# REPORT

**LSI INDUSTRIES, INC. 10000 ALLIANCE ROAD CINCINNATI, OH 45242**

Project No.: G101617355
Client Ref. No.: PH-0531

Date: August 18, 2014

REPORT NO. 101617355CHI-181

TEST OF ONE LED LUMINAIRE

FIXTURE CATALOG NO.

SLI22 LED SS WW **

LED DRIVER: 1040mA Electronic Driver

RENDERED TO

LSI INDUSTRIES INCORPORATED
10000 ALLIANCE ROAD
CINCINNATI, OH 45242

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

AUTHORIZATION: The testing performed was authorized by signed quote number 500518865.

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-79-08: Electrical and Photometric Measurements of Solid-State Lighting Products
IESNA TM-15-11: Luminaire Classification System for Outdoor Luminaires
ANSI C82.77-2002: Harmonic Emission Limits (Power Factor and THD-A)

DESCRIPTION OF SAMPLE: The submitted test sample was representative of a current production sample and was received in good condition.

DATE OF TEST: March 05, 2014

SUMMARY:

Model No.:
SLI22 LED SS WW **
Description: 2X2 luminaire comprised of a rolled steel housing with 96 LEDs and electronic driver delivering 86.7mA per LED.

| Criteria | Result |
|---|---|
| Total Lumen Output | 2569 |
| Input Voltage (V) | 120.0 |
| Total Power (W) | 29.0 |
| Luminaire Efficacy | 89 |
| Power Factor | .989 |
| Driver Output Current (A) | 1.044 |
| $THD_A$ | 10.1% |

Additional Reporting

| | |
|---|---|
| Test Room Ambient Conditions | 24.7C and 9.0% RH |
| Total Luminaire Stabilization Time | 37 Minutes |

Measurement uncertainty budgets have been determined for applicable test methods and are available upon request.

EQUIPMENT LIST

| Equipment Used | Equipment # | Cal. Due Date |
|---|---|---|
| Elgar CW1251P-V AC Power Source 0-300V | 0943A02235 | VBU |
| Yokogawa WT-230 Power Analyzer | 91KA35031 | 12/31/2014 |
| High Speed Moving Mirror Goniophotometer | NA | VBU |
| General DTH04 Temperature/Humidity | 25223-01 | 4/30/2015 |

Photometric and Electrical measurements – Distribution Method

A Type C High Speed Mirror Goniometer was used to measure the intensity (candelas) at each angle of distribution for the test 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 per LM-79-08 requirements. Electrical measurements including voltage, current, and power were measured using the Yokogawa Power Analyzer.

Some graphics were created using Lighting Analysts Photometric Toolbox Professional Edition software.

RESULTS OF TESTS

Model No.:
SLI22 LED SS WW **

Photometric and Electrical Measurements – Distribution Method

| Intertek Sample No. | Base Orientation | Input Voltage (VAC) | Input Current (A) | Input Power (Watts) | Input Power Factor | Absolute Luminous Flux (Lumens) | Lumen Efficacy (Lumens Per Watt) |
|---|---|---|---|---|---|---|---|
| ITK5234 | Horizontal | 120.0 | 0.245 | 29.0 | .989 | 2569 | 89 |

**Characteristics**

| | |
|---|---|
| Lumens Per Lamp | N.A. (absolute) |
| Total Lamp Lumens | N.A. (absolute) |
| Luminaire Lumens | 2569 |
| Total Luminaire Efficiency | N.A. |
| Luminaire Efficacy Rating (LER) | 89 |
| Total Luminaire Watts | 29 |
| Ballast Factor | 1.00 |
| CIE Type | Direct |
| Spacing Criterion (0-180) | 1.34 |
| Spacing Criterion (90-270) | 1.38 |
| Spacing Criterion (Diagonal) | 1.50 |
| Basic Luminous Shape | Rectangular |
| Luminous Length (0-180) | 2.00 ft |
| Luminous Width (90-270) | 2.00 ft |
| Luminous Height | 0.00 ft |

**Luminance Data (cd/sq.m)**

| Angle In Degrees | Average 0-Deg | Average 45-Deg | Average 90-Deg |
|---|---|---|---|
| 45 | 1905 | 2004 | 2129 |
| 55 | 1926 | 2184 | 2395 |
| 65 | 1966 | 2481 | 2793 |
| 75 | 2057 | 2940 | 3542 |
| 85 | 2344 | 4750 | 9748 |

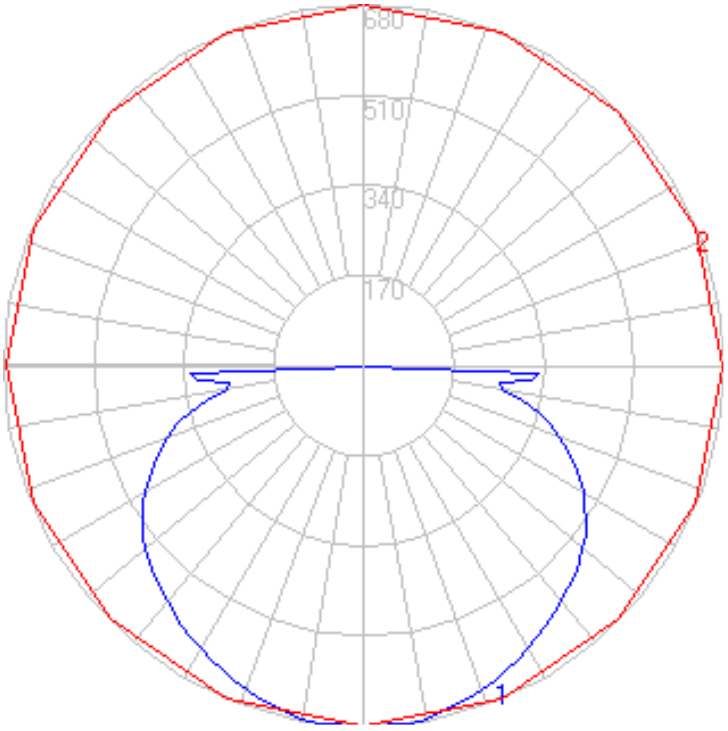
RESULTS OF TESTS (cont'd)

Intensity (Candlepower) Summary

| | 0 | 22.5 | 45 | 67.5 | 90 |
|---|---|---|---|---|---|
| 0 | 678 | 678 | 678 | 678 | 678 |
| 2.5 | 677 | 677 | 678 | 679 | 680 |
| 5 | 677 | 677 | 678 | 679 | 680 |
| 7.5 | 675 | 675 | 678 | 679 | 680 |
| 10 | 672 | 673 | 676 | 678 | 677 |
| 12.5 | 667 | 669 | 673 | 673 | 672 |
| 15 | 662 | 664 | 666 | 665 | 665 |
| 17.5 | 655 | 658 | 659 | 658 | 657 |
| 20 | 647 | 651 | 650 | 650 | 650 |
| 22.5 | 638 | 641 | 640 | 641 | 642 |
| 25 | 628 | 631 | 630 | 633 | 633 |
| 27.5 | 617 | 619 | 619 | 624 | 625 |
| 30 | 604 | 605 | 607 | 614 | 616 |
| 32.5 | 590 | 592 | 596 | 606 | 608 |
| 35 | 574 | 575 | 583 | 595 | 598 |
| 37.5 | 557 | 559 | 569 | 585 | 588 |
| 40 | 540 | 541 | 555 | 574 | 579 |
| 42.5 | 520 | 523 | 542 | 563 | 569 |
| 45 | 501 | 504 | 527 | 552 | 560 |
| 47.5 | 480 | 484 | 512 | 541 | 549 |
| 50 | 458 | 463 | 497 | 529 | 538 |
| 52.5 | 436 | 443 | 482 | 516 | 526 |
| 55 | 411 | 422 | 466 | 502 | 511 |
| 57.5 | 387 | 399 | 449 | 485 | 494 |
| 60 | 362 | 377 | 432 | 466 | 477 |
| 62.5 | 335 | 354 | 412 | 447 | 459 |
| 65 | 309 | 330 | 390 | 425 | 439 |
| 67.5 | 282 | 307 | 366 | 403 | 417 |
| 70 | 255 | 283 | 341 | 379 | 393 |
| 72.5 | 226 | 258 | 313 | 353 | 369 |
| 75 | 198 | 230 | 283 | 324 | 341 |
| 77.5 | 170 | 199 | 250 | 290 | 307 |
| 80 | 139 | 167 | 213 | 247 | 265 |
| 82.5 | 108 | 130 | 168 | 218 | 257 |
| 85 | 76 | 87 | 154 | 273 | 316 |
| 87.5 | 39 | 60 | 177 | 280 | 330 |
| 90 | 0 | 0 | 0 | 0 | 0 |

RESULTS OF TESTS (cont'd)

Polar Candela Distribution:



RESULTS OF TESTS (cont'd)

**Zonal Lumen Summary**

| Zone | Lumens | %Lamp | %Fixt |
|---|---|---|---|
| 0-20 | 252.50 | N.A. | 9.80 |
| 0-30 | 543.77 | N.A. | 21.20 |
| 0-40 | 910.24 | N.A. | 35.40 |
| 0-60 | 1731.99 | N.A. | 67.40 |
| 0-80 | 2397.05 | N.A. | 93.30 |
| 0-90 | 2569.06 | N.A. | 100.00 |
| 10-90 | 2504.41 | N.A. | 97.50 |
| 20-40 | 657.74 | N.A. | 25.60 |
| 20-50 | 1065.9 | N.A. | 41.50 |
| 40-70 | 1197.45 | N.A. | 46.60 |
| 60-80 | 665.06 | N.A. | 25.90 |
| 70-80 | 289.36 | N.A. | 11.30 |
| 80-90 | 172.01 | N.A. | 6.70 |
| 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 | 2569.06 | N.A. | 100.00 |

Total Luminaire Efficiency = N.A.%

**Zonal Lumen Summary**

| Zone | Lumens |
|---|---|
| 0-10 | 64.65 |
| 10-20 | 187.86 |
| 20-30 | 291.27 |
| 30-40 | 366.47 |
| 40-50 | 408.16 |
| 50-60 | 413.59 |
| 60-70 | 375.70 |
| 70-80 | 289.36 |
| 80-90 | 172.01 |
| 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 |

RESULTS OF TESTS (cont'd)

**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 | 106 | 100 | 94 | 89 | 103 | 97 | 92 | 88 | 93 | 89 | 85 | 89 | 86 | 82 | 85 | 82 | 80 | 78 |
| 2 | 95 | 85 | 77 | 70 | 92 | 83 | 76 | 69 | 79 | 73 | 68 | 76 | 71 | 66 | 73 | 68 | 64 | 62 |
| 3 | 86 | 74 | 64 | 57 | 83 | 72 | 63 | 56 | 69 | 61 | 55 | 66 | 60 | 54 | 63 | 58 | 53 | 51 |
| 4 | 78 | 65 | 55 | 47 | 75 | 63 | 54 | 47 | 60 | 52 | 46 | 58 | 51 | 45 | 56 | 50 | 45 | 42 |
| 5 | 71 | 57 | 47 | 40 | 69 | 56 | 47 | 40 | 54 | 46 | 39 | 52 | 44 | 39 | 50 | 43 | 38 | 36 |
| 6 | 66 | 51 | 41 | 35 | 64 | 50 | 41 | 34 | 48 | 40 | 34 | 47 | 39 | 34 | 45 | 38 | 33 | 31 |
| 7 | 61 | 46 | 37 | 30 | 59 | 45 | 36 | 30 | 44 | 36 | 30 | 42 | 35 | 30 | 41 | 34 | 29 | 27 |
| 8 | 56 | 42 | 33 | 27 | 55 | 41 | 33 | 27 | 40 | 32 | 26 | 39 | 31 | 26 | 37 | 31 | 26 | 24 |
| 9 | 53 | 38 | 30 | 24 | 51 | 38 | 30 | 24 | 37 | 29 | 24 | 36 | 29 | 24 | 34 | 28 | 23 | 21 |
| 10 | 49 | 35 | 27 | 22 | 48 | 35 | 27 | 21 | 34 | 26 | 21 | 33 | 26 | 21 | 32 | 26 | 21 | 19 |

PHOTOGRAPH(S)

Report Reviewed By:

Beverly Blake

LSI INDUSTRIES, INC.

Report Reviewed By:

Joe Schledorn

Engineering Team Lead
Lighting Division

Attachment: None