# TEST REPORT

According to ANSI/IES LM-80-15
For

## Hongli Zhihui Group Co.,Ltd. Guangzhou Branch

Room 316, Building 2, No.1, Xianke Yi Road, Huadong Town, Huadu District, Guangzhou, China

## Model: HL-AF-5060H343W-3-S1-THL-HR3

| | |
|---|---|
| **Report Type:**<br>6000 Hours Test Report | **Product Type:**<br>LED Package |
| **Reviewed By:** | Pote Wang |
| **Report Number:** | SZ2220402-12242E-10-6000 |
| **Test Date:** | 2022-04-09 to 2022-12-15 |
| **Report Date:** | 2023-01-12 |
| **Approved by:** | Blake Zhang / EE Engineer |
| **Prepared By:** | Bay Area Compliance Laboratories Corp. (Shenzhen)<br>5/F(B-West) -7/F, the 3rd Phase of Wan Li Industrial<br>Building D, Shihua Road, Futian Free Trade Zone<br>Shenzhen, Guangdong, China.<br>Tel: +86-755-33320018<br>Fax: +86-755-33320008 |
| **Test Facility:** | Test facility was located at No.12, Pulong East 1st Road, Tangxia Town, Dongguan, Guangdong, China. |

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Note:

The model name begins with "HL", such as " HL-AF-5060H***W-3-S1-T**-HR*-***" , "*" is described in detail as follows :
1. The first“***” is the number from 1 to 999 which stands for the brightness level.
2. The second “**” is the letter HL or the number 1 which stands for the bonding wire style.
3. The third“*” is the number 1 or 2 or 3 which stands for the CRI style.
4. The fourth“***” is the letter, which stands for the customer code.

## 1.2 Standards and Reference Documentations

- ANSI/IES LM-80-15: IES Approved

The uncertainty of the temperature is U=0.8671°C (K=2), at the 95% confidence level.

### 1.7 Statement of Traceability

Bay Area Compliance Laboratories Corp. (Shenzhen) attested that all calibration has been performed using suitable standards traceable to National Primary Standards and International System of Units (SI).

### 1.8 Sample Set

**Data Set 1: 55°C, 60mA**

| | |
|---|---|
| Part Number: | HL-AF-5060H343W-3-S1-THL-HR3 |
| Number of Units: | 25 |
| Case Temperature: | >53°C |
| Ambient Temperature: | >50°C |
| Life Test Drive Current: | 60mA |
| Measurement Current: | 60mA |

**Data Set 2: 85°C, 60mA**

| | |
|---|---|
| Part Number: | HL-AF-5060H343W-3-S1-THL-HR3 |
| Number of Units: | 25 |
| Case Temperature: | >83°C |
| Ambient Temperature: | >80°C |
| Life Test Drive Current: | 60mA |
| Measurement Current: | 60mA |

## 2 - Summary of Test Result

| Data Set: | Sample Size | Failures Observed: | Test Interval | Test Duration | | | Reported TM-21 $L_{70}$ Lifetime |
|---|---|---|---|---|---|---|---|
| 1 | 25 | 0 | 1000hrs | 6000hrs | 2.079E-06 | 1.004 | >36000 hours |
| 2 | 25 | 0 | 1000hrs | 6000hrs | 2.487E-06 | 1.004 | >36000 hours |

Average Lumen Maintenance (Percentage of Initial Luminous Flux)

| Data Set: | 1000hrs | 2000hrs | 3000hrs | 4000hrs | 5000hrs | 6000hrs |
|---|---|---|---|---|---|---|
| 1 | 100.16% | 99.96% | 99.75% | 99.54% | 99.33% | 99.13% |
| 2 | 100.12% | 99.87% | 99.62% | 99.38% | 99.13% | 98.88% |

Average Chromaticity Shift

| Data Set: | 1000hrs | 2000hrs | 3000hrs | 4000hrs | 5000hrs | 6000hrs |
|---|---|---|---|---|---|---|
| 1 | 0.0002 | 0.0003 | 0.0005 | 0.0007 | 0.0009 | 0.0011 |
| 2 | 0.0002 | 0.0004 | | | | |

## 3 - Test Data

### 3.1 Data Set 1, 55°C, 60mA (Lumen Maintenance)

| No. | Φ(lm) | Lumen Maintenance (%) | | | | | |
|---|---|---|---|---|---|---|---|
| | 0hr(Initial) | 1000hrs | 2000hrs | 3000hrs | 4000hrs | 5000hrs | 6000hrs |
| 1 | 24.10 | 100.04 | 99.88 | 99.75 | 99.59 | 99.38 | 99.09 |

### 3.2 Data Set 1, 55°C, 60mA (Forward Voltage)

| No. | Forward Voltage (V) | | | | | | |
|---|---|---|---|---|---|---|---|
| | 0hr(Initial) | 1000hrs | 2000hrs | 3000hrs | 4000hrs | 5000hrs | 6000hrs |
| 1 | 2.908 | 2.816 | 2.857 | 2.877 | 2.832 | 2.870 | 2.812 |
| 2 | 2.838 | 2.811 | 2.850 | 2.837 | 2.843 | 2.842 | 2.816 |
| 3 | 2.843 | 2.829 | 2.838 | 2.826 | 2.822 | 2.851 | 2.839 |
| 4 | 2.891 | 2.855 | 2.855 | 2.858 | 2.837 | 2.839 | 2.875 |
| 5 | 2.832 | 2.833 | 2.834 | 2.848 | 2.882 | 2.821 | 2.839 |
| 6 | 2.804 | 2.827 | 2.817 | 2.822 | 2.850 | 2.855 | 2.842 |
| 7 | 2.871 | 2.816 | 2.856 | 2.848 | 2.821 | 2.875 | 2.866 |
| 8 | 2.913 | 2.844 | 2.872 | 2.870 | 2.884 | 2.884 | 2.863 |
| 9 | 2.916 | 2.876 | 2.876 | 2.873 | 2.857 | 2.858 | 2.856 |
| 10 | 2.903 | 2.881 | 2.876 | 2.871 | 2.858 | 2.883 | 2.827 |
| 11 | 2.831 | 2.817 | 2.852 | 2.855 | 2.875 | 2.880 | 2.848 |
| 12 | 2.908 | 2.840 | 2.872 | 2.887 | 2.879 | 2.894 | 2.874 |
| 13 | 2.936 | 2.840 | 2.863 | 2.867 | 2.892 | 2.842 | 2.852 |
| 14 | 2.905 | 2.816 | 2.825 | 2.851 | 2.906 | 2.821 | 2.866 |
| 15 | 2.861 | 2.823 | 2.833 | 2.825 | 2.850 | 2.869 | 2.865 |

### 3.3 Data Set 1, 55°C, 60mA (Chromaticity Shift)

| No. | u' | v' | CCT(K) | Chromaticity Shift (Δu'v') | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 0hr(Initial) | | | 1000hrs | 2000hrs | 3000hrs | 4000hrs | 5000hrs | 6000hrs |
| 1 | 0.2585 | 0.5271 | 2787 | 0.0002 | 0.0004 | 0.0004 | 0.0005 | 0.0008 | 0.0011 |
| 2 | 0.2602 | 0.5272 | 2750 | 0.0002 | 0.0005 | 0.0006 | 0.0006 | 0.0010 | 0.0013 |
| 3 | 0.2599 | 0.5259 | 2762 | 0.0002 | 0.0004 | 0.0006 | 0.0008 | 0.0011 | 0.0013 |
| 4 | 0.2588 | 0.5254 | 2787 | 0.0001 | 0.0002 | 0.0005 | 0.0006 | 0.0011 | 0.0013 |
| 5 | 0.2594 | 0.5261 | 2772 | 0.0002 | 0.0003 | 0.0004 | 0.0008 | 0.0008 | 0.0009 |
| 6 | 0.2572 | 0.5270 | 2814 | 0.0002 | 0.0001 | 0.0002 | 0.0005 | 0.0006 | 0.0008 |
| 7 | 0.2563 | 0.5274 | 2833 | 0.0002 | 0.0001 | 0.0003 | 0.0005 | 0.0006 | 0.0009 |
| 8 | 0.2577 | 0.5249 | 2813 | 0.0002 | 0.0001 | 0.0003 | 0.0006 | 0.0009 | 0.0011 |
| 9 | 0.2581 | 0.5274 | 2793 | 0.0001 | 0.0001 | 0.0004 | 0.0005 | 0.0006 | 0.0009 |
| 10 | 0.2622 | 0.5265 | 2709 | 0.0001 | 0.0002 | 0.0005 | 0.0008 | 0.0011 | 0.0011 |
| 11 | 0.2624 | 0.5289 | 2696 | 0.0002 | 0.0003 | 0.0005 | 0.0007 | 0.0008 | 0.0012 |
| 12 | 0.2598 | 0.5277 | 2755 | 0.0001 | 0.0001 | 0.0004 | 0.0006 | 0.0006 | 0.0008 |
| 13 | 0.2599 | 0.5272 | 2754 | 0.0001 | 0.0003 | 0.0002 | 0.0006 | 0.0007 | 0.0009 |
| 14 | 0.2576 | 0.5267 | 2807 | 0.0001 | 0.0003 | 0.0004 | 0.0006 | 0.0007 | 0.0009 |
| 15 | 0.2592 | 0.5267 | 2773 | 0.0001 | 0.0001 | 0.0003 | 0.0007 | 0.0010 | 0.0011 |
| 16 | 0.2585 | 0.5271 | 2785 | 0.0001 | 0.0004 | 0.0003 | 0.0003 | 0.0007 | 0.0009 |
| 17 | 0.2581 | 0.5247 | 2806 | 0.0002 | 0.0004 | 0.0003 | 0.0005 | 0.0007 | 0.0009 |
| 18 | 0.2573 | 0.5255 | 2820 | 0.0002 | 0.0003 | 0.0004 | 0.0008 | 0.0011 | 0.0012 |
| 19 | 0.2604 | 0.5261 | 2750 | 0.0001 | 0.0003 | 0.0004 | 0.0004 | 0.0007 | 0.0009 |
| 20 | 0.2587 | 0.5249 | 2791 | 0.0002 | 0.0002 | 0.0006 | 0.0006 | 0.0007 | 0.0009 |
| 21 | 0.2590 | 0.5264 | 2778 | 0.0001 | 0.0005 | 0.0005 | 0.0008 | 0.0009 | 0.0010 |
| 22 | 0.2605 | 0.5257 | 2748 | 0.0001 | 0.0003 | 0.0006 | 0.0009 | 0.0010 | 0.0012 |
| 23 | 0.2589 | 0.5269 | 2777 | 0.0001 | 0.0003 | 0.0007 | 0.0011 | 0.0012 | 0.0015 |
| 24 | 0.2583 | 0.5270 | 2791 | 0.0001 | 0.0001 | 0.0007 | 0.0009 | 0.0013 | 0.0016 |
| 25 | 0.2594 | 0.5261 | 2770 | 0.0002 | 0.0002 | 0.0009 | 0.0012 | 0.0013 | 0.0015 |
| Avg. | 0.2591 | 0.5265 | 2777 | 0.0002 | 0.0003 | 0.0005 | 0.0007 | 0.0009 | 0.0011 |
| Med. | 0.2589 | 0.5267 | 2778 | 0.0001 | 0.0003 | 0.0004 | 0.0006 | 0.0008 | 0.0011 |
| st dev | 0.0014 | 0.0010 | 32 | 0.0000 | 0.0001 | 0.0002 | 0.0002 | 0.0002 | 0.0002 |
| Min. | 0.2563 | | | | | | | | |

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### 3.6 Data Set 2, 85°C, 60mA (Chromaticity Shift)

| No. | u' | v' | CCT(K) | Chromaticity Shift (Δu'v') | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 0hr(Initial) | | | 1000hrs | 2000hrs | 3000hrs | 4000hrs | 5000hrs | 6000hrs |
| 26 | 0.2590 | 0.5257 | 2782 | 0.0001 | 0.0003 | 0.0007 | 0.0010 | 0.0012 | 0.0014 |
| 27 | 0.2594 | 0.5270 | 2767 | 0.0001 | 0.0003 | 0.0005 | 0.0006 | 0.0008 | 0.0011 |
| 28 | 0.2588 | 0.5277 | 2776 | 0.0001 | 0.0003 | 0.0004 | 0.0005 | 0.0008 | 0.0010 |
| 29 | 0.2574 | 0.5269 | 2812 | 0.0001 | 0.0005 | 0.0005 | 0.0006 | 0.0008 | 0.0011 |
| 30 | 0.2600 | 0.5285 | 2748 | 0.0002 | 0.0005 | 0.0004 | 0.0006 | 0.0009 | 0.0011 |
| 31 | 0.2589 | 0.5283 | 2771 | 0.0001 | 0.0005 | 0.0005 | 0.0007 | 0.0008 | 0.0011 |
| 32 | 0.2584 | 0.5270 | 2788 | 0.0002 | 0.0004 | 0.0006 | 0.0008 | 0.0009 | 0.0011 |
| 33 | 0.2584 | 0.5272 | 2787 | 0.0001 | 0.0004 | 0.0006 | 0.0006 | 0.0008 | 0.0009 |
| 34 | 0.2572 | 0.5281 | 2809 | 0.0001 | 0.0004 | 0.0006 | 0.0006 | 0.0008 | 0.0009 |
| 35 | 0.2585 | 0.5263 | 2789 | 0.0002 | 0.0004 | 0.0006 | 0.0007 | 0.0009 | 0.0011 |
| 36 | 0.2566 | 0.5249 | 2838 | 0.0002 | 0.0004 | 0.0006 | 0.0007 | 0.0009 | 0.0011 |
| 37 | 0.2585 | 0.5278 | 2782 | 0.0001 | 0.0004 | 0.0006 | 0.0006 | 0.0009 | 0.0013 |
| 38 | 0.2598 | 0.5276 | 2757 | 0.0001 | 0.0004 | 0.0006 | 0.0007 | 0.0009 | 0.0013 |
| 39 | 0.2587 | 0.5275 | 2779 | 0.0001 | 0.0004 | 0.0005 | 0.0006 | 0.0008 | 0.0012 |
| 40 | 0.2577 | 0.5271 | 2803 | 0.0001 | 0.0004 | 0.0005 | 0.0008 | 0.0009 | 0.0013 |
| 41 | 0.2592 | 0.5262 | 2775 | 0.0002 | 0.0004 | 0.0006 | 0.0007 | 0.0010 | 0.0013 |
| 42 | 0.2597 | 0.5263 | 2763 | 0.0002 | 0.0005 | 0.0006 | 0.0008 | 0.0011 | 0.0015 |
| 43 | 0.2571 | 0.5271 | 2817 | 0.0001 | 0.0004 | 0.0006 | 0.0007 | 0.0010 | 0.0013 |
| 44 | 0.2564 | 0.5249 | 2843 | 0.0001 | 0.0005 | 0.0004 | 0.0009 | 0.0009 | 0.0013 |
| 45 | 0.2593 | 0.5262 | 2773 | 0.0001 | 0.0003 | 0.0006 | 0.0007 | 0.0009 | 0.0012 |
| 46 | 0.2601 | 0.5279 | 2748 | 0.0002 | 0.0005 | 0.0005 | 0.0007 | 0.0008 | 0.0009 |
| 47 | 0.2577 | 0.5251 | 2814 | 0.0002 | 0.0004 | 0.0008 | 0.0010 | 0.0014 | 0.0016 |
| 48 | 0.2594 | 0.5259 | 2772 | 0.0001 | 0.0004 | 0.0006 | 0.0010 | 0.0013 | 0.0015 |
| 49 | 0.2582 | 0.5264 | 2795 | 0.0001 | 0.0004 | 0.0004 | 0.0011 | 0.0015 | 0.0015 |
| 50 | 0.2602 | 0.5278 | 2747 | 0.0001 | 0.0006 | 0.0004 | 0.0008 | 0.0013 | 0.0012 |
| Avg. | 0.2586 | 0.5269 | 2785 | 0.0002 | 0.0004 | 0.0006 | 0.0008 | 0.0010 | 0.0012 |
| Med. | 0.2587 | 0.5270 | 2782 | 0.0001 | 0.0004 | 0.0006 | 0.0007 | 0.0009 | 0.0012 |
| st dev | 0.0011 | 0.0010 | 26 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0002 | 0.0002 |
| Min. | 0.2564 | 0.5249 | 2747 | 0.0001 | 0.0003 | 0.0004 | 0.0005 | 0.0008 | 0.0009 |
| Max. | 0.2602 | 0.5285 | 2843 | 0.0002 | 0.0006 | 0.0008 | 0.0011 | 0.0015 | 0.0016 |

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5/F(B-West) -7/F, the 3rd Phase of Wan Li Industrial
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## Directions

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