

TEST REPORT

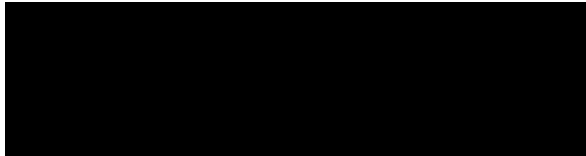
According to ANSI/IES LM-80-15

For

Hongli Zhihui Group Co.,Ltd. Guangzhou Branch

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

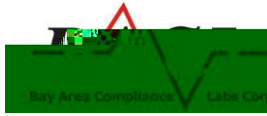
#Model: HL-A-4014HW-S1-PCT-HR3



Product Type:

LED Package

FULL



1 - General Information

1.1 Description of LED Light Sources

Sample Size:

50 PCS samples were received on 2018-10-20. The samples were numbered from 1 to 25 and 26 to 50.

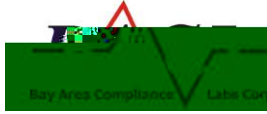
| | |
|---------------------------------------|-----------------------------------------------|
| #Manufacturer: | Hongli Zhihui Group Co.,Ltd. Guangzhou Branch |
| #Part Number: | HL-A-4014HW-S1-PCT-HR3 |
| #Part Type: | LED Package |
| #Drive Level: | DC 150mA |
| #Nominal CCT: | 2700K |
| #Power: | 0.51W |
| #Average Current Density per LED die: | 861.11 mA/mm ² |
| #Average Power Density per LED die: | 2.93 W/mm ² |
| #CRI: | 80 |
| #Die Spacing: | N/A |

Sampling Method:

LED samples for IESNA LM-80 testing consist of units built from a minimum of three manufacturing lots with each manufacturing lot built from different wafer lots built on non-consecutive days.

These manufacturing lots are picked to represent a wide parametric distribution.

#Family products covered by this report:



Bay Area Compliance Laboratories Corp. (Dongguan)

No.69, Pulongcun, Puxinhu Industrial Area Tangxia ,
Dongguan, Guangdong, China.
The IAS Accreditation Number TL-460

| Test Model Number | Multiple Models | Details |
|-------------------|---------------------|----------------------------------------------------------------------------------------------------------------------------|
| | SL-*B4014FTA-11EA* | 1. Different Model name for different market. |
| | SL-*B4014FTA-11EA*H | 2. The first * is the letters I, N, W representing CCT. I mean less than 3700K; N means 3700-4700K; W for more than 4700K. |
| | SL-*B4014FTA-11EA** | 3. The second * is different product solutions (color coordination and application, special solutions, etc.) |

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1.4 Drive Level

As per the manufacturer's specifications, the DC current was regulated to within $\pm 3\%$ of the specified value of the manufacturer during maintenance test, and was within $\pm 0.5\%$ during photometric and electrical measurement test.

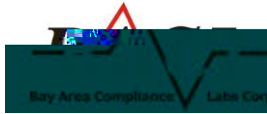
1.5 Ambient Conditions for Maintenance Test

For lumen maintenance test, samples within one data set, were installed on cooling boards in thermal chambers with minimal ambient airflow. The case temperature and ambient temperature was monitored by thermocouples which one was soldered to the coldest DUTs' case (TMP_{LED}) location, while the other is mounted at a distance of 5 mm above the TMP location.

During life testing, TMP_{LED} of the coldest LEDs were maintained at a temperature that was greater than or equal to 2°C below the corresponding nominal case temperature. Surrounding air was maintained at a temperature that was greater than or equal to 5°C below the corresponding nominal case temperature. Thermocouples were shielded from direct DUT optical radiation and comply with ASTM E230 Table 1 "Special Limits".

Samples were connected to DC power supply in series circuits with a constant current. The forward current was regulated to within $\pm 3\%$ of the specified value of the manufacturer.

The relative humidity with BT13 and BT13 (and BT13) was maintained at 50% $\pm 5\%$ during the test.



2 - Summary of Test Result

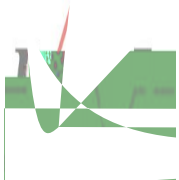
| Data Set: | Sample Size | Failures Observed: | Test Interval | Test Duration | α | β | Reported TM-21 L ₇₀ Lifetime |
|-----------|-------------|--------------------|---------------|---------------|-----------|---------|-----------------------------------------|
| 1 | 25 | 0 | 1000hrs | 9000hrs | 2.494E-06 | 1.004 | >54000hrs |
| 2 | 25 | 0 | 1000hrs | 9000hrs | 3.390E-06 | 1.004 | >54000hrs |

Average Lumen Maintenance (Percentage of Initial Luminous Flux)

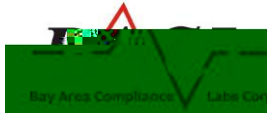
| Data Set: | 1000hrs | 2000hrs | 3000hrs | 4000hrs | 5000hrs | 6000hrs | 7000hrs | 8000hrs | 9000hrs |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1 | 100.09% | 99.85% | 99.63% | 99.38% | 99.15% | 98.91% | 98.66% | 98.41% | 98.15% |
| 2 | 100.03% | 99.71% | 99.37% | 99.04% | | 98.36% | 98.03% | 97.70% | 97.37% |

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3.3 Data Set 1, 85°C, 150mA (Chromaticity Shift)

| No. | u' | v' | CCT(K) | Chromaticity Shift (u'v') | | | | | | | | |
|-----|--------|--------|--------|----------------------------|---------|---------|---------|---------|---------|---------|---------|---------|
| | | | | 0hr(Initial) | 1000hrs | 2000hrs | 3000hrs | 4000hrs | 5000hrs | 6000hrs | 7000hrs | 8000hrs |
| 1 | 0.2571 | 0.5320 | 2793 | 0.0002 | 0.0003 | 0.0006 | 0.0010 | 0.0014 | 0.0018 | 0.0021 | 0.0024 | 0.0029 |
| 2 | 0.2558 | 0.5335 | 2814 | 0.0002 | 0.0004 | 0.0007 | 0.0008 | 0.0012 | 0.0013 | 0.0017 | 0.0019 | 0.0023 |
| 3 | 0.2549 | 0.5326 | 2839 | 0.0003 | 0.0005 | 0.0007 | 0.0011 | 0.0013 | 0.0015 | 0.0018 | 0.0020 | 0.0023 |
| 4 | 0.2607 | 0.5307 | 2723 | 0.0002 | 0.0004 | 0.0006 | 0.0008 | 0.0011 | 0.0015 | 0.0018 | 0.0021 | 0.0024 |
| 5 | 0.2551 | 0.5289 | 2851 | 0.0002 | 0.0004 | 0.0005 | 0.0008 | 0.0010 | 0.0012 | 0.0014 | 0.0017 | 0.0020 |
| 6 | 0.2542 | 0.5321 | 2855 | 0.0001 | 0.0004 | 0.0006 | 0.0009 | 0.0011 | 0.0012 | 0.0016 | 0.0017 | 0.0019 |
| 7 | 0.2550 | 0.5275 | 2861 | 0.0002 | 0.0004 | 0.0006 | 0.0009 | 0.0012 | 0.0012 | 0.0016 | 0.0018 | 0.0019 |
| 8 | 0.2574 | 0.5327 | 2783 | 0.0002 | 0.0006 | 0.0008 | 0.0009 | 0.0010 | 0.0011 | 0.0013 | 0.0014 | 0.0018 |
| 9 | 0.2566 | 0.5311 | 2809 | 0.0002 | 0.0004 | 0.0008 | 0.0009 | 0.0011 | 0.0013 | 0.0013 | 0.0014 | 0.0016 |
| 10 | 0.2544 | 0.5288 | 2868 | 0.0001 | 0.0004 | 0.0006 | 0.0009 | 0.0011 | 0.0013 | 0.0014 | 0.0016 | 0.0017 |
| 11 | 0.2572 | 0.5300 | 2801 | 0.0002 | 0.0004 | 0.0008 | 0.0011 | 0.0015 | 0.0016 | 0.0017 | 0.0018 | 0.0019 |
| 12 | 0.2582 | 0.5312 | 2774 | 0.0002 | 0.0004 | 0.0008 | 0.0012 | 0.0015 | 0.0018 | 0.0019 | 0.0020 | 0.0022 |
| 13 | 0.2577 | 0.5303 | 2788 | 0.0003 | 0.0006 | 0.0008 | 0.0011 | 0.0015 | 0.0019 | 0.0022 | 0.0023 | 0.0024 |
| 14 | 0.2541 | 0.5305 | 2866 | 0.0002 | 0.0004 | 0.0006 | 0.0009 | 0.0012 | 0.0014 | 0.0019 | 0.0024 | 0.0028 |
| 15 | 0.2559 | 0.5320 | 2820 | | | | | | | | | |

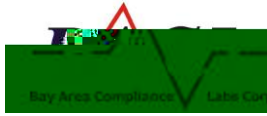
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No.69, Pulongcun, Puxinhu Industrial Area Tangxia ,

Dongguan, Guangdong, China.

The IAS Accreditation Number TL-460

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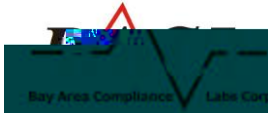


3.208

3.5 Data Set 2, 105°C, 150mA (Forward Voltage)

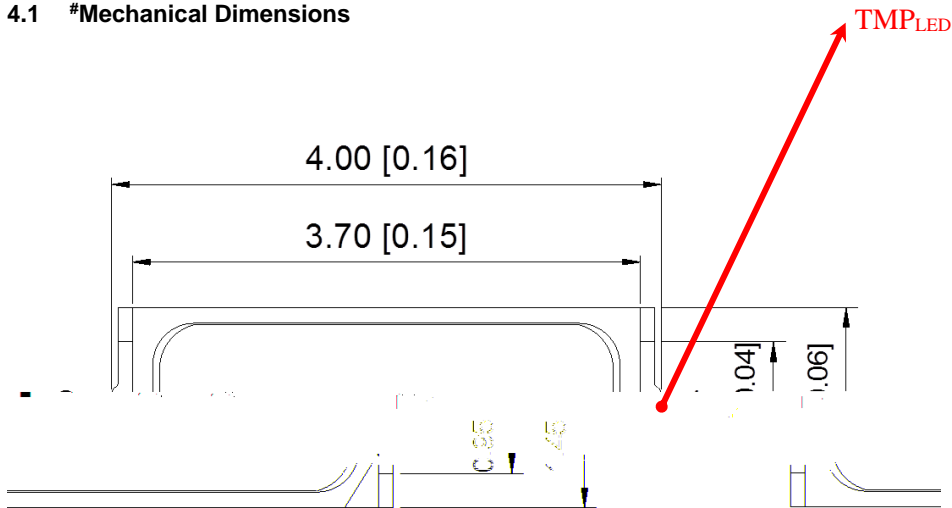
| No. | Forward Voltage (V) | | | | | | | | | |
|-----|---------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| | 0hr(Initial) | 1000hrs | 2000hrs | 3000hrs | 4000hrs | 5000hrs | 6000hrs | 7000hrs | 8000hrs | 9000hrs |
| 26 | 3.302 | 3.277 | 3.278 | 3.279 | 3.281 | 3.277 | 3.277 | 3.281 | 3.286 | 3.282 |
| 27 | 3.281 | 3.258 | 3.258 | 3.260 | 3.258 | 3.257 | 3.254 | 3.260 | 3.266 | 3.260 |
| 28 | 3.310 | 3.285 | 3.288 | 3.287 | 3.293 | 3.288 | 3.287 | 3.285 | 3.295 | 3.293 |
| 29 | 3.217 | 3.187 | 3.187 | 3.188 | 3.193 | 3.187 | 3.186 | 3.186 | 3.193 | 3.190 |
| 30 | 3.246 | 3.218 | 3.223 | 3.223 | 3.228 | 3.221 | 3.220 | 3.221 | 3.227 | 3.231 |
| 31 | 3.229 | 3.199 | 3.202 | 3.203 | 3.208 | 3.203 | | | | |

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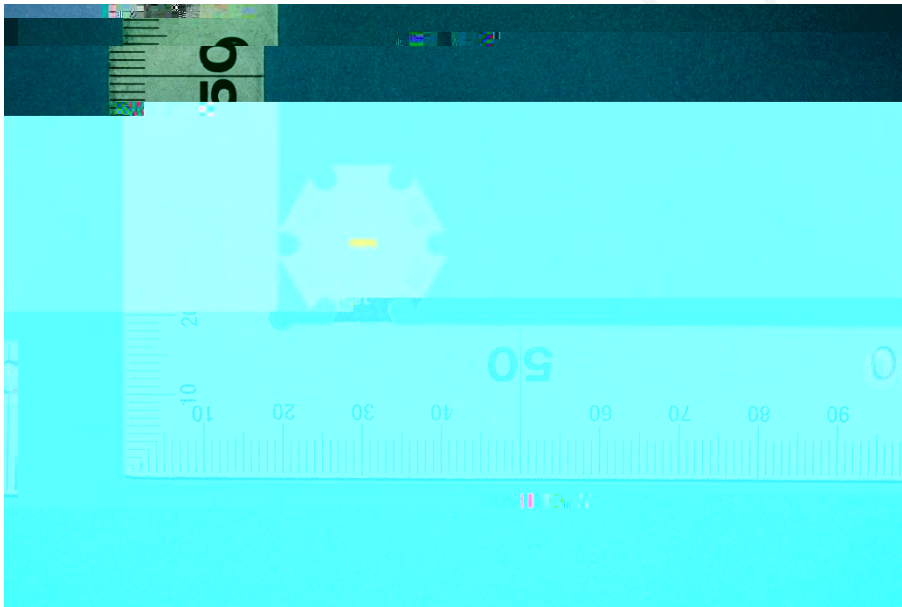
4 - DUT Photo

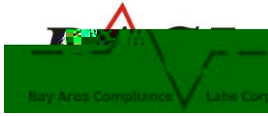
4.1 #Mechanical Dimensions



All dimensions are in millimeter

4.2 DUT Photo





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Directions

*****END OF REPORT*****