



Test report

LED High Bay

DR-HB240-EGXP

(X represent CCT, can be W=3000K, N=4000K, D=5000K, C1=5700K, C2=6000K, C3=6500K)

Tested under

Luminaires - ANSI/UL 1598:2008 (Secs. 19.7, 19.10-16)
ANSI/IES LM-80-15
IES TM-21-11
IES LM-84-14

Applicant:

DUALRAYS LIGHTING Co.,LTD.

3rd Floor, Building A3 | Tianrui Industrial Park| #35, Fuyuan 1st Road, Fuyong Town, Bao'an Dist |
Shenzhen 518103, Guangdong Province, RPC

Prepared By:

Shenzhen Belling Efficiency Testing Lab Co.,Ltd
1 Floor, No. 1 Building, Meibaohe Industrial Park, Dalang Street, Longhua District,
Shenzhen, Guangdong Prov. 518101, China

Complied by: Jovan zhi

Review by: Jason zhou

Project Engineer

Technical Manager

Note 1: The test data was only valid for the test sample(s). This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or use in part without prior written consent from Shenzhen Belling Efficiency Testing Lab Co.,Ltd. This report must not be used by the customer to claim product certification, approval, or endorsement By NVLAP, NIST, or any agency of the U.S. Government.

Note 2: IES TM-21-11: this test method are not in NVLAP accreditation scope.



Project No.: BLTMT210719-04

Test description: Only conduct temperature for LED according to UL1598.

| | |
|-----------|--|
| Test Lab: | Shenzhen Belling Efficiency Testing Lab Co.,Ltd |
| Address: | 1 Floor, No. 1 Building, Meibaohe Industrial Park, Dalang Street, Longhua District, Shenzhen, Guangdong Prov. 518101, China. |

| | |
|--|--|
| Environment: | |
| Accommodations and Environmental conditions, including proper power source meet the requirements of the test standard or UL default criteria (ISO/IEC 17025 Clause 5.3.1, 5.3.2, 5.3.3, 5.3.4) | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A |
| Personnel: | |
| Lab Management shall authorize personnel to operate particular types of equipment used in testing. (ISO/IEC 17025 5.2.5) | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| Equipment: | |
| Testing is being conducted within the test equipment calibration dates. (See Test Instrument Information Page and ISO/IEC 17025 5.5.1, 5.5.2, 5.5.4, 5.5.5, 5.5.8,) | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| Calibrations for testing equipment are traceable to SI Units. Refer to 00-OP-C0032 (Calibration Certificate Analysis). (ISO/IEC 17025 5.6.2.2) | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| Critical Consumables: | |
| Critical consumables are compliant with test standard requirements. (ISO/IEC 17025 Clause 4.6) | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A |
| Sample Identification: | |
| Identification of items to be tested has been made (e.g. model no., Serial No., etc.) (See Test Sample Identification page and ISO/IEC 17025 Clause 5.8.2) | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| Summary: | |
| The test facility was deemed to have the environment and capabilities necessary to perform the tests included in this data package. | |

Description:

Declaration: DUALRAYS LIGHTING Co.,LTD. declare that their product with model DR-HB240-EGXP are the same to the product in the report BLTMT210715-05 and is authorized by original applicant to use their test data.

Note: All the data in previous report BLTMT210715-05 is shared in report.



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TEST EQUIPMENT INFORMATION

| | BELL # | Equipment Description | Model No. | Manufacturer | Serial No. | Last Cal | Cal Due | Cal Freq |
|---|---------|-----------------------|-----------|--------------|--------------------------|------------|------------|----------|
| 1 | BL802 | Power meter | PF9811 | Everfine | G185824 CM13711 40 | 2021-04-26 | 2022-04-25 | 1 year |
| 2 | BL804 | Hybrid Recorder | 34970A | AGILEN T | MY41027 391 | 2021-04-20 | 2022-04-19 | 1 year |
| 3 | BL883 | Environment Measurer | 8813 | Deli | N/A | 2021-04-22 | 2022-04-21 | 1 year |
| 4 | BL861 | Hybrid Recorder | 34970A | KEYSIG HT | MY44095 108 | 2021-04-20 | 2022-04-19 | 1 year |
| 5 | BL834-1 | Thermocouple K | Type K | OMEGA | 23736-1 | 2021-04-22 | 2022-04-21 | 1 year |
| 6 | BL826 | Stop watch | K610 | KISLO | N/A | 2021-04-23 | 2022-04-22 | 1 year |




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TEST SAMPLE IDENTIFICATION:

The table below is provided to provide correlation of sample numbers to specific product related information. Refer to this table when a test identifies a test sample by "Sample No." only.

| Model No. | Test No.+ | Sample No. | Ratings |
|---------------|-----------|------------|----------------------------|
| DR-HB240-EGXP | S1-S25 | S1 | AC 100-277V, 50/60Hz, 240W |

| | |
|-----------------------|---|
| Applicant: | DUALRAYS LIGHTING Co.,LTD. |
| Applicant Address: | 3rd Floor, Building A3 Tianrui Industrial Park #35, Fuyuan 1st Road, Fuyong Town, Bao'an Dist Shenzhen 518103, Guangdong Province, RPC |
| Brand Name: |  |
| Manufacturer: | DUALRAYS LIGHTING Co.,LTD. |
| Manufacturer Address: | 3rd Floor, Building A3 Tianrui Industrial Park #35, Fuyuan 1st Road, Fuyong Town, Bao'an Dist Shenzhen 518103, Guangdong Province, RPC |
| Product Description: | LED High Bay |
| Date Received: | 2021-06-17 |
| Date of Test: | 2021-06-17 to 2021-06-28 |
| Date of Issue: | 2021-07-19 |



METHOD

GENERAL REQUIREMENTS PERTAINING TO SURFACE MOUNTED LUMINAIRES

Unless otherwise noted under METHOD, General requirements are applied.

The test was conducted in a draft-free room as specified in clause 19.10.3 or 19.11.3.

The rated wattage of any lamp used for the temperature test was the highest wattage rating marked on the luminaire.

INSTALLATION AND SUPPORT (Clause 19.1)

The luminaire was installed or supported to simulate intended usage, in accordance with the manufacturer's instructions. Where more than one installation methods are specified the luminaire was installed to result in the maximum operating temperatures.

A luminaire part designed to be adjustable by the user was positioned or adjusted to cause maximum heating of the luminaire, mounting surface, or both.

A luminaire part that was marked in accordance with Table 20.1.1, Item 2.31, was positioned for the temperature test in accordance with the marking.

TEMPERATURE TEST STABILIZATION (Clause 19.2)

Temperatures were measured after they stabilized, when:

The test was run for a minimum of 7.5 h. or the test was run for a minimum of 3 h, and then three successive readings taken at 15 min intervals were within 1°C of one another and not rising. (Temperature shall be measured **after** the test has been running for a minimum of 3 h)



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FREQUENCY (Clause 19.4)

Frequency-sensitive equipment was tested at rated frequency, and equipment marked with more than one frequency was tested at the frequency that produced the maximum temperature rise.

AMBIENT TEMPERATURE (Clause 19.5)

The tests were conducted in an ambient temperature of $25 \pm 5^\circ\text{C}$. Ambient temperature variations above or below 25°C were respectively subtracted from or added to temperatures recorded at points on the luminaire.

The ambient temperature was measured by means of a thermocouple or thermometer.

The thermocouple intended to measure ambient temperature was immersed in 0.5 oz (15 ml) of mineral oil in a glass container or attached to a metal mass of approximately 1 oz (30 g) that was within a cylindrical metal shield open at the top and bottom. The glass container or cylindrical metal shield was placed in the horizontal plane passing through the midpoint of the luminaire's vertical axis at a horizontal distance from the luminaire equal to at least 3 times the luminaire diameter.

[] Tests were conducted in an elevated ambient temperature with a source of heated air providing the elevated temperature for which the luminaire was marked. The maximum airflow past the luminaire was less than 9.1 m/min (30 ft/min). Maximum variations of 5°C from the intended ambient temperature was added to or subtracted from the observed temperature readings.

THERMOCOUPLES:

Reference Section 19.7 of UL 1598.

THERMOCOUPLES CONTACT:

Thermocouples were in contact with the TMP LED location described in LM-80 test report. In order to gain the maximum temperature, if appropriate, more than one thermocouple were contact in these locations. For details information, please refer to clause 3.3 for the photo of thermocouple contact.



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TEST RESULTS

| | |
|--------------------------------------|--------------------|
| Test Model No.: | DR-HB240-EGXP |
| LED Driver Model No.: | SS-240CP-54B |
| LED Package/Module No.: | NF2L757DR |
| Rating of LED Package/Module: | 100mA |
| Manufacturer of LED Package/ Module: | Nichia Corporation |

| | |
|--------------------------------|-------|
| Input Voltage (V): | 120 |
| Input Power (W): | 246.5 |
| LED Board Input Current (mA): | 3796 |
| Single LED Input Current (mA): | 99.89 |

| | | | | | |
|---|-------|-------|-------|-------|-------|
| Sample No.: | S1 | S2 | S3 | S4 | S5 |
| LED Ts/°C (Temperature at soldering board): | 72.44 | 69.91 | 71.09 | 71.10 | 76.64 |
| Sample No.: | S6 | S7 | S8 | S9 | S10 |
| LED Ts/°C (Temperature at soldering board): | 76.30 | 75.10 | 70.15 | 70.53 | 72.93 |
| Sample No.: | S11 | S12 | S13 | S14 | S15 |
| LED Ts/°C (Temperature at soldering board): | 74.81 | 74.14 | 76.60 | 74.89 | 69.29 |
| Sample No.: | S16 | S17 | S18 | S19 | S20 |
| LED Ts/°C (Temperature at soldering board): | 76.44 | 71.68 | 74.17 | 71.22 | 74.11 |
| Sample No.: | S21 | S22 | S23 | S24 | S25 |
| LED Ts/°C (Temperature at soldering board): | 70.40 | 74.39 | 74.90 | 76.98 | 71.87 |
| LED Driver/°C (Temperature at Tc): | 55.04 | | | | |
| Total operated period(hours): | 4 | | | | |
| Ambient °C : | 25.00 | | | | |
| Test Ambient: | 25.36 | | | | |

Lumen Maintenance Projection(IESNA TM-21-11 Method)

| | |
|--|-------------|
| 50000hrs at which to estimate lumen maintenance: | 92.42% |
| Forward current on each LED light source: | 99.89mA |
| Reported L ₇₀ lumen maintenance life: | >60000hours |
| Reported L ₉₀ lumen maintenance life: | >60000hours |

Note: Please refer to appendix B and C for details of TM-21 inputs and report.



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Temperature Interpolation

Test data from LM-80 report issued by Nichia Corporation was referenced to calculate the lumen maintenance life according to IES TM-21-11.

| Sample No. | 50000hrs at which to estimate lumen maintenance | Reported L ₇₀ lumen maintenance life | Reported L ₈₀ lumen maintenance life | Reported L ₉₀ lumen maintenance life |
|------------|---|---|---|---|
| S1 | 92.42% | >60000 | >60000 | >60000 |
| S2 | 92.78% | >60000 | >60000 | >60000 |
| S3 | 92.65% | >60000 | >60000 | >60000 |
| S4 | 92.62% | >60000 | >60000 | >60000 |
| S5 | 91.78% | >60000 | >60000 | >60000 |
| S6 | 91.83% | >60000 | >60000 | >60000 |
| S7 | 92.02% | >60000 | >60000 | >60000 |
| S8 | 92.75% | >60000 | >60000 | >60000 |
| S9 | 92.70% | >60000 | >60000 | >60000 |
| S10 | 92.35% | >60000 | >60000 | >60000 |
| S11 | 92.06% | >60000 | >60000 | >60000 |
| S12 | 92.17% | >60000 | >60000 | >60000 |
| S13 | 91.78% | >60000 | >60000 | >60000 |
| S14 | 92.05% | >60000 | >60000 | >60000 |
| S15 | 92.87% | >60000 | >60000 | >60000 |
| S16 | 91.81% | >60000 | >60000 | >60000 |
| S17 | 92.53% | >60000 | >60000 | >60000 |
| S18 | 92.16% | >60000 | >60000 | >60000 |
| S19 | 92.60% | >60000 | >60000 | >60000 |
| S20 | 92.17% | >60000 | >60000 | >60000 |
| S21 | 92.72% | >60000 | >60000 | >60000 |
| S22 | 92.13% | >60000 | >60000 | >60000 |
| S23 | 92.05% | >60000 | >60000 | >60000 |
| S24 | 91.72% | >60000 | >60000 | >60000 |
| S25 | 92.50% | >60000 | >60000 | >60000 |

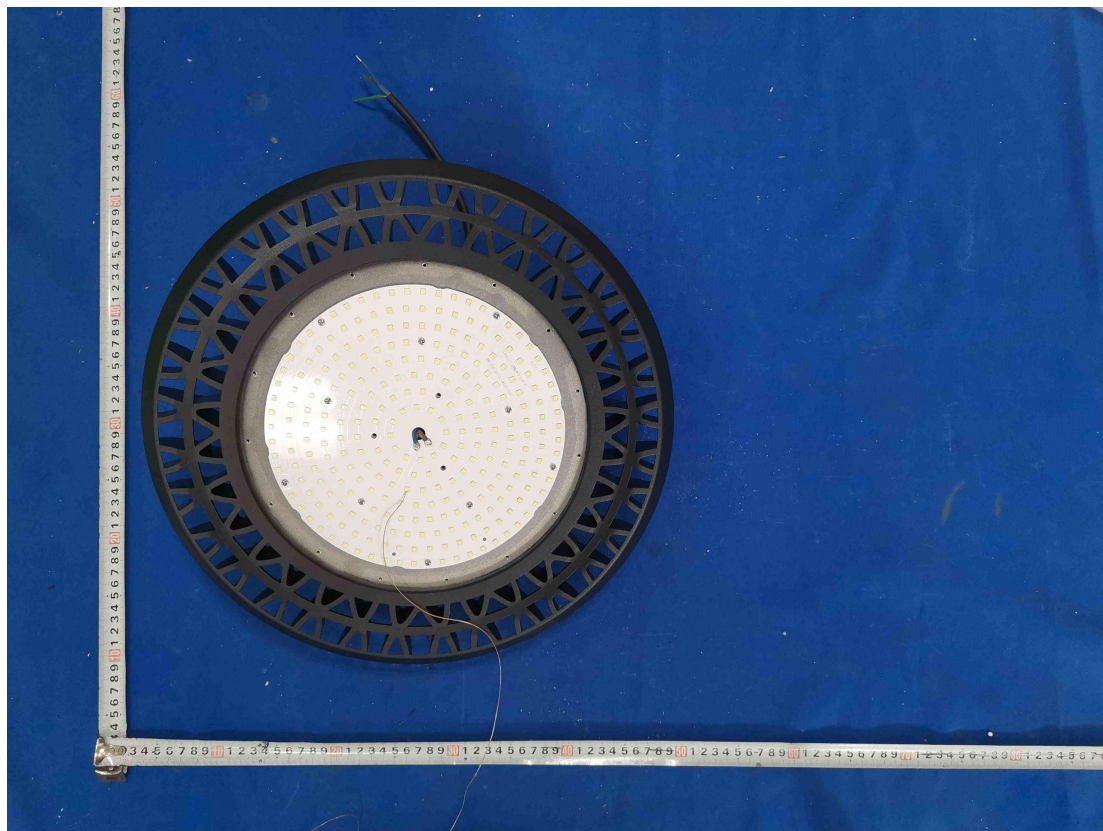
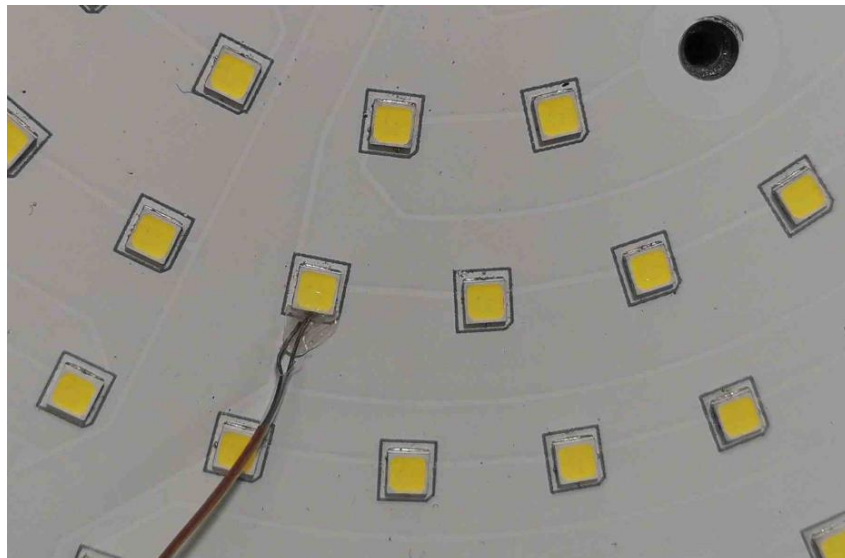
Projected from Reported:

L₉₀B₅₀: ≥60000hrs



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Test Photos for LEDs:



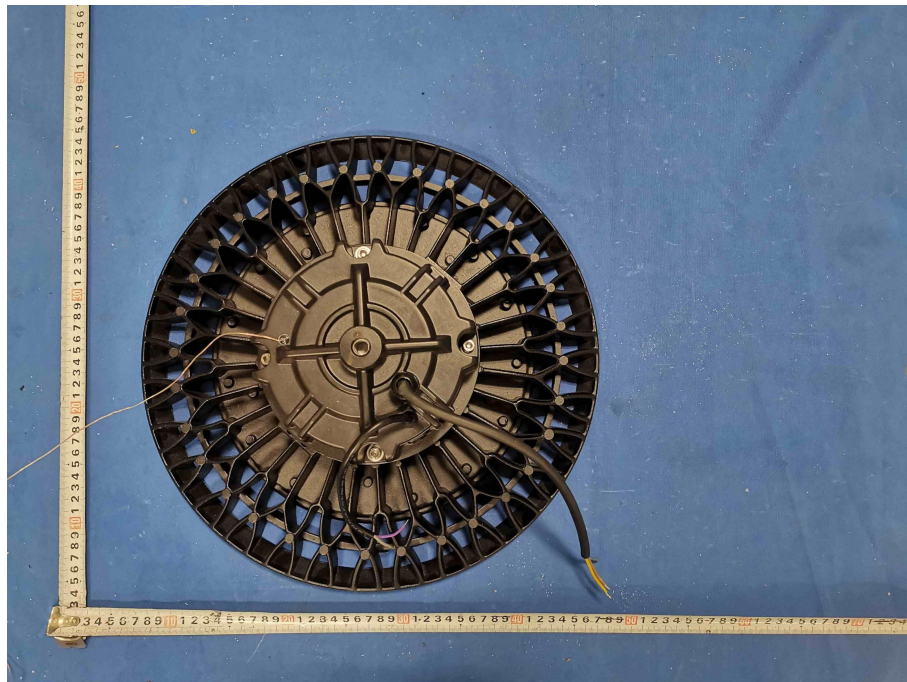


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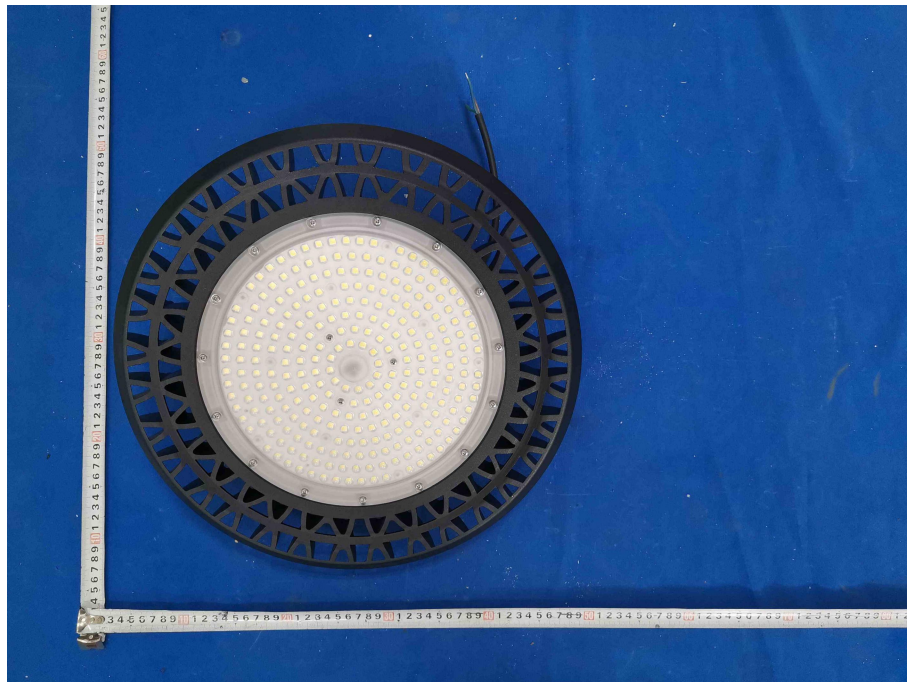
Test Photos for LED Drivers:





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EUT Photos:





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Appendix A: LM-80 report summary

| | | | |
|---|--------------------|--------|--------|
| Report originated by: | Nichia Corporation | | |
| Manufactured by: | Nichia Corporation | | |
| LM-80 report No.: | SQETMN558101 | | |
| LED Model: | NF2L757DR | | |
| Number of LED light source tested: | 25 units | | |
| Drive Current: | 100mA | | |
| Case temperature: | 55°C | 85°C | 105°C |
| 10100 hours lumen maintenance: | 98.1% | 96.4% | 92.3% |
| 10100 hours color maintenance($\Delta u'v'$): | 0.0014 | 0.0014 | 0.0019 |



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Appendix B: TM-21 Input

| TM-21 Inputs | | | | | | | |
|--|---|---|-----------------------|--------------------------------------|-----------------------|---------------------------------------|-----------------------|
| Instructions | Description of LED Light Source Tested (manufacturer, model, catalog number) | LM-80 Test Inputs | | | | | |
| | | Test Data for 55° C Case Temperature | | Test Data for 65° C Case Temperature | | Test Data for 105° C Case Temperature | |
| | | Time (hours) | Lumen Maintenance (%) | Time (hours) | Lumen Maintenance (%) | Time (hours) | Lumen Maintenance (%) |
| <p>Yellow fields are completed by the user. Fields not used should be left blank. Cyan fields are calculated based on user entries.</p> <p>First, enter a description of the LED light source tested. Then complete the fields labeled "LM-80 Testing Details". Test duration must be at least 5,000 hours. If only one case temperature data sets to be used (no interpolation), complete only "Tested case temperature 1". For only two case temperature data sets, complete 1 and 2.</p> <p>Next, further to the right, in the corresponding box(es) for each tested case temperature, enter the test data along with the time (in hours) at which each measurement was taken. Data entered must be normalized then averaged measured data (per TM-21 sections 5.2.1 and 5.2.2). If case temperatures have different test durations, enter data up to the lowest of the test durations for all of the case temperatures.</p> <p>Enter drive current, in-situ temperature data and the percentage of initial lumens to project to in the fields labeled "In-Situ Inputs".</p> <p>Results can be tailored to estimate lumen maintenance at a specific time by entering a value (t) in the yellow field. A complete TM-21 report will appear on the next tab labeled "Report".</p> | <p>NICHIA NF2L757DR</p> | 541 | 98.90% | 541 | 98.50% | 541 | 97.90% |
| | | 1008 | 99.00% | 1007 | 98.40% | 1008 | 97.30% |
| | | 1698 | 98.90% | 1697 | 98.00% | 1698 | 96.80% |
| | | 2380 | 98.60% | 2379 | 97.60% | 2380 | 96.70% |
| | | 3142 | 98.50% | 3141 | 97.30% | 3142 | 96.10% |
| | | 3830 | 98.40% | 3829 | 97.20% | 3830 | 94.70% |
| | | 4545 | 98.30% | 4544 | 97.00% | 4545 | 94.20% |
| | | 5210 | 98.30% | 5210 | 97.00% | 5210 | 94.00% |
| | | 6044 | 98.30% | 6043 | 96.90% | 6044 | 93.70% |
| | | 6805 | 98.10% | 6805 | 96.70% | 6805 | 93.30% |
| | | 7601 | 98.20% | 7601 | 96.60% | 7601 | 93.00% |
| | | 8436 | 98.00% | 8437 | 96.40% | 8436 | 92.50% |
| | | 9269 | 97.80% | 9269 | 96.10% | 9269 | 92.20% |
| | | 10100 | 98.10% | 10100 | 96.40% | 10100 | 92.30% |
| | | <p>LM-80 Testing Details</p> <p>Total number of units tested per case temperature: 25</p> <p>Number of failures: 0</p> <p>Number of units measured: 25</p> <p>Test duration (hours): 10000</p> <p>Tested drive current (mA): 100</p> <p>Tested case temperature 1 (T_{case} °C): 55</p> <p>Tested case temperature 2 (T_{case} °C): 65</p> <p>Tested case temperature 3 (T_{case} °C): 105</p> | | | | | |
| <p>In-Situ Inputs</p> <p>Drive current for each LED package/array/module (mA): 99.89</p> <p>In-situ case temperature (T_{amb} °C): 72.44</p> <p>Percentage of initial lumens to project to (e.g. for L₇₀, enter 70): 70</p> | | | | | | | |
| <p>Results</p> <p>Time (t) at which to estimate lumen maintenance (hours): 50,000</p> <p>Lumen maintenance at time (t) (%): 92.42%</p> <p>Reported L70 (hours): ~50000</p> | | | | | | | |

