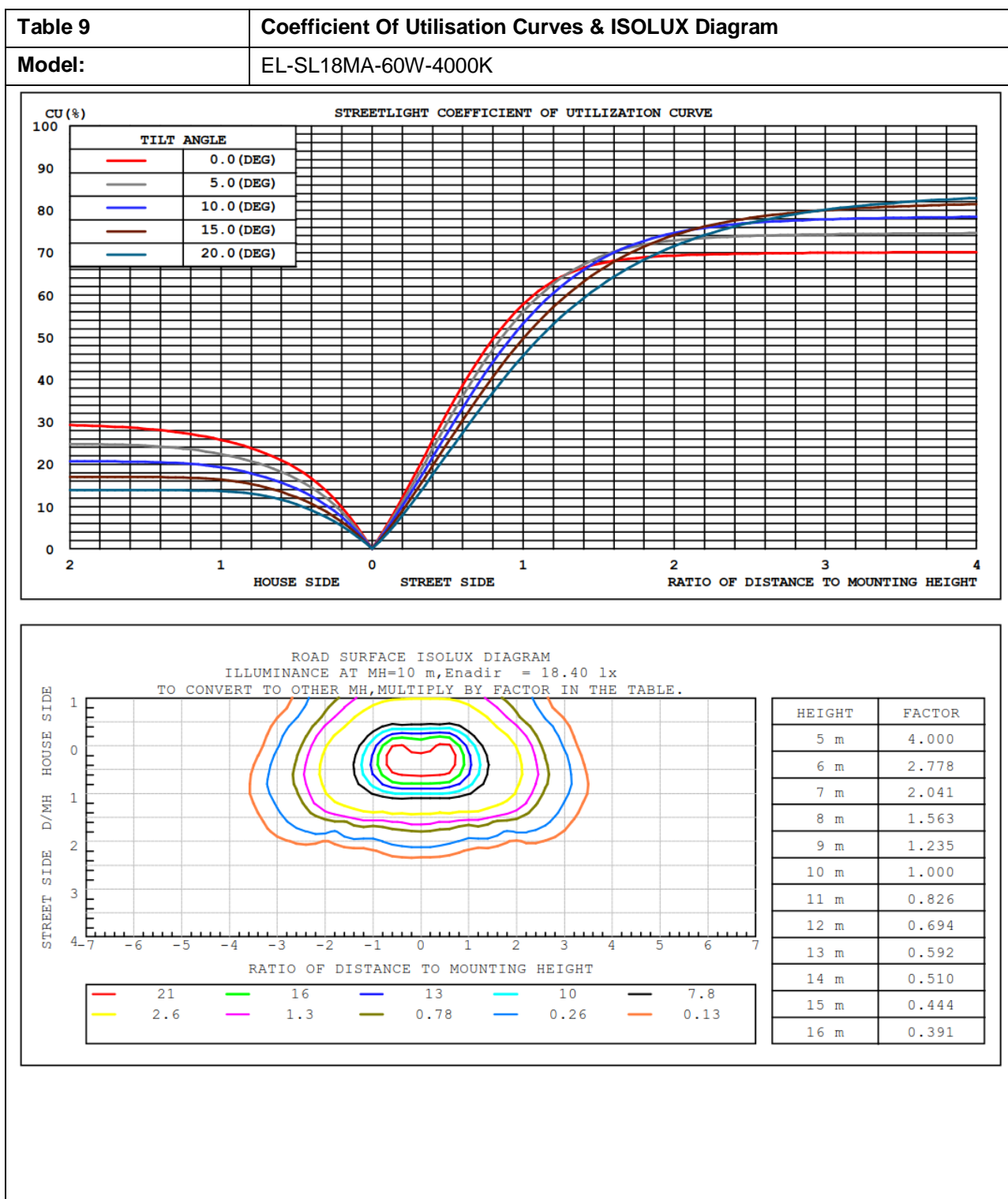
| Table 5  |   | ZONAL FLUX DIAGRAM  |        |        |       |        |        |        |          |             |              |       |
|----------|---|---------------------|--------|--------|-------|--------|--------|--------|----------|-------------|--------------|-------|
| Model:   |   | EL-SL18MA-60W-4000K |        |        |       |        |        |        |          |             |              |       |
| $\gamma$ | C0  | C45                 | C90    | C135   | C180  | C225   | C270   | C315   | $\gamma$ | $\Phi$ zone | $\Phi$ total | %lamp |
| 10       | 1977  | 2141                | 2229   | 2163   | 2008  | 1750   | 1581   | 1714   | 0- 10    | 180.8       | 180.8        | 1.95  |
| 20       | 2533  | 2781                | 2981   | 2804   | 2599  | 1629   | 1172   | 1579   | 10- 20   | 596.9       | 777.7        | 8.4   |
| 30       | 3244  | 3902                | 3457   | 3981   | 3376  | 1284   | 860.3  | 1250   | 20- 30   | 1157        | 1935         | 20.9  |
| 40       | 3318  | 4557                | 3259   | 4597   | 3342  | 1245   | 751.9  | 1186   | 30- 40   | 1739        | 3674         | 39.7  |
| 50       | 3335  | 4475                | 2085   | 4482   | 3359  | 1115   | 658.9  | 1082   | 40- 50   | 2067        | 5741         | 62    |
| 60       | 3079  | 3179                | 766.5  | 3144   | 3099  | 780.2  | 313.9  | 790.3  | 50- 60   | 2005        | 7746         | 83.7  |
| 70       | 1029  | 363.2               | 135.2  | 331.9  | 1027  | 263.4  | 15.19  | 283.0  | 60- 70   | 1225        | 8971         | 97    |
| 80       | 58.31   | 70.34               | 31.22  | 60.88  | 51.21 | 6.819  | 0.0706 | 9.808  | 70- 80   | 247.9       | 9219         | 99.6  |
| 90       | 1.181   | 0.8190              | 0.2952 | 0.5419 | 1.103 | 0.7382 | 0.1652 | 0.6479 | 80- 90   | 12.04       | 9231         | 99.8  |
| 100      | 0   | 0                   | 0      | 0      | 0     | 0      | 0      | 0      | 90-100   | 0.0442      | 9231         | 99.8  |
| 110      | 0   | 0                   | 0      | 0      | 0     | 0      | 0      | 0      | 100-110  | 0           | 9231         | 99.8  |
| 120      | 0   | 0                   | 0      | 0      | 0     | 0      | 0      | 0      | 110-120  | 0           | 9231         | 99.8  |
| 130      | 0   | 0                   | 0      | 0      | 0     | 0      | 0      | 0      | 120-130  | 0           | 9231         | 99.8  |
| 140      | 0   | 0                   | 0      | 0      | 0     | 0      | 0      | 0      | 130-140  | 0           | 9231         | 99.8  |
| 150      | 0   | 0                   | 0      | 0      | 0     | 0      | 0      | 0      | 140-150  | 0           | 9231         | 99.8  |
| 160      | 0   | 0                   | 0      | 0      | 0     | 0      | 0      | 0      | 150-160  | 0           | 9231         | 99.8  |
| 170      | 0   | 0                   | 0      | 0      | 0     | 0      | 0      | 0      | 160-170  | 0           | 9231         | 99.8  |
| 180      | 0   | 0                   | 0      | 0      | 0     | 0      | 0      | 0      | 170-180  | 0           | 9231         | 99.8  |
| DEG      | LUMINOUS INTENSITY:cd Less than 25% Percent = 7.4 % |                     |        |        |       |        |        |        |          | UNIT:lm     |              |       |



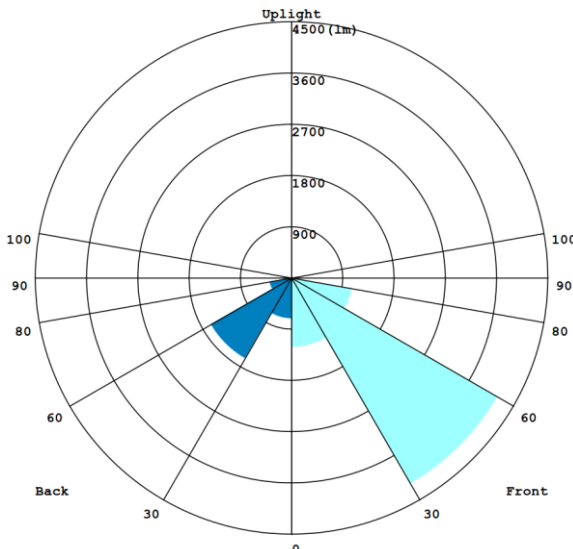








|          |                     |
|----------|---------------------|
| Table 10 | LCS                 |
| Model:   | EL-SL18MA-60W-4000K |



The diagram is a circular IESNA luminaire flux distribution plot. The vertical axis is labeled 'Uplight' at the top and '0' at the bottom. The horizontal axis is labeled 'Back' on the left and 'Front' on the right. Concentric circles represent lumens: 900, 1800, 2700, 3600, and 4500 (labeled as 4500 (lm)). Radial lines represent beam angles: 0, 30, 60, 80, 90, and 100 degrees. The plot shows two main light distribution areas: a large cyan area in the 'Front' direction (0-60 degrees) and a smaller blue area in the 'Back' direction (90-100 degrees).

IESNA Luminaire Flux Distribution Table:

| Zone                         | Lumens | Luminaire % |
|------------------------------|--------|-------------|
| FL - Front-Low(0-30)         | 1219.8 | 13.2        |
| FM - Front-Medium(30-60)     | 4179.8 | 45.3        |
| FH - Front-High(60-80)       | 1081.1 | 11.7        |
| FVH - Front-Very High(80-90) | 10.693 | 0.1         |
| Total Forward Light          | 6491.4 | 70.3        |

|                             |        |      |
|-----------------------------|--------|------|
| BL - Back-Low(0-30)         | 714.74 | 7.7  |
| BM - Back-Medium(30-60)     | 1631.5 | 17.7 |
| BH - Back-High(60-80)       | 392.23 | 4.2  |
| BVH - Back-Very High(80-90) | 1.3434 | 0.0  |
| Total Back Light            | 2739.9 | 29.7 |

|                            |          |     |
|----------------------------|----------|-----|
| UL - Uplight-Low(90-100)   | 0.044237 | 0.0 |
| UH - Uplight-High(100-180) | 0        | 0.0 |
| Total Up Light             | 0.044237 | 0.0 |

|                           |          |
|---------------------------|----------|
| BUG(Back,Up,Glare) Rating | B2-U0-G1 |
|---------------------------|----------|

| Zone        | Downward Lumens | Upward Lumens | Total Lumens |
|-------------|-----------------|---------------|--------------|
| House Side  | 6491.3          | 0.018732      | 6491.4       |
| Street Side | 2739.8          | 0.025505      | 2739.9       |

#### Attachment 1: Equipment List

| No. | Type                                   | Manufacture | Model                   | Equipment ID | Next Calibration |
|-----|--|-------------|-------------------------|--------------|------------------|
| 1   | Full-field Speed Goniophotometer       | Everfine    | GO-R5000                | S1207714-YQ  | May. 18.2019     |
| 2   | High-accuracy Digital Photometer Head  | Everfine    | ID-1000_P-B/ID-1000_P-C | S1207714a-YQ | May. 18.2019     |
| 3   | High-accuracy Digital Photometer Head  | Everfine    | ID-1000_P-B/ID-1000_P-C | S1207714b-YQ | May. 18.2019     |
| 4   | High Accuracy Array Spectroradio Meter | Labsphere   | CDS-600                 | S1312826-YQ  | May. 18.2019     |
| 5   | Standard Light Source                  | Everfine    | D908                    | S1207714d-YQ | May. 18.2019     |
| 6   | Digital Power Meter                    | Yokogawa    | WT310                   | S1310805-YQ  | May. 18.2019     |
| 7   | Digital CC & CV DC Power Supply        | Everfine    | WY12010                 | S1207714f-YQ | May. 18.2019     |
| 8   | Intelligent AC Power Source            | Everfine    | DPS1060                 | S1207714g-YQ | May. 18.2019     |
| 10  | DC Power Supply                        | Everfine    | WY3010                  | S1108624-YQ  | May. 18.2019     |
| 11  | Flux Reference Lamp                    | Labsphere   | SCL-1400                | S1602991-YQ  | May. 18.2019     |
| 12  | luminance Source                       | Everfine    | SLS-150                 | S1108626-YQ  | May. 18.2019     |
| 13  | Thermometer                            | Fluke       | Fluke 52-II             | S0712414-YQ  | May. 18.2019     |

-- END OF TEST REPORT --