# REPORT

**25800 COMMERCENTRE DRIVE, LAKE FOREST, CA 92630**

Project No. G101918458 Date: March 17, 2015

REPORT NO. 101918458LAX-021

TEST OF ONE LED PROFILE

MODEL NO. WW PROFILE 19°

RENDERED TO

ELATION PROFESSIONAL
6122 S. EASTERN AVE
COMMERCE, CA 90040 USA

TEST: Electrical and Photometric tests as required to the IESNA test standard.

STATEMENT OF LIMITATION: This report must not be used by the client to claim product certification, approval, or endorsement by A2LA, NIST, or any agency of the federal government.

AUTHORIZATION: The testing performed was authorized by signed quote number Q500519256.

STANDARDS USED: The following American National Standards or Illuminating Engineering Society of North America Test Guides were used in part or totally to test each specimen:

IESNA LM-79 - 2008: Electrical and Photometric Measurements of Solid State Lighting

DESCRIPTION OF SAMPLE: The client submitted one production sample of model number WW PROFILE 19°. The sample was received by Intertek on March 10, 2015, in undamaged condition and one sample was tested as received. The sample designation was LAN1503101019-003.

DATES OF TESTS: March 16, 2015

SUMMARY

| | |
|---|---|
| Model No.: | WW PROFILE 19° |
| Description: | LED Profile |

| | Result | |
|---|---|---|
| Criteria | Sphere | Goniometer |
| Total Lumen Output (Lumens) | 4246 | 4187 |
| Total Power (W) | 173.3 | 173.3 |
| Luminaire Efficacy (LPW) | 24.5 | 24.16 |

| Criteria | Result |
|---|---|
| Power Factor | 0.974 |
| Current ATHD % | 3.79 |
| Correlated Color Temperature (CCT - K) | 3106 |
| Color Rendering Index (CRI - Ra) | 94.3 |
| Color Rendering Index (CRI - R9) | 75.6 |
| DUV | 0.001 |
| Chromaticity Coordinate (x) | 0.428 |
| Chromaticity Coordinate (y) | 0.399 |
| Chromaticity Coordinate (u') | 0.247 |
| Chromaticity Coordinate (v') | 0.518 |

EQUIPMENT LIST

| Equipment Used | Model Number | Control Number | Last Date Calibrated | Calibration Due Date |
|---|---|---|---|---|
| DC Power Supply | LPS-100-0833 | 000832 | 05/20/14 | 05/20/15 |
| LapSphere 3M Integrating Sphere | CA-11821-LRT | 000830 | 02/15/15 | 03/25/15 |
| LabSphere Spectrometer | CDS-3020 | 000834 | 02/15/15 | 03/25/15 |
| California Instruments Power Supply | CSW5550 | 001339 | VBU | VBU |
| Yokogawa Power Meter | WT333 | 001340 | 05/15/14 | 05/15/15 |
| Extech Instruments Stop Watch | 365510 | 001379 | 11/07/14 | 11/07/15 |
| Temp and HR meter | 971 | 001178 | 12/22/14 | 12/22/15 |
| LSI High Speed Mirror Goniometer | 6440T | 000943 | 02/25/15 | 03/25/15 |
| Elgar Power Supply | CW1251 | 000944 | VBU | VBU |
| Yokogawa Power Analyzer | WT210 | 000945 | 11/26/14 | 11/26/15 |
| Temp. & RH Meter | 971 | 001178 | 12/22/14 | 12/22/15 |
| Extech Instruments Stop Watch | 365510 | 001390 | 12/08/14 | 12/08/15 |
| Tape Measure | 33-430 | 001491 | 12/08/14 | 12/08/15 |

TEST METHODS

Seasoning in Sample Orientation – LED Products

No seasoning was performed in accordance with IESNA LM-79.

Photometric and Electrical Measurements – Integrating Sphere Method

A Labsphere CDS 3020 Spectrometer and Three Meter Sphere was used to measure correlated color temperature, chromaticity coordinates, and the color rendering index for each SSL unit.

Ambient temperature was measured at a position inside the sphere. Each SSL unit was operated on the client provided driver at the rated input voltage in its designated orientation. Each SSL unit was allowed to stabilize for at least thirty minutes before measurements were made. Electrical measurements including voltage, current, and power were measured using the Yokogawa Power Analyzer.

The calibration of the sphere spectrometer system is traceable to the National Institute of Standards and Technology.

Photometric and Electrical Measurements – Distribution Method

A LSI Type C High Speed Model 6440 Mirror Goniometer was used to measure the intensity (candelas) at each angle of distribution for each sample.

Ambient temperature was measured equal to the height of the sample mounted on the Goniometer equipment. Each sample was operated at input rated voltage in its designated orientation. Each sample was allowed to stabilize for at least thirty minutes before measurements were made. Electrical measurements including voltage, current, and power were measured using the Yokogawa Power Analyzer.

Some graphics were created with Photometrics Plus software.

RESULTS OF TEST

Photometric and Electrical Measurements at Ambient Temperature (25°C +/- 1°C) - Integrating Sphere Method

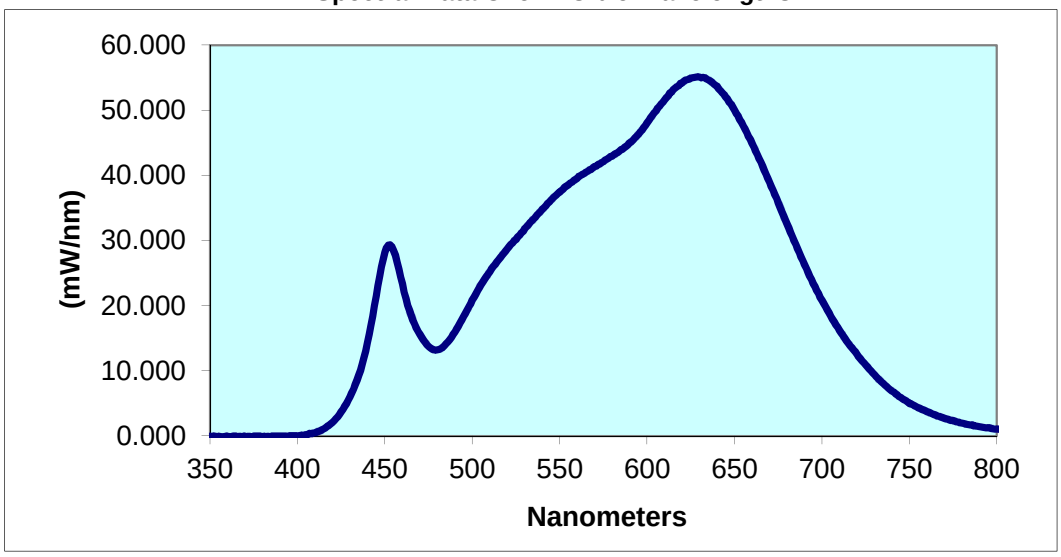
| Intertek Sample No. | Base Orientation | Input Voltage {Vac} | Input Current (mA) | Input Power (Watts) | Input Power Factor | Current ATHD (%) | Luminous Flux (Lumens) | Lumen Efficacy (LPW) |
|---|---|---|---|---|---|---|---|---|
| LAN1503101019-003 | UP | 120.0 | 1483 | 173.3 | 0.974 | 3.79 | 4246 | 24.5 |

| Correlated Color Temperature (K) | CRI -Ra | CRI -R9 | DUV | CIE 31' Chromaticity Coordinate | CIE 31' Chromaticity Coordinate (y) | CIE 76' Chromaticity Coordinate (u') | CIE 76' Chromaticity Coordinate (v') |
|---|---|---|---|---|---|---|---|
| 3106 | 94.3 | 75.6 | 0.001 | 0.428 | 0.399 | 0.247 | 0.518 |

Spectral Distribution over Visible Wavelengths

| nm | mW/nm | nm | mW/nm | nm | mW/nm | nm | mW/nm | nm | mW/nm |
|---|---|---|---|---|---|---|---|---|---|
| 350 | -0.067 | 440 | 14.250 | 530 | 31.830 | 620 | 54.240 | 710 | 16.240 |
| 355 | -0.036 | 445 | 21.470 | 535 | 33.270 | 625 | 54.960 | 715 | 14.230 |
| 360 | -0.059 | 450 | 28.200 | 540 | 34.800 | 630 | 55.100 | 720 | 12.520 |
| 365 | -0.055 | 455 | 28.500 | 545 | 36.230 | 635 | 54.650 | 725 | 10.930 |
| 370 | -0.054 | 460 | 23.330 | 550 | 37.450 | 640 | 53.690 | 730 | 9.403 |
| 375 | -0.062 | 465 | 18.520 | 555 | 38.610 | 645 | 51.980 | 735 | 8.053 |
| 380 | -0.107 | 470 | 15.620 | 560 | 39.580 | 650 | 49.960 | 740 | 6.894 |
| 385 | -0.041 | 475 | 13.710 | 565 | 40.520 | 655 | 47.580 | 745 | 5.918 |
| 390 | -0.031 | 480 | 13.230 | 570 | 41.370 | 660 | 44.940 | 750 | 5.020 |
| 395 | 0.005 | 485 | 14.170 | 575 | 42.140 | 665 | 42.040 | 755 | 4.345 |
| 400 | 0.017 | 490 | 16.000 | 580 | 42.950 | 670 | 38.950 | 760 | 3.764 |
| 405 | 0.178 | 495 | 18.320 | 585 | 43.960 | 675 | 35.770 | 765 | 3.212 |
| 410 | 0.481 | 500 | 20.860 | 590 | 45.010 | 680 | 32.580 | 770 | 2.715 |
| 415 | 1.075 | 505 | 23.210 | 595 | 46.300 | 685 | 29.410 | 775 | 2.347 |
| 420 | 2.082 | 510 | 25.240 | 600 | 48.090 | 690 | 26.290 | 780 | 1.965 |
| 425 | 3.708 | 515 | 27.030 | 605 | 49.910 | 695 | 23.410 | | |
| 430 | 6.020 | 520 | 28.730 | 610 | 51.630 | 700 | 20.800 | | |
| 435 | 9.292 | 525 | 30.200 | 615 | 53.160 | 705 | 18.400 | | |

**Spectral Data Over Visible Wavelengths**



RESULTS OF TEST (cont'd)

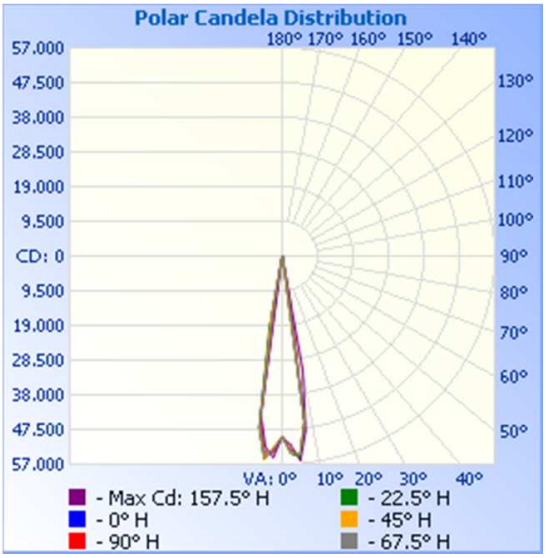
Photometric and Electrical Measurements at Ambient Temperature (25°C +/- 1°C) – Distribution Method

| Intertek Sample No. | Base Orientation | Input Voltage {Vac} | Input Current (mA) | Input Power (Watts) | Input Power Factor | Absolute Luminous Flux (Lumens) | Lumen Efficacy (Lumens Per Watt) |
|---|---|---|---|---|---|---|---|
| LAN1503101019-003 | UP | 120.0 | 1535 | 173.3 | 0.941 | 4187 | 24.16 |

Intensity (Candlepower) Summary at 25°C - Candelas

Maximum Candela Value: 56,169.0

| Angle | 0 | 22.5 | 45 | 67.5 | 90 |
|---|---|---|---|---|---|
| 0 | 49412 | 49412 | 49412 | 49412 | 49412 |
| 5 | 54981 | 54943 | 54312 | 54544 | 54830 |
| 10 | 1076 | 979 | 494 | 5136 | 11150 |
| 15 | 36 | 31 | 46 | 31 | 40 |
| 20 | 58 | 37 | 41 | 68 | 36 |
| 25 | 43 | 20 | 25 | 46 | 23 |
| 30 | 5 | 32 | 3 | 15 | 14 |
| 35 | 20 | 9 | 2 | 21 | 5 |
| 40 | 0 | 0 | 18 | 0 | 1 |
| 45 | 0 | 0 | 0 | 2 | 0 |
| 50 | 0 | 0 | 0 | 0 | 4 |
| 55 | 2 | 6 | 4 | 3 | 6 |
| 60 | 0 | 4 | 5 | 4 | 0 |
| 65 | 0 | 0 | 3 | 0 | 10 |
| 70 | 0 | 0 | 16 | 0 | 2 |
| 75 | 0 | 2 | 0 | 0 | 2 |
| 80 | 0 | 0 | 4 | 0 | 0 |
| 85 | 0 | 0 | 0 | 0 | 0 |
| 90 | 12 | 0 | 0 | 0 | 0 |

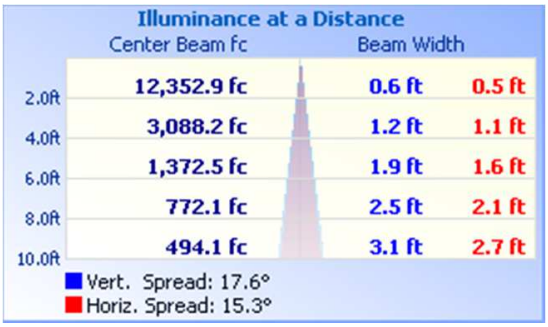


RESULTS OF TEST (cont'd)

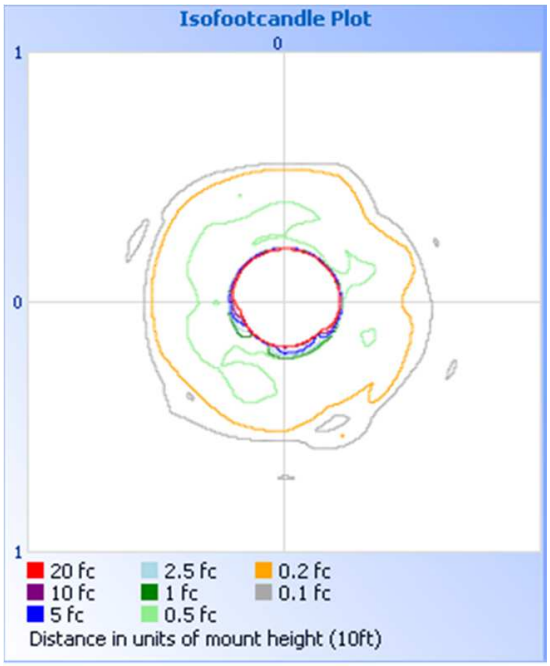
Illumination Plots

Mounting Height: 10 ft.

Illuminance - Cone of Light




Isoillumination Plot




Zonal Lumen Summary and Percentages at 25°C

| Zone | Lumens | % Luminaire |
|---|---|---|
| 0-30 | 4170 | 99.6 |
| 0-40 | 4174 | 99.7 |
| 0-60 | 4178 | 99.8 |
| 60-90 | 7.9 | 0.2 |
| 0-90 | 4186 | 100.0 |
| 90-180 | 0.3 | 0.0 |
| 0-180 | 4187 | 100.0 |

Zonal Lumens and Percentages at 25°C

| Zone | Lumens | % Luminaire |
|---|---|---|
| 0-10 | 3882 | 92.7 |
| 10-20 | 269.8 | 6.4 |
| 20-30 | 18.0 | 0.4 |
| 30-40 | 4.2 | 0.1 |
| 40-50 | 2.4 | 0.1 |
| 50-60 | 1.8 | 0.0 |
| 60-70 | 2.4 | 0.1 |
| 70-80 | 2.8 | 0.1 |
| 80-90 | 2.6 | 0.1 |
| 90-100 | 0.3 | 0.0 |

PICTURE (not to scale)


CONCLUSION

The results tabulated in this report are representative of the actual test samples submitted for this report only. The data is provided to the client for further evaluation. Compliance to the referenced specification requirements was not determined in this report.

In Charge Of Tests:

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Technician
Lighting Division

Report Reviewed By:

Kenda Branch
Lighting Performance Team Lead
Lighting Division

Attachment: None