

SONNEMAN - A WAY OF LIGHT TEST REPORT

SCOPE OF WORK

LED Performance Testing

MODEL NUMBER

2181.25-L

PROJECT NUMBER

G104119984

REPORT NUMBER

104119984CRT-011

REPORT ISSUE DATE

January 29, 2020

REPORT REVISION DATE

None

PAGES

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REPORT NUMBER
104119984CRT-011

TEST OF (1) ABSTRACT LARGE LED SURFACE MOUNT

MODEL NUMBER
2181.25-L

REPORT RENDERED TO:
SONNEMAN - A WAY OF LIGHT
151 AIRPORT DRIVE
WAPPINGERS FALLS, NY 12590
ATTN. BRYAN CROWTHER

STATEMENT OF LIMITATION

NVLAP Lab Code 100402-0. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

AUTHORIZATION

The testing performed was authorized by signed quote number Qu-01007713-2.

TEST STANDARDS

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

TEST DATES

January 29, 2020

In Charge of Testing:



Gerald Gray
Associate Engineer
Lighting Division

Reviewer:



Kristie Ray
Engineer
Lighting Division

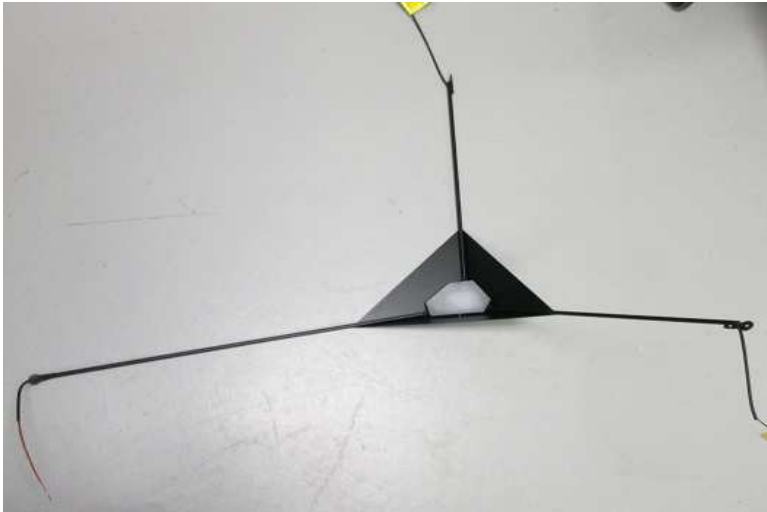
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SAMPLE INFORMATION

| Control No. | Model No. | Description | Type | Received |
|------------------|-----------|----------------------------------|------------|-----------|
| CRT200128307-001 | 2181.25-L | Abstract Large LED Surface Mount | Production | 1/28/2020 |

SAMPLE PHOTOS



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SUMMARY OF DATA

| | |
|-----------------------------|----------------------------------|
| Product Model No.: | 2181.25-L |
| Product Description: | Abstract Large LED Surface Mount |
| LED Model No.: | Not Provided |
| Driver Model No.: | Not Provided |
| Light Source: | LED |

| Criteria | Results |
|------------------------------------|----------------|
| Light Output (lumens) | 643.4 |
| Input Power (W) @ 120 (Vac) | 10.90 |
| Lumen Efficacy (lm/W) | 59.0 |
| Input Power Factor () @ 120 (Vac) | 0.973 |

TEST METHODS

SEASONING IN SAMPLE ORIENTATION - LED PRODUCTS

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

PHOTOMETRIC AND ELECTRICAL MEASUREMENTS - DISTRIBUTION METHOD

A Type C Mirror Goniometer was used to measure the intensity (candela) at each angle of distribution for the SSL sample.

Ambient temperature was measured equal to the height of the sample mounted on the goniometer equipment. The SSL sample was operated on the client provided driver at rated input volts in its designated orientation. The SSL sample was allowed to stabilize for at least thirty minutes before measurements were made. Stabilization procedures to LM-79 were followed. Electrical measurements including voltage, current, and power were measured using a power analyzer.

The calibration of the goniometer-photometer system is traceable to the National Institute of Standards and Technology.

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PHOTOMETRIC AND ELECTRICAL MEASUREMENTS - DISTRIBUTION METHOD (25°C +/- 1°C)

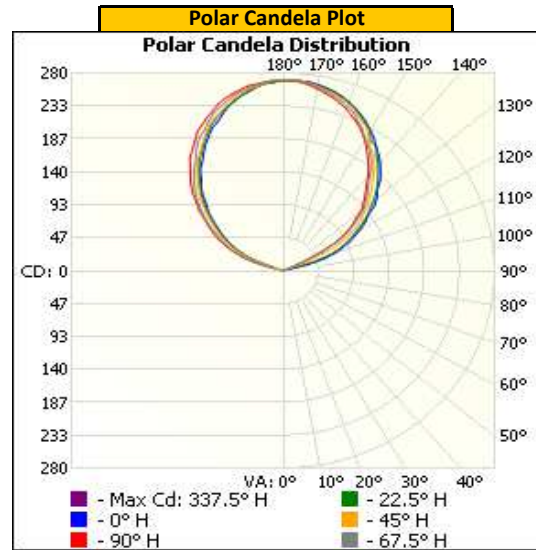
| | | | |
|--------------------------|-----------|----------------------------|------------------|
| Fixture Model No. | 2181.25-L | Fixture Control No. | CRT200128307-001 |
|--------------------------|-----------|----------------------------|------------------|

| | | | | |
|-------------------------|----------------------------|---------------------------|------------------------|-------------------------------|
| Base Orientation | Input Voltage (Vac) | Input Current (mA) | Input Power (W) | Input Power Factor () |
| Down | 120.06 | 93.3 | 10.90 | 0.973 |

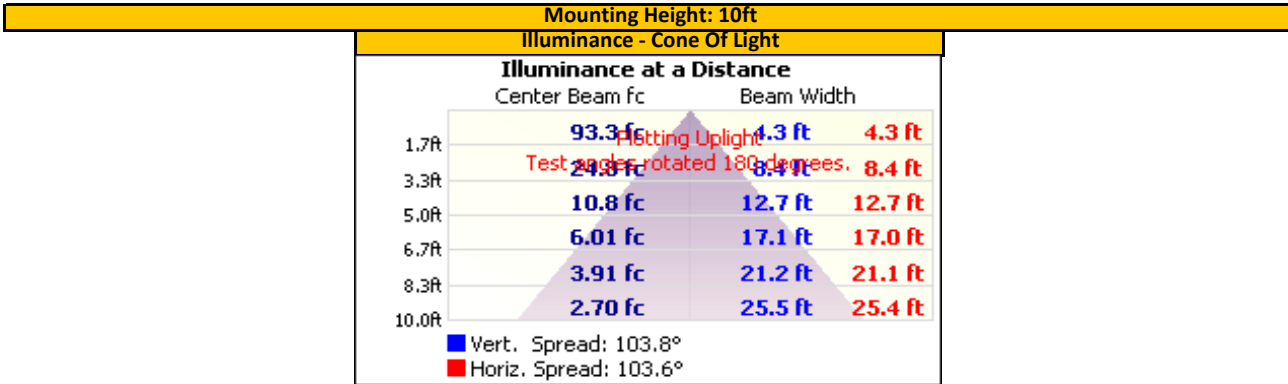
| | |
|--------------------------|------------------------------|
| Light Output (lm) | Lumen Efficacy (lm/W) |
| 643.4 | 59.0 |

INTENSITY SUMMARY - CANDELA

| Angle | 0 | 22.5 | 45 | 67.5 | 90 |
|-------|-----|------|-----|------|-----|
| 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | 0 | 0 | 0 | 0 | 0 |
| 10 | 0 | 0 | 0 | 0 | 0 |
| 15 | 0 | 0 | 0 | 0 | 0 |
| 20 | 0 | 0 | 0 | 0 | 0 |
| 25 | 0 | 0 | 0 | 0 | 0 |
| 30 | 0 | 0 | 0 | 0 | 0 |
| 35 | 0 | 0 | 0 | 0 | 0 |
| 40 | 0 | 0 | 0 | 0 | 0 |
| 45 | 0 | 0 | 0 | 0 | 0 |
| 50 | 0 | 0 | 0 | 0 | 0 |
| 55 | 0 | 0 | 0 | 0 | 0 |
| 60 | 0 | 0 | 0 | 0 | 0 |
| 65 | 0 | 0 | 0 | 0 | 0 |
| 70 | 0 | 0 | 0 | 0 | 0 |
| 75 | 0 | 0 | 0 | 0 | 0 |
| 80 | 0 | 0 | 0 | 0 | 0 |
| 85 | 0 | 0 | 0 | 0 | 0 |
| 90 | 0 | 0 | 0 | 0 | 0 |
| 95 | 0 | 0 | 0 | 0 | 0 |
| 100 | 0 | 0 | 0 | 0 | 0 |
| 105 | 35 | 18 | 0 | 0 | 0 |
| 110 | 72 | 66 | 10 | 0 | 0 |
| 115 | 97 | 92 | 65 | 27 | 27 |
| 120 | 118 | 113 | 100 | 84 | 80 |
| 125 | 138 | 136 | 126 | 115 | 111 |
| 130 | 162 | 156 | 147 | 140 | 136 |
| 135 | 182 | 177 | 166 | 158 | 154 |
| 140 | 200 | 196 | 187 | 180 | 175 |
| 145 | 214 | 215 | 206 | 201 | 195 |
| 150 | 230 | 230 | 225 | 216 | 215 |
| 155 | 244 | 242 | 239 | 234 | 231 |
| 160 | 254 | 254 | 251 | 247 | 244 |
| 165 | 263 | 262 | 260 | 257 | 254 |
| 170 | 268 | 266 | 266 | 264 | 262 |
| 175 | 270 | 270 | 270 | 269 | 268 |
| 180 | 270 | 270 | 270 | 270 | 270 |



ILLUMINANCE SUMMARY



ZONAL LUMENS

| Zonal Lumen Summary | | | | | |
|---------------------|--------|-----------|---------|--------|-------|
| Zone | Lumens | Luminaire | Zone | Lumens | Total |
| 0-30 | 0.0 | 0.0% | 0-10 | 0.0 | 0.0% |
| 0-40 | 0.0 | 0.0% | 10-20 | 0.0 | 0.0% |
| 0-60 | 0.0 | 0.0% | 20-30 | 0.0 | 0.0% |
| 60-90 | 0.0 | 0.0% | 30-40 | 0.0 | 0.0% |
| 70-100 | 0.0 | 0.0% | 40-50 | 0.0 | 0.0% |
| 90-120 | 78.3 | 12.2% | 50-60 | 0.0 | 0.0% |
| 0-90 | 0.0 | 0.0% | 60-70 | 0.0 | 0.0% |
| 90-180 | 643.4 | 100.0% | 70-80 | 0.0 | 0.0% |
| 0-180 | 643.4 | 100.0% | 80-90 | 0.0 | 0.0% |
| | | | 90-100 | 0.0 | 0.0% |
| | | | 100-110 | 11.0 | 1.7% |
| | | | 110-120 | 67.2 | 10.4% |
| | | | 120-130 | 107.8 | 16.8% |
| | | | 130-140 | 125.9 | 19.6% |
| | | | 140-150 | 126.2 | 19.6% |
| | | | 150-160 | 107.7 | 16.7% |
| | | | 160-170 | 72.1 | 11.2% |
| | | | 170-180 | 25.4 | 3.9% |

| | | | | | |
|-----------------------------|-----------|--------------------------|----|-----------------------------|-----------|
| Test Equipment Used: | 1 thru 10 | | | | |
| Ambient Temp (°C): | 24.7 | Relative Hum (%): | NA | Test Completion Date | 1/29/2020 |

See last page for equipment details

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EQUIPMENT LIST

| # | Equipment | Model No | Control No. | Last Cal | Cal Due |
|----|---|------------|-------------|-----------|-----------|
| 1 | LSI High Speed Mirror Goniometer | 6440 | --- | 1/14/2020 | 2/14/2020 |
| 2 | Elgar AC Power Supply | CW1251 | --- | VBU | VBU |
| 3 | Sorenson DC Power Supply | XG 150-10 | --- | VBU | VBU |
| 4 | Yokogawa Power Analyzer | WT210 | E464 | 5/7/2019 | 5/7/2020 |
| 5 | Omega Thermometer | DPI8-C24 | M263 | 5/7/2019 | 5/7/2020 |
| 6 | M-D Building Products Digital Level | Smart Tool | L112 | 5/1/2019 | 5/1/2020 |
| 7 | NIST Luminous Intensity Standard Source | NBS10322 | N1427 | 2/11/2019 | 2/11/2021 |
| 8 | NIST Luminous Intensity Standard Source | NBS10332 | N1435 | 2/11/2019 | 2/11/2021 |
| 9 | NIST Luminous Intensity Standard Source | NBS10265 | N1437 | 2/11/2019 | 2/11/2021 |
| 10 | NIST Luminous Flux Standard Source | NBS10428 | N1424 | 1/3/2019 | 1/3/2021 |