# LM-79-08 Test Report

for

# GREEN CREATIVE LTD

756 North Zhongshan Rd., Unit B301 Zhabei District, Shanghai

# WALL PACK

# Model: 40HIDWP/850/277V/EX39

# 40HIDWP/850/277V/E26

## Laboratory: Leading Testing Laboratories

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Report No.: HZ18020011d

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

**Review by:**

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Feb. 11, 2018

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Manager: Jim Zhang
Feb. 11, 2018

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: **40HIDWP/850/277V/EX39**

| Luminous Efficacy (Lumens /Watt) | Total Luminous Flux (Lumens) | Power (Watts) | Power Factor |
|---|---|---|---|
| 152.8 | 6029.2 | 39.45 | 0.9914 |

| CCT (K) | CRI | Stabilization Time (Light & Power) |
|---|---|---|
| 5077 | 84.3 | 60 |

Table 1: Executive Data Summary

Note: The above results are recorded/ derived from measurements made using an Integrating Sphere.

| **Test specifications:** | |
|---|---|
| **Date of Receipt** | : Feb. 06, 2018 |
| **Date of Test** | : Feb. 09, 2018 |
| **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 |

# TABLE OF CONTENT

LM-79-08 Test Report ..... 1
Sample Photos ..... 4
TEST RESULTS ..... 5
Spectral Power Distribution ..... 6
Zonal Lumen Tabulation ..... 7
Luminous Intensity Distribution Plots ..... 9
Luminous Intensity Data ..... 10
EQUIPMENT LIST ..... 12
TEST METHODS ..... 12
Seasoning of SSL Product ..... 12
Goniophotometer Method ..... 12
Photometric and Electrical Measurements ..... 12
Color Characteristics Measurements ..... 13
Color Spatial Uniformity ..... 13

## Sample Photos

40HIDWP/850/277V/EX39

40HIDWP/850/277V/E26

| **Equipment Under Test (EUT)** | |
|---|---|
| **Name** | : WALL PACK |
| **Model** | : 40HIDWP/850/277V/EX39 |
| **Electrical Ratings** | : 120-277V, 60Hz |
| **Product Description** | : EX39/E26 base, 5000K |
| **Manufacturer** | : GREEN CREATIVE LTD |
| **Address** | : 756 North Zhongshan Rd., Unit B301 Zhabei District, Shanghai |

Note: Model 40HIDWP/850/277V/EX39 and model 40HIDWP/850/277V/E26 are identical except their different screw base. Model 40HIDWP/850/277V/EX39 is EX39 base. 40HIDWP/850/277V/E26 is E26 base. Model 40HIDWP/850/277V/EX39 was chosen to be representative model in this report.

## TEST RESULTS

Test ambient temperature was 25.0℃.

Base orientation was base up. 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 2.47 m.

Luminous data was taken at 0.5° vertical intervals and 10.0°horizontal intervals.

| Parameter | Result | |
|---|---|---|
| Test Voltage (V) | 120.0 | 277.0 |
| Voltage frequency (Hz) | 60 | 60 |
| Test Current (A) | 0.332 | 0.160 |
| Power Factor | 0.9914 | 0.8983 |
| Test Power (W) | 39.45 | 39.74 |
| THD A% | 10.23 | 15.32 |
| Luminous Efficacy (lm/W) | 152.8 | 151.7 |
| Total Luminous Flux (lm) | 6029.2 | 6028.4 |
| Color Rendering Index (CRI) | 84.3 | |
| R9 | 16 | |
| Correlated Color Temperature (CCT) (K) | 5077 | |
| Chromaticity (Chroma x, Chroma y) | (0.3430, 0.3509) | |
| Chromaticity (Chroma u, Chroma v) | (0.2103, 0.3227) | |
| Chromaticity (Chroma u', Chroma v') | (0.2103, 0.4840) | |
| Duv | 0.0005 | |
| Average Beam Angle (°) | 118.5 | |
| Center Beam Candle Power (cd) | 1775 | |
| Spacing Criteria | 1.21 (0°-180°)/ 1.27 (90°-270°) | |
| Zonal Lumens in the 0°-60°Zone | 66.75% | |
| Zonal Lumens in the 60°-90°Zone | 26.48% | |
| Zonal Lumens in the 90°-120°Zone | 6.44% | |
| Zonal Lumens in the 120°-180°Zone | 0.33% | |

| Special Color Rendering Indices | |
|---|---|
| R1 | 83 |
| R2 | 89 |
| R3 | 92 |
| R4 | 85 |
| R5 | 84 |
| R6 | 84 |
| R7 | 88 |
| R8 | 70 |
| R9 | 16 |
| R10 | 73 |
| R11 | 84 |
| R12 | 65 |
| R13 | 85 |
| R14 | 96 |
| Rf | 83 |
| Rg | 97 |

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

| γ(°) | Lumens | % Total |
|---|---|---|
| 0- 10 | 167.645 | 2.78% |
| 10- 20 | 480.036 | 7.96% |
| 20- 30 | 727.564 | 12.07% |
| 30- 40 | 875.929 | 14.53% |
| 40- 50 | 913.536 | 15.15% |
| 50- 60 | 859.808 | 14.26% |
| 60- 70 | 724.895 | 12.02% |
| 70- 80 | 527.847 | 8.75% |
| 80- 90 | 343.728 | 5.70% |
| 90-100 | 219.924 | 3.65% |
| 100-110 | 119.923 | 1.99% |
| 110-120 | 48.134 | 0.80% |
| 120-130 | 11.993 | 0.20% |
| 130-140 | 3.912 | 0.06% |
| 140-150 | 2.18 | 0.04% |
| 150-160 | 1.268 | 0.02% |
| 160-170 | 0.639 | 0.01% |
| 170-180 | 0.195 | 0.00% |
| Total | 6029.2 | 100% |

| γ(°) | Lumens | % Total |
|---|---|---|
| 0- 60 | 4024.518 | 66.75% |
| 60- 90 | 1596.47 | 26.48% |
| 0-90 | 5620.988 | 93.23% |
| 90- 180 | 408.168 | 6.77% |
| 0- 180 | 6029.2 | 100% |

Table 3: Zonal Lumen Data

Chart 2: Illuminance Plot (Footcandles)

## Luminous Intensity Distribution Plots

Chart 3: Isocandela Plot

Chart 4: Polar Candela Distribution

## Luminous Intensity Data

Table--1 UNIT: cd

| γ (DEG) \ C (DEG) | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | 170 | 180 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 1775 | 1775 | 1775 | 1775 | 1775 | 1775 | 1775 | 1775 | 1775 | 1775 | 1775 | 1775 | 1775 | 1775 | 1775 | 1775 | 1775 | 1775 | 1775 |
| 5 | 1785 | 1787 | 1785 | 1785 | 1783 | 1779 | 1777 | 1773 | 1768 | 1766 | 1760 | 1756 | 1752 | 1746 | 1744 | 1740 | 1739 | 1740 | 1740 |
| 10 | 1783 | 1782 | 1780 | 1777 | 1773 | 1770 | 1766 | 1761 | 1754 | 1747 | 1738 | 1728 | 1716 | 1705 | 1698 | 1693 | 1688 | 1689 | 1689 |
| 15 | 1761 | 1759 | 1756 | 1753 | 1750 | 1744 | 1737 | 1728 | 1719 | 1708 | 1693 | 1679 | 1665 | 1653 | 1642 | 1635 | 1628 | 1630 | 1631 |
| 20 | 1720 | 1717 | 1715 | 1713 | 1704 | 1698 | 1691 | 1679 | 1668 | 1655 | 1636 | 1617 | 1599 | 1584 | 1576 | 1571 | 1564 | 1563 | 1565 |
| 25 | 1656 | 1653 | 1651 | 1646 | 1640 | 1634 | 1628 | 1616 | 1601 | 1584 | 1562 | 1541 | 1523 | 1508 | 1497 | 1492 | 1489 | 1493 | 1498 |
| 30 | 1562 | 1560 | 1561 | 1559 | 1555 | 1551 | 1542 | 1526 | 1513 | 1491 | 1467 | 1445 | 1428 | 1417 | 1407 | 1405 | 1410 | 1420 | 1431 |
| 35 | 1437 | 1439 | 1446 | 1452 | 1452 | 1446 | 1435 | 1426 | 1420 | 1401 | 1373 | 1342 | 1317 | 1308 | 1309 | 1316 | 1327 | 1337 | 1340 |
| 40 | 1295 | 1293 | 1306 | 1321 | 1327 | 1326 | 1337 | 1338 | 1333 | 1314 | 1284 | 1251 | 1218 | 1196 | 1200 | 1224 | 1236 | 1240 | 1244 |
| 45 | 1136 | 1139 | 1160 | 1181 | 1195 | 1224 | 1238 | 1240 | 1244 | 1233 | 1195 | 1151 | 1120 | 1104 | 1100 | 1113 | 1120 | 1120 | 1130 |
| 50 | 982 | 984 | 1007 | 1032 | 1072 | 1112 | 1138 | 1163 | 1170 | 1160 | 1120 | 1072 | 1033 | 1009 | 1004 | 992 | 988 | 986 | 993 |
| 55 | 849 | 841 | 843 | 877 | 946 | 1001 | 1047 | 1076 | 1089 | 1081 | 1038 | 985 | 950 | 924 | 903 | 879 | 854 | 847 | 834 |
| 60 | 711 | 707 | 707 | 744 | 816 | 894 | 951 | 989 | 1008 | 1000 | 955 | 902 | 866 | 838 | 807 | 761 | 716 | 681 | 664 |
| 65 | 547 | 561 | 581 | 628 | 702 | 782 | 850 | 892 | 915 | 907 | 862 | 812 | 780 | 749 | 705 | 639 | 565 | 502 | 486 |
| 70 | 350 | 378 | 452 | 511 | 588 | 670 | 736 | 776 | 801 | 794 | 752 | 707 | 683 | 659 | 596 | 515 | 417 | 344 | 334 |
| 75 | 204 | 235 | 319 | 403 | 465 | 545 | 620 | 672 | 693 | 690 | 650 | 603 | 570 | 538 | 482 | 403 | 299 | 225 | 195 |
| 80 | 88.2 | 118 | 203 | 300 | 361 | 445 | 528 | 578 | 599 | 596 | 560 | 521 | 494 | 453 | 377 | 282 | 195 | 124 | 91.2 |
| 85 | 26.0 | 48.5 | 121 | 211 | 295 | 361 | 434 | 486 | 512 | 514 | 479 | 442 | 415 | 374 | 299 | 206 | 129 | 57.5 | 34.0 |
| 90 | 3.80 | 17.6 | 66.9 | 148 | 230 | 293 | 364 | 420 | 450 | 451 | 416 | 385 | 360 | 308 | 229 | 147 | 75.9 | 22.5 | 4.68 |
| 95 | 0.05 | 5.82 | 32.9 | 94.2 | 167 | 233 | 294 | 351 | 381 | 382 | 353 | 324 | 298 | 242 | 169 | 102 | 41.0 | 9.02 | 0.00 |
| 100 | 0.00 | 3.44 | 15.8 | 46.6 | 109 | 172 | 227 | 283 | 317 | 319 | 293 | 267 | 235 | 178 | 110 | 51.9 | 19.4 | 5.96 | 0.00 |
| 105 | 0.04 | 2.13 | 11.4 | 27.3 | 54.1 | 102 | 160 | 207 | 243 | 246 | 223 | 198 | 163 | 108 | 59.8 | 31.2 | 14.3 | 3.56 | 0.15 |
| 110 | 0.33 | 1.50 | 6.28 | 17.0 | 36.3 | 64.7 | 98.0 | 131 | 158 | 162 | 146 | 127 | 101 | 68.9 | 41.2 | 20.4 | 8.15 | 2.08 | 0.44 |
| 115 | 0.54 | 1.31 | 4.39 | 10.9 | 19.4 | 33.6 | 58.0 | 80.9 | 99.0 | 102 | 92.0 | 79.4 | 60.8 | 37.8 | 20.9 | 13.6 | 5.49 | 1.74 | 0.63 |
| 120 | 0.68 | 1.30 | 3.30 | 6.67 | 12.1 | 20.5 | 28.8 | 35.8 | 46.0 | 49.4 | 44.1 | 36.4 | 30.6 | 24.9 | 13.9 | 8.08 | 4.05 | 1.72 | 0.74 |
| 125 | 0.82 | 1.29 | 2.74 | 4.75 | 7.22 | 11.1 | 16.3 | 20.9 | 27.5 | 29.8 | 26.5 | 22.1 | 18.6 | 13.0 | 8.71 | 5.84 | 3.27 | 1.51 | 0.90 |
| 130 | 1.01 | 1.25 | 2.24 | 3.75 | 5.35 | 6.99 | 8.43 | 9.95 | 12.0 | 13.0 | 12.3 | 10.9 | 9.61 | 8.28 | 6.51 | 4.52 | 2.74 | 1.40 | 1.15 |
| 135 | 1.19 | 1.29 | 1.96 | 3.08 | 4.11 | 5.24 | 6.13 | 6.70 | 6.81 | 6.60 | 7.12 | 7.45 | 7.02 | 6.09 | 4.89 | 3.59 | 2.36 | 1.42 | 1.44 |
| 140 | 1.36 | 1.39 | 1.75 | 2.53 | 3.33 | 4.03 | 4.62 | 4.99 | 4.93 | 4.66 | 5.16 | 5.50 | 5.24 | 4.63 | 3.86 | 3.00 | 2.00 | 1.51 | 1.72 |
| 145 | 1.47 | 1.49 | 1.65 | 2.17 | 2.82 | 3.26 | 3.61 | 3.84 | 3.80 | 3.66 | 3.96 | 4.18 | 4.04 | 3.67 | 3.18 | 2.51 | 1.82 | 1.61 | 1.96 |
| 150 | 1.54 | 1.55 | 1.61 | 1.84 | 2.30 | 2.71 | 2.91 | 3.00 | 2.98 | 2.94 | 3.09 | 3.24 | 3.21 | 3.01 | 2.64 | 2.10 | 1.71 | 1.67 | 2.12 |
| 155 | 1.64 | 1.64 | 1.66 | 1.71 | 1.93 | 2.28 | 2.49 | 2.57 | 2.53 | 2.53 | 2.60 | 2.72 | 2.70 | 2.51 | 2.21 | 1.85 | 1.72 | 1.74 | 2.21 |
| 160 | 1.74 | 1.74 | 1.74 | 1.78 | 1.80 | 1.81 | 1.98 | 2.20 | 2.24 | 2.25 | 2.28 | 2.30 | 2.19 | 1.93 | 1.87 | 1.86 | 1.79 | 1.80 | 2.23 |
| 165 | 1.84 | 1.84 | 1.83 | 1.84 | 1.87 | 1.85 | 1.80 | 1.77 | 1.76 | 1.77 | 1.79 | 1.81 | 1.84 | 1.86 | 1.85 | 1.85 | 1.85 | 1.86 | 2.19 |
| 170 | 1.96 | 1.96 | 1.95 | 1.94 | 1.94 | 1.92 | 1.90 | 1.88 | 1.87 | 1.87 | 1.87 | 1.89 | 1.91 | 1.93 | 1.94 | 1.95 | 1.96 | 1.95 | 2.13 |
| 175 | 2.10 | 2.09 | 2.08 | 2.07 | 2.05 | 2.03 | 2.01 | 1.99 | 1.98 | 1.98 | 1.98 | 2.00 | 2.02 | 2.04 | 2.06 | 2.08 | 2.10 | 2.10 | 2.10 |
| 180 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |

Table 4: Luminous Intensity Data

Table--2 UNIT: cd

| γ (DEG) \ C (DEG) | 190 | 200 | 210 | 220 | 230 | 240 | 250 | 260 | 270 | 280 | 290 | 300 | 310 | 320 | 330 | 340 | 350 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 1775 | 1775 | 1775 | 1775 | 1775 | 1775 | 1775 | 1775 | 1775 | 1775 | 1775 | 1775 | 1775 | 1775 | 1775 | 1775 | 1775 |
| 5 | 1741 | 1741 | 1743 | 1745 | 1750 | 1754 | 1757 | 1762 | 1768 | 1770 | 1775 | 1777 | 1779 | 1781 | 1782 | 1785 | 1786 |
| 10 | 1690 | 1692 | 1696 | 1703 | 1714 | 1723 | 1731 | 1741 | 1751 | 1758 | 1765 | 1770 | 1774 | 1775 | 1776 | 1779 | 1780 |
| 15 | 1631 | 1636 | 1643 | 1651 | 1660 | 1672 | 1686 | 1700 | 1716 | 1726 | 1734 | 1742 | 1747 | 1753 | 1759 | 1759 | 1758 |
| 20 | 1568 | 1575 | 1581 | 1589 | 1599 | 1608 | 1620 | 1635 | 1655 | 1668 | 1679 | 1693 | 1705 | 1713 | 1719 | 1722 | 1718 |
| 25 | 1503 | 1510 | 1514 | 1518 | 1521 | 1529 | 1548 | 1571 | 1593 | 1607 | 1618 | 1629 | 1640 | 1652 | 1661 | 1661 | 1657 |
| 30 | 1438 | 1442 | 1442 | 1439 | 1444 | 1455 | 1468 | 1488 | 1513 | 1531 | 1544 | 1562 | 1568 | 1568 | 1577 | 1573 | 1566 |
| 35 | 1347 | 1356 | 1354 | 1353 | 1358 | 1364 | 1385 | 1413 | 1441 | 1458 | 1465 | 1471 | 1475 | 1474 | 1465 | 1462 | 1448 |
| 40 | 1250 | 1259 | 1261 | 1261 | 1266 | 1282 | 1292 | 1309 | 1332 | 1354 | 1372 | 1385 | 1376 | 1359 | 1342 | 1325 | 1309 |
| 45 | 1137 | 1143 | 1152 | 1166 | 1175 | 1169 | 1178 | 1208 | 1237 | 1253 | 1256 | 1264 | 1266 | 1244 | 1213 | 1188 | 1166 |
| 50 | 999 | 1011 | 1030 | 1056 | 1063 | 1076 | 1104 | 1137 | 1165 | 1181 | 1183 | 1169 | 1141 | 1120 | 1082 | 1048 | 1013 |
| 55 | 851 | 877 | 906 | 937 | 971 | 1002 | 1027 | 1061 | 1092 | 1108 | 1105 | 1082 | 1038 | 983 | 942 | 885 | 856 |
| 60 | 685 | 733 | 784 | 826 | 883 | 919 | 944 | 973 | 1004 | 1020 | 1017 | 990 | 939 | 866 | 793 | 737 | 711 |
| 65 | 510 | 572 | 652 | 730 | 786 | 826 | 858 | 888 | 922 | 936 | 923 | 886 | 830 | 755 | 673 | 605 | 570 |
| 70 | 362 | 427 | 532 | 620 | 688 | 740 | 766 | 789 | 820 | 833 | 825 | 788 | 724 | 641 | 551 | 467 | 401 |
| 75 | 230 | 310 | 415 | 511 | 581 | 640 | 677 | 707 | 735 | 746 | 729 | 682 | 614 | 529 | 433 | 342 | 247 |
| 80 | 128 | 214 | 304 | 407 | 493 | 544 | 574 | 594 | 617 | 627 | 618 | 579 | 514 | 421 | 328 | 235 | 137 |
| 85 | 59.8 | 133 | 221 | 307 | 386 | 443 | 480 | 504 | 527 | 531 | 515 | 469 | 400 | 319 | 237 | 142 | 64.2 |
| 90 | 25.9 | 78.7 | 157 | 238 | 318 | 380 | 418 | 439 | 456 | 463 | 447 | 401 | 330 | 249 | 167 | 83.5 | 22.7 |
| 95 | 10.7 | 43.8 | 104 | 178 | 252 | 317 | 356 | 379 | 393 | 399 | 381 | 331 | 260 | 184 | 110 | 45.6 | 8.67 |
| 100 | 5.34 | 23.9 | 64.5 | 127 | 187 | 248 | 289 | 309 | 323 | 327 | 307 | 258 | 195 | 131 | 68.1 | 24.2 | 4.69 |
| 105 | 3.41 | 14.7 | 39.0 | 81.2 | 133 | 191 | 231 | 251 | 262 | 265 | 245 | 198 | 138 | 84.6 | 41.5 | 13.7 | 3.38 |
| 110 | 2.46 | 8.76 | 21.1 | 49.5 | 93.5 | 133 | 165 | 181 | 191 | 192 | 173 | 138 | 94.1 | 51.4 | 18.9 | 7.68 | 2.59 |
| 115 | 2.06 | 6.10 | 12.1 | 22.9 | 44.8 | 81.7 | 118 | 136 | 143 | 144 | 124 | 84.5 | 45.9 | 20.1 | 11.4 | 5.44 | 2.20 |
| 120 | 1.77 | 4.72 | 8.27 | 13.6 | 21.8 | 33.0 | 49.7 | 63.3 | 71.5 | 67.5 | 50.7 | 32.7 | 20.6 | 12.4 | 7.00 | 4.32 | 1.99 |
| 125 | 1.64 | 3.99 | 6.51 | 8.95 | 11.7 | 16.9 | 23.8 | 29.4 | 29.3 | 29.3 | 24.4 | 15.6 | 10.3 | 7.60 | 5.75 | 3.59 | 1.78 |
| 130 | 1.66 | 3.48 | 5.43 | 7.16 | 8.46 | 9.41 | 10.4 | 11.4 | 11.4 | 10.8 | 9.29 | 8.14 | 7.24 | 6.19 | 4.89 | 3.19 | 1.52 |
| 135 | 1.76 | 3.16 | 4.86 | 5.95 | 6.84 | 7.43 | 7.60 | 7.29 | 6.75 | 6.65 | 6.74 | 6.48 | 5.96 | 5.25 | 4.45 | 3.07 | 1.49 |
| 140 | 1.91 | 2.93 | 4.36 | 5.11 | 5.76 | 6.16 | 6.24 | 5.95 | 5.52 | 5.46 | 5.59 | 5.47 | 5.15 | 4.65 | 3.95 | 2.77 | 1.57 |
| 145 | 2.01 | 2.51 | 3.72 | 4.46 | 4.86 | 5.22 | 5.32 | 5.13 | 4.86 | 4.82 | 4.91 | 4.77 | 4.45 | 4.11 | 3.47 | 2.47 | 1.74 |
| 150 | 2.15 | 2.35 | 3.07 | 3.97 | 4.36 | 4.49 | 4.47 | 4.34 | 4.17 | 4.13 | 4.18 | 4.17 | 4.09 | 3.72 | 2.86 | 2.21 | 1.88 |
| 155 | 2.24 | 2.27 | 2.53 | 3.41 | 3.96 | 4.11 | 4.08 | 3.95 | 3.82 | 3.80 | 3.86 | 3.90 | 3.91 | 3.29 | 2.44 | 2.22 | 1.94 |
| 160 | 2.27 | 2.27 | 2.31 | 2.37 | 3.04 | 4.80 | 4.45 | 4.19 | 4.07 | 4.08 | 4.26 | 4.88 | 3.94 | 2.35 | 2.24 | 2.26 | 1.98 |
| 165 | 2.24 | 2.24 | 2.24 | 2.24 | 2.22 | 2.24 | 2.31 | 2.45 | 2.61 | 2.70 | 2.45 | 2.25 | 2.19 | 2.22 | 2.23 | 2.25 | 1.99 |
| 170 | 2.20 | 2.20 | 2.20 | 2.18 | 2.18 | 2.16 | 2.14 | 2.11 | 2.09 | 2.08 | 2.09 | 2.11 | 2.14 | 2.17 | 2.19 | 2.21 | 2.00 |
| 175 | 2.11 | 2.12 | 2.12 | 2.11 | 2.10 | 2.08 | 2.06 | 2.04 | 2.03 | 2.02 | 2.04 | 2.07 | 2.09 | 2.12 | 2.14 | 2.13 | 2.09 |
| 180 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |

Table 5: Luminous Intensity Data

## EQUIPMENT LIST

| Test Equipment | Model | Equipment No. | Calibration Date | Calibration Due date |
|---|---|---|---|---|
| Goniophotometer system | GO-R5000 | HZTE011-01 | Aug. 23, 2017 | Aug. 22, 2018 |
| Digital Power Meter | PF2010A | HZTE028-01 | Aug. 10, 2017 | Aug. 09, 2018 |
| AC Power Supply | DPS1060 | HZTE001-06 | Aug. 10, 2017 | Aug. 09, 2018 |
| DC Power Supply | WY12010 | HZTE004-03 | Aug. 10, 2017 | Aug. 09, 2018 |
| Standard Source | D908 | HZTE012-01 | Aug. 20, 2017 | Aug. 19, 2018 |
| Standard source | SCL-1400 | HZTE012-02 | Aug. 20, 2017 | Aug. 19, 2018 |
| Temperature and humidity recorder | JR900 | HZTE018-01 | Aug. 16, 2017 | Aug. 15, 2018 |
| Temperature recorder | JM624U | HZTE018-08 | Aug. 17, 2017 | Aug. 16, 2018 |

Table 6: 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 expended uncertainty is 2.3% 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°/180° and C=90°/270°) 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, Δu'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.

*** End of Report ***

This report is considered invalidated without the Special Seal for Inspection of the LTL. This report shall not be altered, increased or deleted. The results shown in this test report refer only to the sample(s) tested. Without written approval of LTL, this test report shall not be copied except in full and published as advertisement.