



LM-79-08 Test and ISTMT Report

for

A.L.P. Lighting Components, Inc.

6333 Gross Point Road, Niles, IL 60714

2FT LED Linear Ambient Luminaire Direct

Model: 31422-3750LW-1

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

No.1805, DongLiu road, BinJiang District, Hangzhou, China

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www.ledtestlab.com

Report No.: HZ15060015e

The laboratory that conducted the testing detailed in this report has been accredited for SSL by NVLAP.

Review by:

Engineer: April Zou
Jun. 26, 2015

Approved by:



Manager: Jim Zhang
Jun. 26, 2015

Note: This report does not imply product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

Test Summary

Sample Tested: 31422-3750LW-1

| Luminous Efficacy (Lumens /Watt) | Total Luminous Flux (Lumens) | Power (Watts) | Power Factor |
|-------------------------------------|---------------------------------|---------------------------------------|--------------|
| 100.8 | 2889.9 | 28.66 | 0.9944 |
| CCT (K) | CRI | Stabilization Time (Light & Power) | |
| 5281 | 84.4 | 60 | |

Table 1: Executive Data Summary

Test specifications:

| | |
|---------------------------|--|
| Date of Receipt | : Jun. 04, 2015 |
| Date of Test | : Jun. 12, 2015 to Jun. 25, 2015 |
| Test item | : Total Luminous Flux, Luminous Distribution Intensity, Luminous Efficacy, Correlated Color Temperature, Color Rendering Index, Chromaticity Coordinate, Electrical parameters |
| Reference Standard | : IESNA LM-79-2008 Approved Method for the Electrical and Photometric Measurements of Solid-State Lighting Products ANSI/UL 8750-2011 Light Emitting Diode (LED) Equipment for Use in Lighting Products ANSI/UL 1598-2010 Standard for Safety of Luminaire |

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Sample Photo



Figure 1- Overview of the sample

Equipment Under Test (EUT)

| | |
|----------------------------|--|
| Name | : 2FT LED Linear Ambient Luminaire Direct |
| Model | : 31422-3750LW-1 |
| Brand Name | : A.L.P Lighting |
| Electrical Ratings | : AC120~277V, 50/60 Hz, 37W |
| Product Description | : Wrap 314 base, 5000K, Dimmable Driver: PIFC-C201B Manufacturer of light source: LG INNOTEK Model of light source: LGIT 5630 G2 Quantity of light source: 56pcs |
| Manufacturer | : A.L.P. Lighting Components, Inc. |
| Address | : 6333 Gross Point Road, Niles, IL 60714 |

TEST RESULTS

Test ambient temperature was 25.2°C.

Sample orientation was light down. Test was conducted without a dimmer in the circuit.

The stabilization time of the sample was 60 minutes, and the total operating time including stabilization was 95 minutes.

The photometric distance of Goniophotometer is 30m.

Luminous data was taken at 0.5°vertical intervals and 10°horizontal intervals.

| Parameter | Result | |
|--|------------------------------------|--------|
| Test Voltage (V) | 120.0 | 277.0 |
| Voltage frequency (Hz) | 60 | 60 |
| Test Current (A) | 0.240 | 0.113 |
| Power Factor | 0.9944 | 0.9257 |
| Test Power (W) | 28.66 | 29.07 |
| Off-State Power (W) | 0 | 0 |
| THD A% | 6.19 | 18.28 |
| Luminous Efficacy (lm/W) | 100.8 | 99.4 |
| Total Luminous Flux (lm) | 2889.9 | 2890.0 |
| Color Rendering Index (CRI) | 84.4 | |
| R9 | 12 | |
| Correlated Color Temperature (CCT) (K) | 5281 | |
| Chromaticity (Chroma x, Chroma y) | (0.3377, 0.3467) | |
| Chromaticity (Chroma u, Chroma v) | (0.2083, 0.3208) | |
| Chromaticity (Chroma u', Chroma v') | (0.2083, 0.4812) | |
| Duv | 0.0006 | |
| Average Beam Angle (°) | 107.6 | |
| Center Beam Candle Power (cd) | 991 | |
| Spacing Criteria | 1.20 (0°-180°)/ 1.21 (90°-270°) | |
| Zonal Lumens in the 0°-60°Zone | 73.50% | |
| Zonal Lumens in the 60°-90°Zone | 21.91% | |
| Zonal Lumens in the 90°-120°Zone | 2.82% | |
| Zonal Lumens in the 120°-180°Zone | 1.77% | |

| Special Rendering Indices | Color |
|---------------------------|-------|
| R1 | 83 |
| R2 | 89 |
| R3 | 93 |
| R4 | 85 |
| R5 | 84 |
| R6 | 85 |
| R7 | 87 |
| R8 | 69 |
| R9 | 12 |
| R10 | 74 |
| R11 | 85 |
| R12 | 69 |
| R13 | 84 |
| R14 | 96 |

Table 2 Test data per Goniophotometer Method

Note: According to CIE 1976 (u', v') diagram, $u' = u = 4x/(-2x+12y+3)$, $v' = 3v/2 = 9y/(-2x+12y+3)$.

Spectral Power Distribution

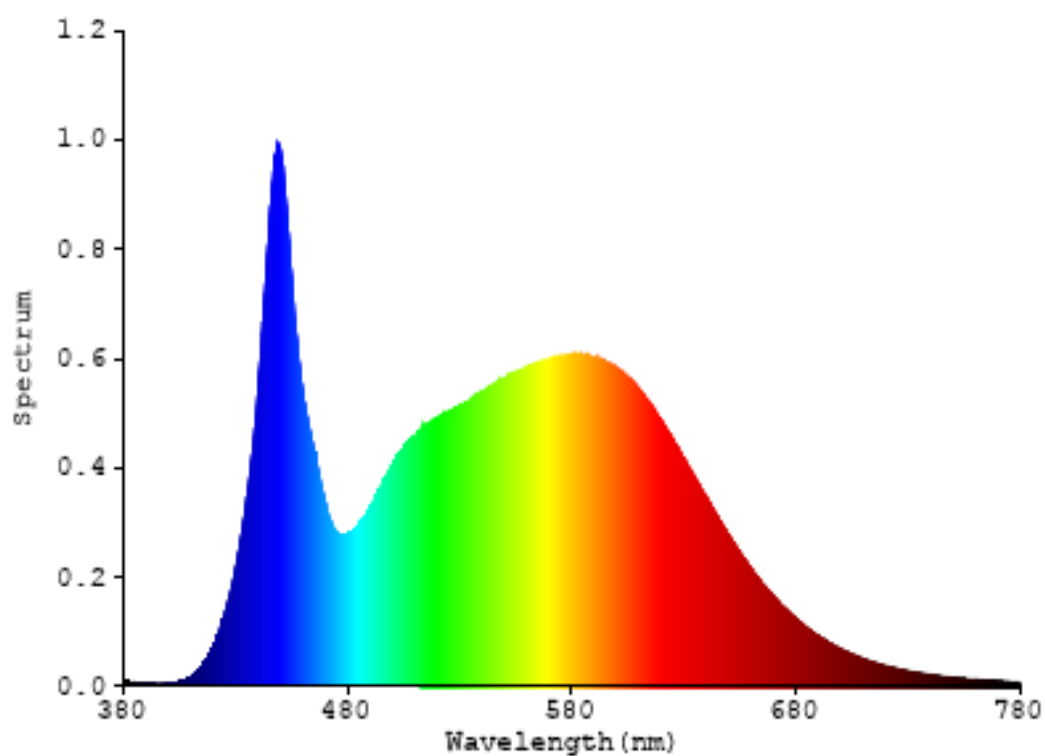


Chart 1: Spectral Power Distribution

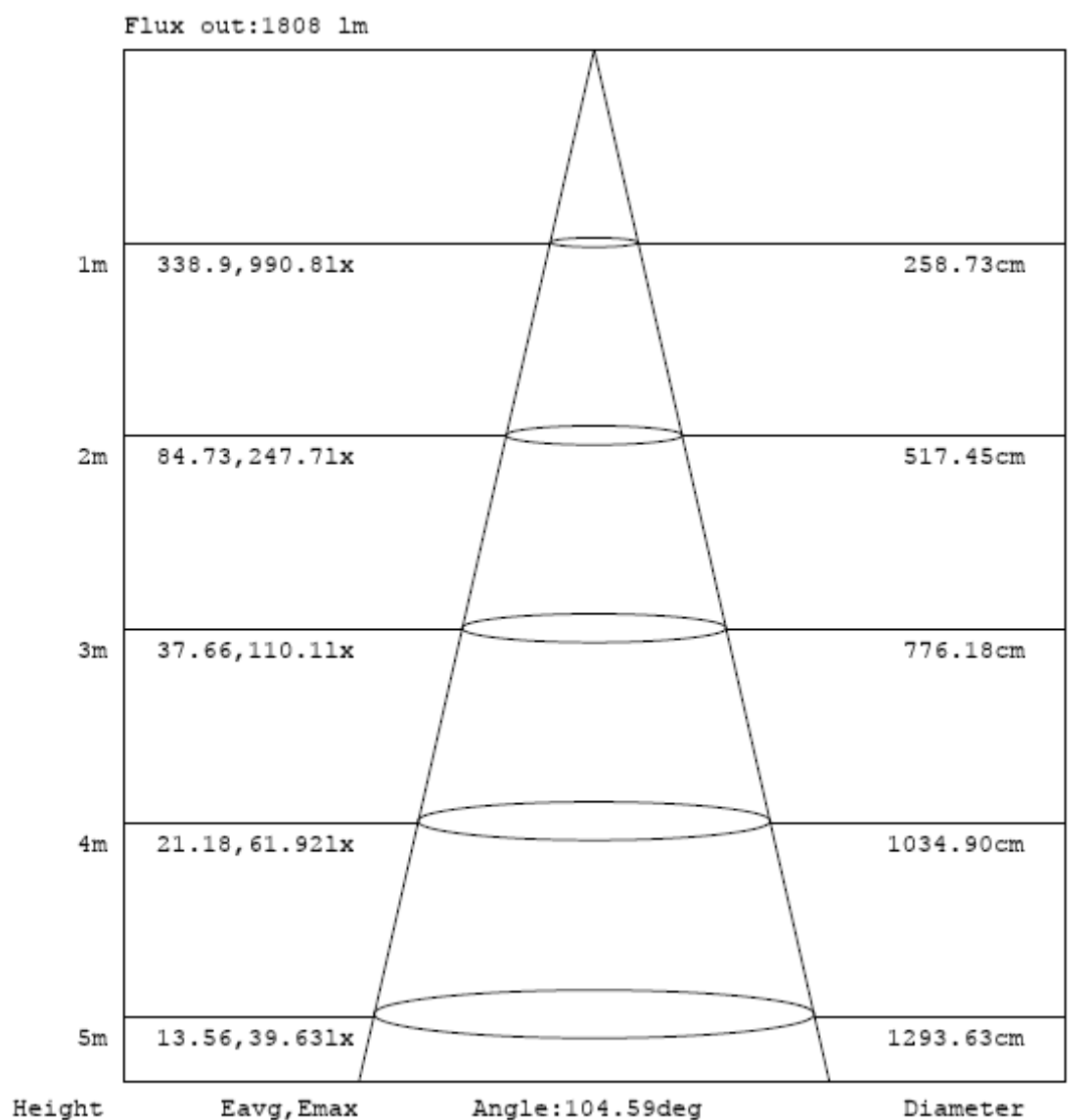
Zonal Lumen Tabulation- Goniophotometer Method

| $\gamma(^{\circ})$ | Lumens | % Total |
|--------------------|---------|---------|
| 0- 10 | 93.509 | 3.24% |
| 10- 20 | 265.438 | 9.18% |
| 20- 30 | 395.524 | 13.69% |
| 30- 40 | 466.284 | 16.13% |
| 40- 50 | 474.319 | 16.41% |
| 50- 60 | 428.925 | 14.84% |
| 60- 70 | 343.488 | 11.89% |
| 70- 80 | 225.238 | 7.79% |
| 80- 90 | 64.657 | 2.24% |
| 90-100 | 22.886 | 0.79% |
| 100-110 | 31.735 | 1.10% |
| 110-120 | 26.867 | 0.93% |
| 120-130 | 20.935 | 0.72% |
| 130-140 | 14.765 | 0.51% |
| 140-150 | 9.056 | 0.31% |
| 150-160 | 4.518 | 0.16% |
| 160-170 | 1.551 | 0.05% |
| 170-180 | 0.229 | 0.01% |
| Total | 2889.9 | 100% |

| $\gamma(^{\circ})$ | Lumens | % Total |
|--------------------|----------|---------|
| 0- 60 | 2123.999 | 73.50% |
| 60- 90 | 633.383 | 21.91% |
| 0-90 | 2757.382 | 95.41% |
| 90- 180 | 132.542 | 4.59% |
| 0- 180 | 2889.9 | 100% |

Table 3: Zonal Lumen Data

Illuminance Plots



Note: The Curves indicate the illuminated area and the average illumination when the luminaire is at different distance.

Chart 2: Beam angle

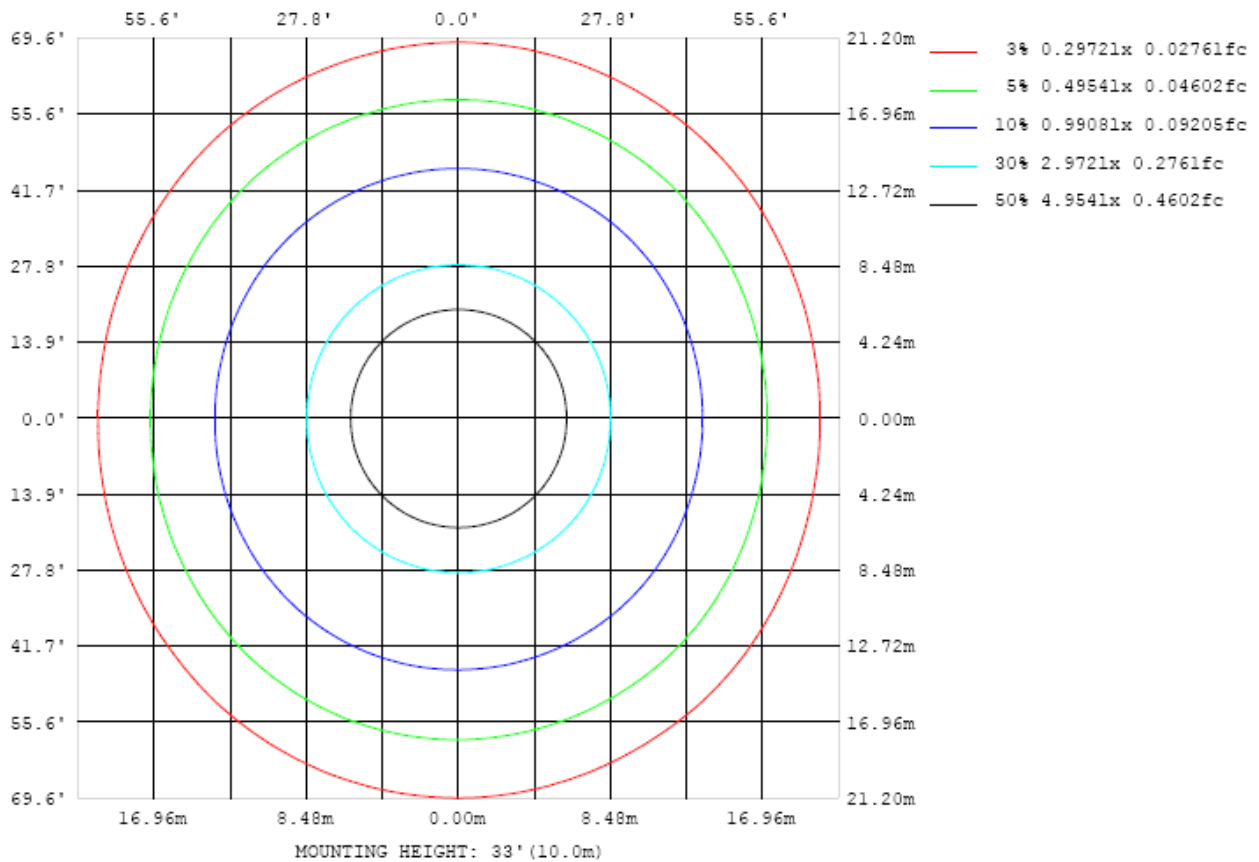


Chart 3: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

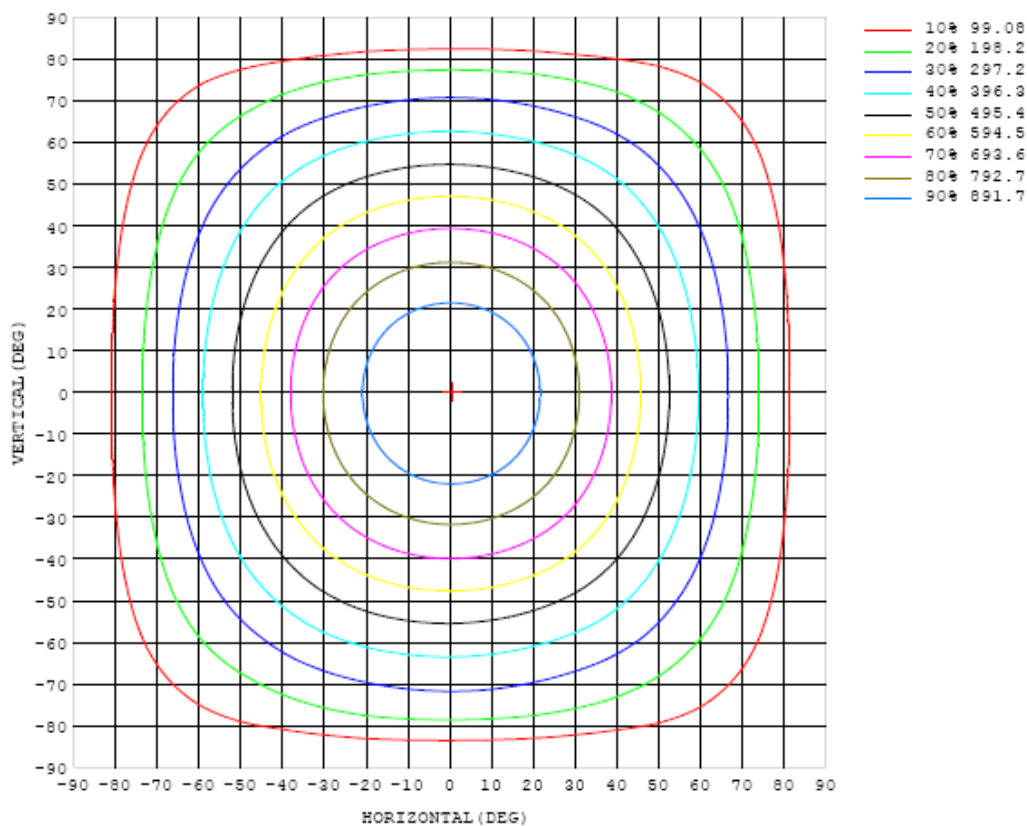


Chart 4: Isocandla Plot

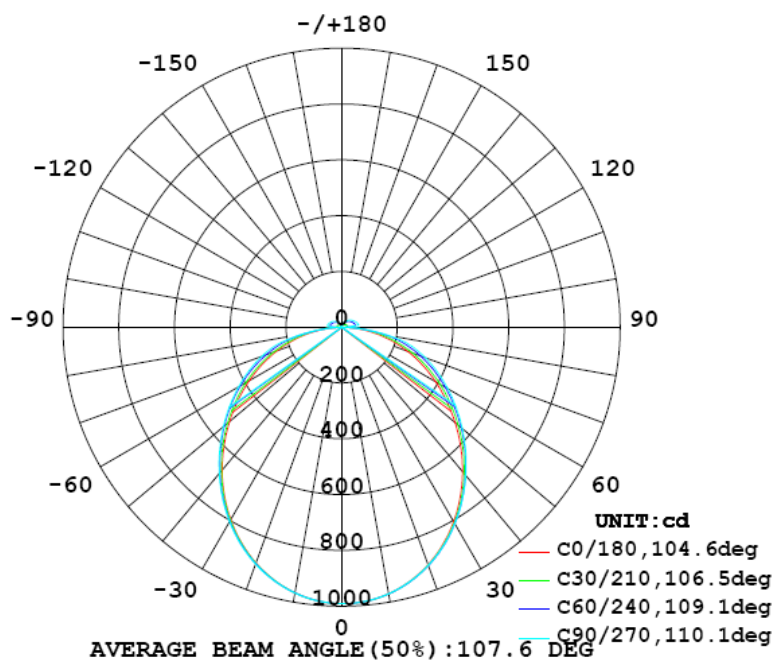


Chart 5: Polar Candela Distribution

Luminous Intensity Data

Table--1

UNIT: cd

| C (DEG) γ (DEG) | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | 170 | 180 |
|--------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 0 | 991 | 991 | 991 | 991 | 991 | 991 | 991 | 991 | 991 | 991 | 991 | 991 | 991 | 991 | 991 | 991 | 991 | 991 | 991 |
| 5 | 986 | 986 | 986 | 986 | 986 | 986 | 986 | 986 | 986 | 986 | 986 | 985 | 985 | 985 | 985 | 985 | 985 | 985 | 985 |
| 10 | 970 | 970 | 970 | 970 | 970 | 970 | 970 | 970 | 970 | 970 | 970 | 969 | 969 | 969 | 968 | 968 | 967 | 967 | 967 |
| 15 | 943 | 944 | 944 | 944 | 945 | 945 | 945 | 945 | 945 | 944 | 944 | 943 | 942 | 942 | 941 | 940 | 939 | 939 | 938 |
| 20 | 906 | 906 | 907 | 908 | 909 | 909 | 909 | 909 | 909 | 909 | 908 | 907 | 906 | 905 | 904 | 902 | 901 | 900 | 900 |
| 25 | 859 | 860 | 861 | 863 | 864 | 865 | 865 | 865 | 865 | 864 | 864 | 863 | 861 | 860 | 858 | 856 | 854 | 853 | 852 |
| 30 | 804 | 805 | 807 | 809 | 811 | 812 | 813 | 813 | 813 | 813 | 812 | 811 | 809 | 807 | 805 | 802 | 799 | 797 | 797 |
| 35 | 742 | 743 | 746 | 749 | 752 | 753 | 754 | 755 | 755 | 755 | 754 | 753 | 751 | 748 | 745 | 741 | 738 | 736 | 735 |
| 40 | 675 | 676 | 680 | 684 | 688 | 690 | 692 | 693 | 693 | 693 | 692 | 691 | 688 | 685 | 681 | 676 | 673 | 669 | 668 |
| 45 | 604 | 606 | 610 | 616 | 622 | 625 | 627 | 628 | 629 | 630 | 629 | 627 | 624 | 620 | 614 | 609 | 604 | 600 | 597 |
| 50 | 532 | 534 | 539 | 547 | 553 | 558 | 560 | 563 | 564 | 565 | 565 | 563 | 559 | 554 | 547 | 540 | 534 | 528 | 525 |
| 55 | 459 | 462 | 468 | 476 | 485 | 491 | 494 | 497 | 500 | 502 | 502 | 500 | 495 | 489 | 480 | 471 | 464 | 457 | 454 |
| 60 | 389 | 391 | 398 | 408 | 418 | 426 | 430 | 434 | 437 | 440 | 439 | 437 | 431 | 424 | 413 | 403 | 395 | 387 | 384 |
| 65 | 320 | 322 | 329 | 339 | 351 | 360 | 365 | 372 | 377 | 379 | 378 | 374 | 367 | 358 | 346 | 336 | 326 | 319 | 315 |
| 70 | 252 | 254 | 261 | 271 | 284 | 294 | 301 | 310 | 317 | 319 | 317 | 311 | 302 | 292 | 278 | 268 | 259 | 251 | 247 |
| 75 | 185 | 187 | 195 | 203 | 216 | 228 | 237 | 248 | 256 | 259 | 256 | 247 | 236 | 224 | 210 | 201 | 192 | 184 | 180 |
| 80 | 118 | 121 | 129 | 137 | 149 | 157 | 161 | 168 | 171 | 172 | 171 | 168 | 161 | 154 | 143 | 135 | 126 | 118 | 113 |
| 85 | 49.9 | 53.5 | 60.0 | 66.2 | 67.7 | 64.5 | 66.6 | 70.3 | 71.5 | 71.5 | 71.4 | 70.5 | 66.8 | 62.9 | 65.3 | 64.4 | 56.3 | 49.8 | 45.2 |
| 90 | 0.27 | 0.25 | 0.27 | 0.34 | 0.75 | 1.51 | 1.39 | 2.77 | 2.14 | 2.06 | 2.48 | 1.04 | 1.06 | 0.60 | 0.44 | 0.50 | 0.40 | 0.30 | 0.16 |
| 95 | 0.50 | 2.64 | 9.50 | 18.0 | 26.5 | 30.5 | 33.3 | 35.1 | 35.5 | 35.4 | 34.9 | 33.9 | 31.3 | 28.1 | 24.0 | 15.9 | 8.17 | 2.12 | 0.31 |
| 100 | 0.74 | 3.23 | 11.5 | 21.5 | 31.7 | 41.4 | 50.1 | 56.7 | 60.5 | 61.8 | 60.3 | 56.3 | 49.1 | 40.2 | 30.4 | 20.3 | 10.6 | 2.68 | 0.54 |
| 105 | 1.00 | 3.40 | 11.6 | 21.5 | 31.4 | 40.5 | 48.2 | 54.0 | 57.5 | 58.6 | 57.3 | 53.5 | 47.5 | 39.6 | 30.4 | 20.5 | 10.7 | 2.83 | 0.80 |
| 110 | 1.28 | 3.60 | 11.2 | 20.7 | 30.1 | 38.6 | 45.9 | 51.3 | 54.4 | 55.3 | 54.1 | 50.8 | 45.2 | 37.9 | 29.1 | 19.7 | 10.4 | 3.00 | 1.10 |
| 115 | 1.42 | 3.58 | 10.7 | 19.6 | 28.4 | 36.4 | 43.1 | 48.0 | 51.0 | 51.8 | 50.7 | 47.6 | 42.4 | 35.6 | 27.5 | 18.6 | 9.84 | 3.09 | 1.33 |
| 120 | 1.66 | 3.71 | 10.1 | 18.3 | 26.5 | 33.8 | 40.0 | 44.5 | 47.3 | 48.1 | 47.1 | 44.1 | 39.4 | 33.0 | 25.6 | 17.3 | 9.29 | 3.14 | 1.58 |
| 125 | 1.88 | 3.40 | 9.28 | 16.8 | 24.3 | 31.1 | 36.7 | 40.9 | 43.5 | 44.2 | 43.2 | 40.5 | 36.1 | 30.3 | 23.4 | 15.8 | 8.68 | 3.30 | 1.89 |
| 130 | 2.25 | 3.64 | 8.84 | 15.4 | 22.0 | 28.2 | 33.3 | 37.1 | 39.4 | 40.1 | 39.2 | 36.8 | 32.7 | 27.5 | 21.1 | 14.3 | 7.92 | 2.34 | 1.93 |
| 135 | 2.50 | 3.56 | 8.02 | 13.8 | 19.7 | 25.1 | 29.8 | 33.1 | 35.1 | 35.7 | 34.9 | 32.7 | 29.3 | 24.4 | 18.9 | 13.1 | 7.00 | 2.07 | 2.12 |
| 140 | 2.37 | 3.12 | 6.88 | 12.2 | 17.2 | 22.1 | 25.9 | 29.0 | 30.8 | 31.3 | 30.5 | 28.6 | 25.4 | 21.3 | 16.5 | 11.4 | 6.49 | 2.29 | 2.30 |
| 145 | 2.15 | 2.28 | 6.33 | 10.5 | 14.8 | 18.8 | 22.3 | 24.8 | 26.3 | 26.7 | 26.1 | 24.4 | 21.7 | 18.2 | 14.2 | 9.45 | 5.64 | 2.44 | 2.51 |
| 150 | 2.33 | 2.30 | 5.24 | 8.11 | 12.3 | 15.9 | 18.5 | 20.4 | 21.6 | 22.0 | 21.5 | 20.1 | 18.1 | 15.2 | 11.3 | 7.77 | 4.77 | 2.43 | 2.40 |
| 155 | 2.28 | 2.28 | 4.48 | 6.78 | 9.32 | 12.3 | 14.4 | 16.1 | 17.3 | 17.6 | 17.2 | 16.1 | 14.4 | 11.7 | 9.13 | 6.66 | 3.98 | 2.52 | 2.66 |
| 160 | 3.30 | 2.46 | 2.83 | 5.30 | 7.01 | 8.66 | 9.99 | 11.4 | 12.6 | 12.9 | 12.7 | 11.7 | 10.3 | 8.90 | 7.33 | 5.76 | 3.01 | 2.29 | 2.95 |
| 165 | 3.03 | 2.51 | 1.84 | 2.99 | 4.92 | 5.85 | 6.81 | 7.63 | 8.27 | 8.57 | 8.50 | 8.09 | 7.49 | 6.63 | 5.61 | 4.41 | 2.74 | 2.52 | 3.15 |
| 170 | 2.78 | 2.69 | 1.99 | 1.64 | 1.95 | 3.30 | 4.31 | 4.75 | 5.05 | 5.29 | 5.53 | 5.40 | 5.06 | 4.67 | 3.37 | 1.86 | 2.02 | 2.40 | 3.01 |
| 175 | 2.11 | 2.14 | 2.14 | 1.86 | 1.56 | 1.50 | 1.47 | 1.43 | 1.41 | 1.40 | 1.39 | 1.37 | 1.42 | 1.53 | 1.70 | 1.89 | 2.40 | 2.67 | 2.65 |
| 180 | 2.72 | 2.72 | 2.72 | 2.72 | 2.72 | 2.72 | 2.72 | 2.72 | 2.72 | 2.72 | 2.72 | 2.72 | 2.72 | 2.72 | 2.72 | 2.72 | 2.72 | 2.72 | 2.72 |

Table 4: Luminous Intensity Data

Table--2

UNIT: cd

| C (DEG) y (DEG) | 190 | 200 | 210 | 220 | 230 | 240 | 250 | 260 | 270 | 280 | 290 | 300 | 310 | 320 | 330 | 340 | 350 | | |
|--------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----|--|
| 0 | 991 | 991 | 991 | 991 | 991 | 991 | 991 | 991 | 991 | 991 | 991 | 991 | 991 | 991 | 991 | 991 | 991 | | |
| 5 | 984 | 984 | 984 | 984 | 984 | 984 | 984 | 984 | 984 | 985 | 985 | 985 | 985 | 985 | 985 | 985 | 986 | 986 | |
| 10 | 967 | 967 | 967 | 967 | 967 | 967 | 967 | 967 | 967 | 967 | 968 | 968 | 968 | 969 | 969 | 969 | 970 | | |
| 15 | 938 | 938 | 938 | 938 | 939 | 939 | 940 | 940 | 940 | 940 | 941 | 941 | 942 | 942 | 942 | 942 | 943 | | |
| 20 | 900 | 900 | 900 | 901 | 902 | 902 | 903 | 903 | 904 | 904 | 904 | 904 | 905 | 905 | 905 | 905 | 906 | | |
| 25 | 852 | 853 | 854 | 855 | 856 | 857 | 857 | 858 | 858 | 858 | 858 | 859 | 859 | 859 | 859 | 859 | 859 | | |
| 30 | 797 | 798 | 799 | 801 | 802 | 803 | 804 | 805 | 805 | 805 | 805 | 805 | 806 | 806 | 806 | 805 | 804 | 804 | |
| 35 | 735 | 736 | 738 | 741 | 743 | 744 | 745 | 746 | 747 | 747 | 747 | 746 | 746 | 746 | 746 | 744 | 743 | 742 | |
| 40 | 668 | 670 | 673 | 676 | 679 | 681 | 682 | 683 | 684 | 684 | 684 | 683 | 683 | 681 | 679 | 677 | 675 | | |
| 45 | 598 | 600 | 604 | 609 | 613 | 615 | 617 | 619 | 620 | 620 | 619 | 618 | 617 | 615 | 611 | 607 | 604 | | |
| 50 | 526 | 530 | 535 | 541 | 547 | 550 | 552 | 554 | 555 | 554 | 553 | 551 | 550 | 546 | 541 | 536 | 532 | | |
| 55 | 455 | 460 | 466 | 474 | 481 | 485 | 488 | 490 | 491 | 489 | 487 | 485 | 483 | 478 | 471 | 465 | 460 | | |
| 60 | 385 | 390 | 397 | 407 | 415 | 420 | 424 | 427 | 428 | 426 | 423 | 420 | 417 | 411 | 402 | 395 | 390 | | |
| 65 | 316 | 322 | 329 | 338 | 348 | 355 | 360 | 365 | 366 | 365 | 361 | 355 | 351 | 344 | 334 | 326 | 321 | | |
| 70 | 249 | 254 | 261 | 270 | 281 | 289 | 297 | 303 | 306 | 304 | 298 | 290 | 284 | 276 | 265 | 258 | 252 | | |
| 75 | 181 | 187 | 193 | 200 | 212 | 222 | 231 | 237 | 240 | 238 | 233 | 224 | 217 | 207 | 197 | 190 | 185 | | |
| 80 | 114 | 119 | 125 | 130 | 134 | 137 | 141 | 143 | 144 | 145 | 144 | 141 | 142 | 138 | 130 | 123 | 117 | | |
| 85 | 45.9 | 48.9 | 50.6 | 47.4 | 41.9 | 42.7 | 44.5 | 44.3 | 44.3 | 45.3 | 45.9 | 45.2 | 47.2 | 53.4 | 55.1 | 52.3 | 49.1 | | |
| 90 | 0.02 | 0.42 | 0.79 | 2.05 | 3.56 | 4.88 | 6.05 | 6.74 | 6.91 | 6.66 | 6.12 | 4.76 | 3.44 | 1.98 | 0.78 | 0.45 | 0.66 | | |
| 95 | 1.93 | 7.68 | 14.9 | 23.8 | 33.1 | 40.4 | 45.0 | 47.0 | 47.5 | 46.7 | 44.5 | 40.1 | 33.2 | 24.8 | 16.0 | 8.43 | 2.13 | | |
| 100 | 2.41 | 9.15 | 17.6 | 26.4 | 34.8 | 42.2 | 47.7 | 50.6 | 51.3 | 49.8 | 46.2 | 40.8 | 33.8 | 25.8 | 17.5 | 9.23 | 2.48 | | |
| 105 | 2.63 | 9.29 | 17.7 | 26.2 | 34.1 | 40.6 | 45.5 | 48.2 | 48.9 | 47.5 | 44.2 | 39.1 | 32.7 | 25.2 | 17.1 | 9.14 | 2.63 | | |
| 110 | 2.87 | 9.12 | 17.1 | 25.1 | 32.6 | 38.8 | 43.3 | 45.8 | 46.4 | 45.1 | 42.2 | 37.4 | 31.3 | 24.1 | 16.5 | 8.97 | 2.90 | | |
| 115 | 2.99 | 8.77 | 16.3 | 23.8 | 30.7 | 36.5 | 40.7 | 43.1 | 43.6 | 42.5 | 39.7 | 35.3 | 29.6 | 22.9 | 15.7 | 8.68 | 3.06 | | |
| 120 | 3.05 | 8.33 | 15.2 | 22.3 | 28.7 | 34.0 | 37.9 | 40.1 | 40.7 | 39.7 | 37.0 | 33.0 | 27.7 | 21.5 | 14.9 | 8.29 | 3.06 | | |
| 125 | 3.01 | 7.76 | 14.0 | 20.5 | 26.4 | 31.3 | 34.9 | 37.0 | 37.5 | 36.6 | 34.2 | 30.5 | 25.5 | 19.9 | 13.8 | 7.93 | 3.39 | | |
| 130 | 3.11 | 7.41 | 12.8 | 18.6 | 24.0 | 28.3 | 31.6 | 33.5 | 34.1 | 33.3 | 31.0 | 27.6 | 23.4 | 18.2 | 12.7 | 7.65 | 3.29 | | |
| 135 | 2.97 | 6.48 | 11.8 | 16.6 | 21.3 | 25.4 | 28.3 | 29.9 | 30.4 | 29.7 | 28.0 | 24.9 | 20.9 | 16.3 | 11.9 | 6.50 | 3.12 | | |
| 140 | 2.39 | 5.69 | 10.4 | 14.8 | 18.6 | 22.1 | 24.6 | 26.1 | 26.6 | 26.0 | 24.4 | 21.8 | 18.4 | 14.9 | 10.5 | 6.00 | 1.77 | | |
| 145 | 1.65 | 5.08 | 8.63 | 12.7 | 16.1 | 18.8 | 20.9 | 22.3 | 22.7 | 22.2 | 20.8 | 18.9 | 16.4 | 12.7 | 8.80 | 5.27 | 1.70 | | |
| 150 | 1.68 | 4.21 | 7.14 | 10.1 | 13.5 | 15.9 | 17.6 | 18.6 | 19.0 | 18.6 | 17.7 | 16.1 | 13.8 | 10.4 | 7.70 | 4.52 | 2.09 | | |
| 155 | 2.12 | 3.67 | 6.02 | 8.32 | 10.4 | 12.2 | 13.9 | 15.0 | 15.3 | 15.1 | 13.9 | 12.3 | 10.6 | 8.92 | 6.51 | 3.90 | 2.03 | | |
| 160 | 2.76 | 2.01 | 4.08 | 6.52 | 7.78 | 9.11 | 10.1 | 10.8 | 11.0 | 10.8 | 10.1 | 9.42 | 8.25 | 6.83 | 4.38 | 2.31 | 3.06 | | |
| 165 | 3.32 | 2.81 | 1.88 | 3.60 | 5.69 | 6.50 | 7.24 | 7.76 | 7.92 | 7.83 | 7.40 | 6.62 | 5.92 | 4.30 | 2.47 | 2.49 | 3.03 | | |
| 170 | 2.89 | 2.91 | 2.51 | 1.88 | 1.64 | 2.10 | 3.51 | 4.34 | 4.50 | 4.46 | 4.11 | 2.74 | 1.64 | 1.71 | 2.13 | 2.71 | 2.80 | | |
| 175 | 2.63 | 2.56 | 2.70 | 2.83 | 2.91 | 2.69 | 2.26 | 1.95 | 1.84 | 1.94 | 2.16 | 2.33 | 2.51 | 2.50 | 2.36 | 2.17 | 2.15 | | |
| 180 | 2.72 | 2.72 | 2.72 | 2.72 | 2.72 | 2.72 | 2.72 | 2.72 | 2.72 | 2.72 | 2.72 | 2.72 | 2.72 | 2.72 | 2.72 | 2.72 | 2.72 | | |

Table 5: Luminous Intensity Data

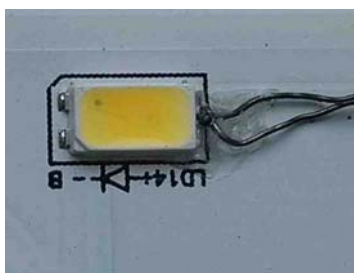
ISTMT TEST DATA:

Sample Tested: **31422-3750LW-1**

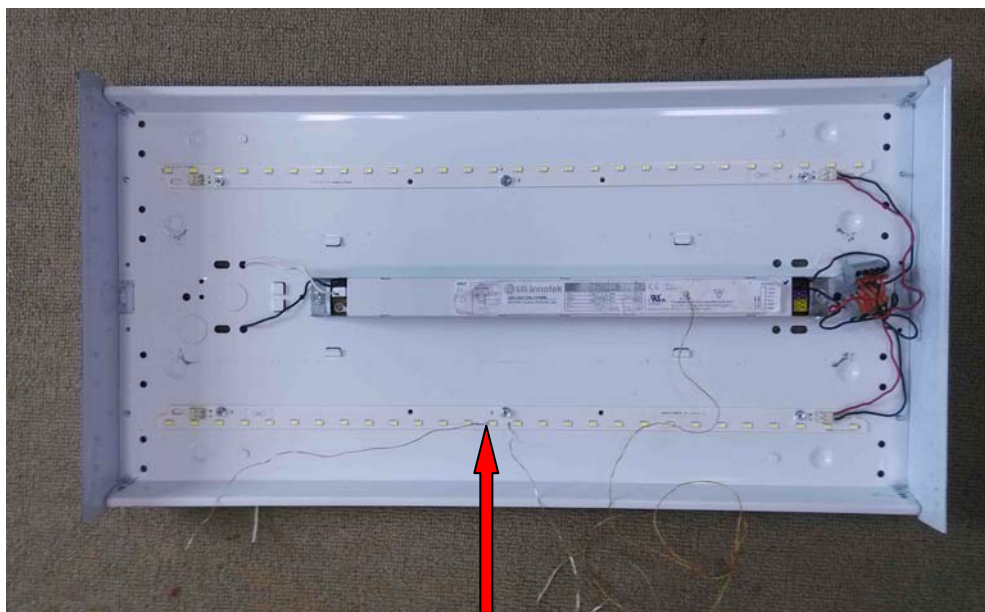
Test ambient temperature was 28.7°C.

Test orientation was Light Down.

The stabilization time of the sample was 7.5 hours.



View of In-Situ Point- Ts



Location of In-Situ Point from overall view

To get the maximum temperature, Ts point is middle of the LED board.

| Input Voltage (V) | Input Power (W) | Tested LED source current (mA) | Measured Driver Temp Maximum Temperature (Corrected to Ta=25°C) | Measured In-Situ Maximum Temperature (Corrected to Ta=25°C) |
|----------------------|--------------------|--------------------------------------|---|---|
| 120.0 | 28.66 | 142.3 | 43.1 | 50.4 |
| 277.0 | 29.07 | 142.4 | 43.2 | 50.6 |

Table 6: ISTMT test data

EQUIPMENT LIST

| Test Equipment | Model | Equipment No. | Calibration Date | Calibration Due date |
|-----------------------------------|-----------|---------------|------------------|----------------------|
| Goniophotometer system | GO-R5000 | HZTE011-01 | Sep. 18, 2014 | Sep. 17, 2015 |
| Digital Power Meter | PF2010A | HZTE028-01 | Sep. 18, 2014 | Sep. 17, 2015 |
| AC Power Supply | PCR 500L | HZTE001-08 | Sep. 18, 2014 | Sep. 17, 2015 |
| DC Power Supply | WY12010 | HZTE004-03 | Sep. 18, 2014 | Sep. 17, 2015 |
| Temperature Meter | TES1310 | HZTE017-01 | Sep. 18, 2014 | Sep. 17, 2015 |
| Standard source | D908 | HZTE012-01 | Sep. 18, 2014 | Sep. 17, 2015 |
| Digital Power Meter | WT210 | HZTE008-01 | Sep. 18, 2014 | Sep. 17, 2015 |
| AC Power Supply | PCR 500L | HZTE001-07 | Sep. 18, 2014 | Sep. 17, 2015 |
| DC Power Supply | 6154 | HZTE004-04 | Sep. 18, 2014 | Sep. 17, 2015 |
| Temperature and humidity recorder | JR900 | HZTE018-01 | Sep. 18, 2014 | Sep. 17, 2015 |
| Multi-Meter | FLUKE 289 | HZTE020-03 | Nov. 09, 2014 | Nov. 08, 2015 |

Table 7: Test Equipment List

TEST METHODS

Seasoning of SSL Product

For the purpose of rating new SSL products, SSL products shall be tested with no seasoning. Therefore, no seasoning was performed.

Goniophotometer Method

Photometric and Electrical Measurements

An EVERFINE Type C Model GO-R5000 Goniophotometer was used to measure the intensity at each angle of distribution for each sample. The photometric distance is 2.475m for near-field measurement or 30m for far-field measurement. Bandwidth of spectroradiometer is 380nm-780nm.

Ambient temperature was measured at the same height of the sample mounted on the Goniophotometer equipment. Each SSL unit was operated on the client provided driver at the rated input voltage in its designated orientation.

The stabilization time typically ranges from 30 min (small integrated LED lamps) to 2 or more hours for large SSL luminaires). It can be judged that stability is reached when the variation (maximum – minimum) of at least 3 readings of the light output and electrical power over a period of 30 min, taken 15 minutes apart, is less than 0.5 %.

Electrical measurements including voltage, current, and power were measured using the Everfine Digital Power Meter.

Some graphics were created with Photometric Plus software.

The standard reference of the Goniophotometer system is halogen incandescent lamp, the intensity distribution type is omni-directional, and is traceable to the National Institute of Metrology P.R. China.

The uncertainty of goniophotometer system reported in this document is expanded uncertainty is 1.94% with a coverage factor $k=2$.

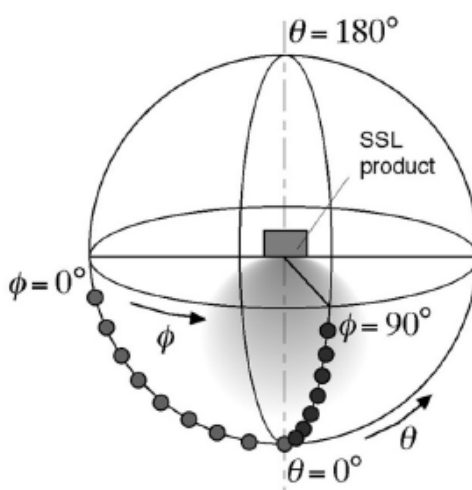
Color Characteristics Measurements

The color characteristics of SSL products include chromaticity coordinates, correlated color temperature, and color rendering index. These characteristics of SSL products may be spatially non-uniform, and thus, in order that they can be specified accurately, the color quantities shall be measured as values that are spatially average, weighted to intensity, over the angular range where light is intentionally emitted from the SSL product. The color characteristics measurements are using gonio-spectroradiometer.

Color Spatial Uniformity

The characteristics of SSL products may be spatially non-uniform, the chromaticity coordinate shall be measured at two vertical planes ($C=0^\circ/180^\circ$ and $C=90^\circ/270^\circ$) and at 10° or less intervals for vertical angle until the light output dropped to below 10% of the peak intensity. The averaged weighted chromaticity coordinate was calculated from these points. The data was then analyzed to check for delta color differences of the u' , v' chromaticity coordinates. The spatial non-uniformity of chromaticity, $\Delta u'v'$, is determined as the maximum deviation (distance on the CIE (u' , v') diagram) among all measured points from the spatially averaged chromaticity coordinate.

The geometry for the chromaticity measurement using gonio-spectroradiometer is shown as following.



ISTMT

The luminaire was installed to simulate intended usage, in accordance with the manufacturer's instructions.

Temperatures were measured after they stabilized, when the test was run for a minimum of 7.5 h.

The tests were conducted in an ambient temperature of 25 ± 5 °C. Ambient temperature variations above or below 25°C were respectively subtracted from or added to temperatures recorded at points on the luminaire.

Temperatures recorded at points on a luminaire were measured by means of thermocouples.

The thermocouples had conductors no larger than No. 24 AWG (0.21mm^2) and no smaller than No. 30 AWG (0.05mm^2). Thermocouples complied with the requirements specified in ASTM MNL 12 and thermocouples as listed in the table of the limits of error specified in NIST ITS 90, or ISA MC96.1.

The luminaire was installed in the test box in the configuration that resulted in the highest operating temperatures, considering different trim and maximum lamp wattage combinations, lampholder adjustment heights, and the like.

The test box was constructed of 12mm thick plywood as described below:

The test box was rectangular and had four sides and a bottom.

The four sides of the test box for a ceiling-mounted luminaire were a minimum distance of 8.5 in (215mm) from the nearest part of the lamp housing or heat-producing parts. The top edge of the sides of the test box were a minimum of 8.5 in (215mm) above the highest point of any permanently attached part of the lamp housing.

Thermal insulation of the loose-fill type was poured into the test box through the open top, until level with the top, without applying any compacting procedure.

The thermal insulation was conditioned to the density specified by the insulation manufacturer to obtain a required rated thermal resistance of Rsi 0.56 to 0.678 (R3.2 to R3.85).

All spaces around the luminaire and between it and the sides of the box were filled with the thermal insulation.

*** End of Report ***

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