



Model # LED8E26A1941K
 PO# TCP-7633
 LP Type: LED A Lamp

SPHERE: Peabody
 Rated Life: 25,000
 Cal File: ALAMP_856-028_11-4-11.cal

Technician: Tyler Thompson

Date: 11/28/11

Approved Signatory: Angela Benton-Smith

Date: 12/6/11



NVLAP Lab Code 200571-0

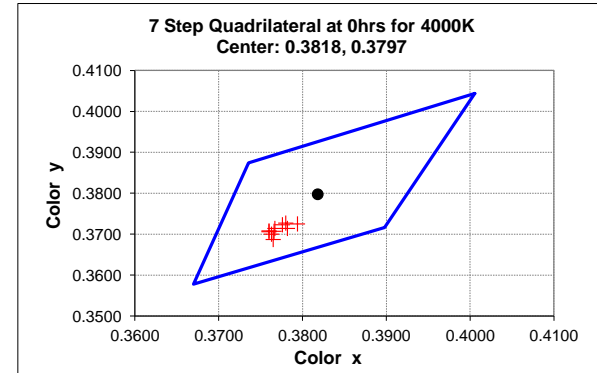
0 HOUR RESULTS

| | Lp. # | Volts | Amps | Watts | pf (≥.7) | 0 Hr. Lumens | CCT | CRI (≥80) | Sph Temp | x Value | y Value | u' Value | v' Value | Duv | 7-Step Color Compliance | LPW (>40) | Stabilization Time | R9 |
|---------|----------|--------|--------|-------|----------|--------------|------|-----------|----------|---------|---------|----------|----------|---------|-------------------------|-----------|--------------------|----|
| Base Up | P-7633-1 | 119.97 | 0.0731 | 8.20 | 0.936 | 570 | 4079 | 86 | 75.7 | 0.3760 | 0.3706 | 0.2246 | 0.4982 | -0.0016 | PASS | 69.5 | 0:30 | 22 |
| | P-7633-2 | 119.97 | 0.0720 | 8.06 | 0.934 | 556 | 3996 | 86 | 75.7 | 0.3794 | 0.3725 | 0.2262 | 0.4995 | -0.0017 | PASS | 69.0 | 0:30 | 22 |
| | P-7633-3 | 119.97 | 0.0722 | 8.07 | 0.932 | 561 | 4062 | 86 | 75.7 | 0.3766 | 0.3707 | 0.2250 | 0.4983 | -0.0017 | PASS | 69.5 | 0:30 | 22 |
| | P-7633-4 | 119.97 | 0.0713 | 7.98 | 0.932 | 550 | 4080 | 86 | 75.7 | 0.3760 | 0.3708 | 0.2246 | 0.4983 | -0.0015 | PASS | 68.9 | 0:30 | 22 |
| | P-7633-5 | 119.97 | 0.0728 | 8.16 | 0.934 | 547 | 4038 | 86 | 75.6 | 0.3780 | 0.3727 | 0.2251 | 0.4994 | -0.0012 | PASS | 67.0 | 0:45 | 21 |

| | Lp. # | Volts | Amps | Watts | pf (≥.7) | 0 Hr. Lumens | CCT | CRI (≥80) | Sph Temp | x Value | y Value | u' Value | v' Value | Duv | 7-Step Color Compliance | LPW (>40) | Stabilization Time | R9 |
|------------|-----------|--------|--------|-------|----------|--------------|----------|-----------|----------|---------|---------|----------|----------|----------|-------------------------|-----------|--------------------|----|
| Base Down | P-7633-6 | 119.97 | 0.0724 | 8.11 | 0.934 | 534 | 4046 | 86 | 75.7 | 0.3776 | 0.3723 | 0.2250 | 0.4992 | -0.0013 | PASS | 65.8 | 0:45 | 21 |
| | P-7633-7 | 119.97 | 0.0724 | 8.14 | 0.936 | 487 | 4050 | 86 | 75.6 | 0.3765 | 0.3687 | 0.2257 | 0.4974 | -0.0027 | PASS | 59.8 | 0:30 | 24 |
| | P-7633-8 | 119.97 | 0.0709 | 7.91 | 0.931 | 525 | 4067 | 86 | 75.6 | 0.3763 | 0.3700 | 0.2250 | 0.4979 | -0.0020 | PASS | 66.4 | 0:30 | 22 |
| | P-7633-9 | 119.97 | 0.0715 | 8.03 | 0.936 | 541 | 4065 | 86 | 75.7 | 0.3767 | 0.3714 | 0.2248 | 0.4987 | -0.0014 | PASS | 67.4 | 0:30 | 22 |
| | P-7633-10 | 119.97 | 0.0730 | 8.21 | 0.937 | 542 | 4023 | 86 | 75.9 | 0.3782 | 0.3714 | 0.2258 | 0.4989 | -0.0019 | PASS | 66.0 | 0:30 | 22 |
| Grand AVG. | | 119.97 | 0.0722 | 8.09 | 0.934 | 541 | 4051 | 86 | 75.7 | 0.3771 | 0.3711 | 0.2252 | 0.4986 | -0.0017 | | 66.9 | 0:33 | 22 |
| Compliance | | | | | Complies | Complies | Complies | Complies | | | | | | Complies | Complies | Complies | | |

LUMEN & COLOR MAINTENANCE

| | Date: | | | | | | | | |
|------------|-----------|-----------------------|-----------------------|--------------------------|--------------------------|-----------------|-----------------------|--------------------------|--------------------------|
| | Lp. # | 3000 Hr. Lumen Lumens | 3000 Hr. Lumen Maint. | 3000 Hr. u' Color Maint. | 3000 Hr. v' Color Maint. | 6000 Hr. Lumens | 6000 Hr. Lumen Maint. | 6000 Hr. u' Color Maint. | 6000 Hr. v' Color Maint. |
| Base Up | P-7633-1 | | | | | | | | |
| | P-7633-2 | | | | | | | | |
| | P-7633-3 | | | | | | | | |
| | P-7633-4 | | | | | | | | |
| | P-7633-5 | | | | | | | | |
| Base Down | P-7633-6 | | | | | | | | |
| | P-7633-7 | | | | | | | | |
| | P-7633-8 | | | | | | | | |
| | P-7633-9 | | | | | | | | |
| | P-7633-10 | | | | | | | | |
| Grand AVG. | | | | | | | | | |
| Compliance | | TBD | TBD | TBD | | TBD | TBD | TBD | |





Model # LED8E26A1941K
 PO# TCP-7633
 LP Type: LED A Lamp

SPHERE: Peabody
 Rated Life: 25,000
 Cal File:

Technician: Bipin Rao

Date: 11/30/11

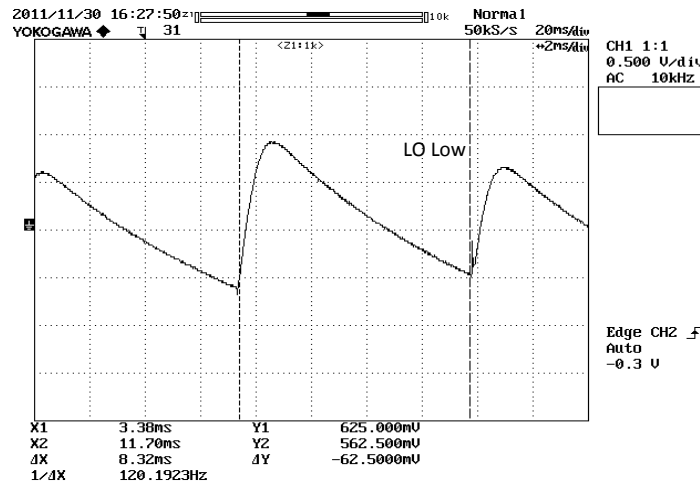
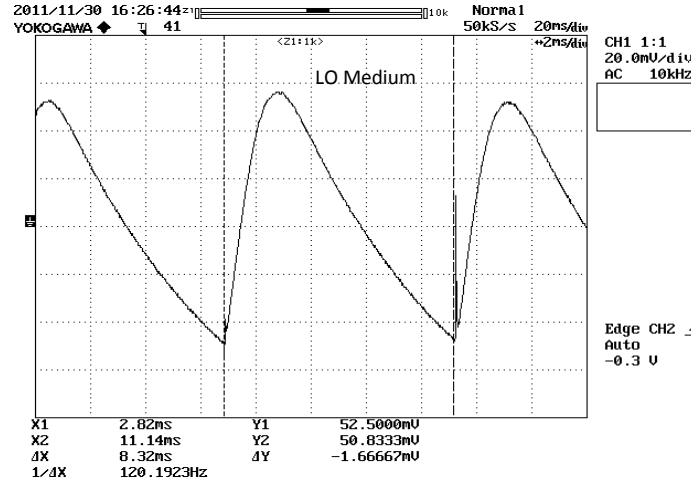
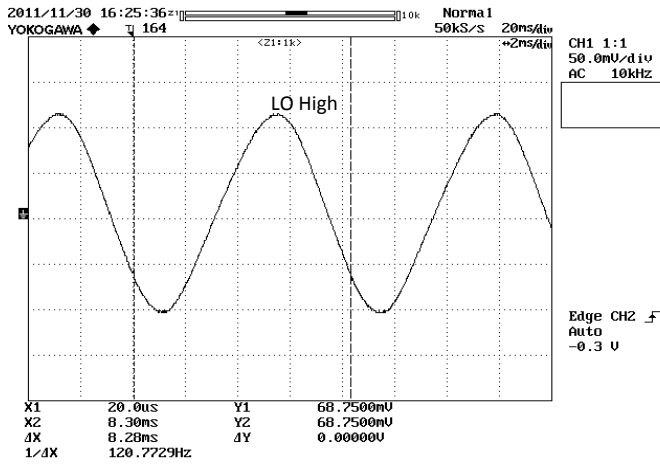
Approved Signatory: Angela Benton-Smith

Date: 11/30/11



NVLAP Lab Code 200571-0

| Date: | | 11/30/11 | | |
|------------|--|---|--|--|
| Lp. # | L.O. = Hi Ballast Freq (≥120 Hz) | L.O. = Med Ballast Freq (≥120 Hz) | L.O. = Lo Ballast Freq (≥120 Hz) | |
| TCP-7633 | 120.8 | 120.2 | 120.2 | |
| Compliance | Complies | Complies | Complies | |





Model # LED8E26A1941K
PO# TCP-7633
LP Type: LED A Lamp

SPHERE: Peabody
Rated Life: 25,000
Cal File:

Technician: Tyler Thompson

Date: 11/23/11

Approved Signatory: Angela Benton-Smith

Date: 12/6/11



NVLAP Lab Code 200571-0

| Date: 11/23/11 | |
|----------------|-----------------------------------|
| Lp. # | Transient Protection PASS/FAIL |
| T-7633-1 | PASS |
| T-7633-2 | PASS |
| T-7633-3 | PASS |
| T-7633-4 | PASS |
| T-7633-5 | PASS |
| Compliance | Complies |

| Date: 12/1/11 | |
|---------------|-------------|
| Lp. # | Noise (dbA) |
| N-7633-1 | 15.9 |

| Date: | | |
|------------|----------------------------|----------------------------|
| Lp. # | Rapid Cycles Endured (25K) | Rapid Cycles Endured (50K) |
| RC-7633-1 | | |
| RC-7633-2 | | |
| RC-7633-3 | | |
| RC-7633-4 | | |
| RC-7633-5 | | |
| RC-7633-6 | | |
| RC-7633-7 | | |
| RC-7633-8 | | |
| RC-7633-9 | | |
| RC-7633-10 | | |
| Compliance | TBD | TBD |



NVLAP Lab Code 200571-0

327 Campus Drive, Aurora, Ohio 44202 Phone: 330-995-1335 Fax: 330-995-1343

Test Report

PO Number: TCP-7633

Model No. LED8E26A1941K

SUBMITTED TO

Technical Consumer Products
325 Campus Drive
Aurora, OH 44202

Customer Information

Requestor's Name Tammie Madden Company Name TCP

Address 325 Campus Drive

City Aurora

State OH

Zip Code 44202

Telephone: 330-995-1337

Fax: 330-995-6188

Email: tmadden@tcpi.com

Date of Receipt: 11/22/11

Date of this Report: 12/6/11

This Test Report covers the Lamp Model Numbers shown below.

| Quantity | Model No. |
|----------|---------------|
| 27 | LED8E26A1941K |

At the customers request this report has been generated to provide test data for the following tests: Electrical, photometric and colorimetric tests, transient test, operating frequency, noise, dimensional, lumen maintenance at 1000, 3000 and 6000 hours, rapid cycle stress test, color maintenance at 6000 hours, electromagnetic and radio frequency interference, 120 degree zonal lumen percentage, color spatial uniformity and center beam intensity testing. The tests as requested are in compliance with ISO 17025, NVLAP and Energy Star requirements. The Photometric measurements are in compliance with LM79:2008. Aurora International Testing Laboratory is only responsible for the validity of the test data. The test results relate only to the lamps tested.

*** THIS REPORT CONTAINS DATA THAT IS NOT COVERED BY THE NVLAP ACCREDITATION**

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327 Campus Drive, Aurora, Ohio 44202 Phone: 330-995-1335 Fax: 330-995-1343

Test Report

PO Number: TCP-7633

The following standards and specifications were used in part or totally for each test sample:

1. IES NA LM 16 -1995 Practical guide to Colorimetry of Light Sources
2. IESNA LM-58 : Spectroradiometric Measurements
3. IES NA LM79:2008 (Sections 9 & 12) Approved Method: Electrical and Photometric Measurements of Solid State Lighting Products
4. ANSI C78.377-2008: Specifications for the Chromaticity of Solid State Lighting products
5. ANSI Chromaticity Final PC.xls Worksheet
6. CIE Publication 13.3:1995 Method of Measuring and Specifying Color Rendering Index
7. CIE Publication 15:2004 Method of Measuring and Specifying Color Rendering Index
8. Energy Star® Program Requirements for Integral LED Lamps V1: 12/03/09

TEST METHODS

Electrical Photometric and Colorimetric Measurements

Total light output (luminous flux) was measured using an integrating sphere, a spectroradiometer and software. The spectral luminous flux measurements were made using the spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. Each lamp was operated in the designated orientation at its rated voltage. Each lamp preburned for 5 hours on a test rack adjacent to the sphere. After transfer to the sphere the lamps were allowed to stabilize before measurements were made. The chromaticity coordinates, correlated color temperature and color rendering index for each lamp are calculated from the spectral radiant flux measurements taken at 0.4 nm intervals over the range of 380-780 nm. The calibration of the sphere spectroradiometer system is traceable to the National Institute of Standards and Technology. Electrical measurements including voltage, current, power and power factor are measured using a power analyzer. The ambient temperature condition inside the sphere was maintained at 77 °F ± 1.8 °F and was measured at a position inside the sphere. The operating frequency was measured with an oscilloscope, at an ambient temperature of 77 °F +/- 1.8 °F.

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327 Campus Drive, Aurora, Ohio 44202 Phone: 330-995-1335 Fax: 330-995-1343

Test Report

PO Number: TCP-7633

Transient Protection Test

During the test, each lamp was operated at its rated voltage and in its designated orientation. The ambient room temperature was maintained at 77 °F ± 1.8 °F. An instrument with a surge simulator module was used to generate the 2500-volt ring wave across the lamp base contacts. Seven strikes were performed on each lamp sample.

Rapid Cycle Stress Test

Lamps were operated on a two-minutes on / two-minutes off time cycle at its rated voltage. The lamps are cycled once for every two hours of the required minimum rated life.

Lumen and Color Maintenance

The lamps were burned in their designated orientation at their rated voltage. After burning 1000 hours on a continuous duty cycle the lumen maintenance was measured. The lamps are then placed back on the life test rack in their designated orientation and burned to 3000 hours. The lumen maintenance was again measured. The lamps are then placed back on the life test rack in their designated orientation and burned to 6000 hours. The lumen maintenance was again measured at this final interval. The color maintenance was measured at the 6000 hour interval.

Noise Level

The noise level for each sample was determined by using a sound level meter. The sample was placed inside of a sound chamber with a sound floor level of ≤20 dbA. The dbA reading of each lamp was noted as pass/fail when read on the sound rating A range. Each sample was operated in its designated orientation at its rated voltage.

| <u>Sound Ratings</u> | <u>Sound Ratings</u> |
|----------------------|----------------------------------|
| | <u>Average Noise Rating (dB)</u> |
| A | 20-24 |
| B | 25-30 |
| C | 31-36 |

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327 Campus Drive, Aurora, Ohio 44202 Phone: 330-995-1335 Fax: 330-995-1343

Test Report

PO Number : TCP-7633

Equipment List :

| Description | Manufacturer | Model |
|-------------------------------------|------------------------------|------------------|
| 1.5 Meter Integrating Sphere | Everfine | Spektron |
| AC Power Source | California Instruments | 2001L |
| AC Power Source | California Instruments | 4500Ls |
| Spectroradiometer | Optronics Laboratories, Inc. | OL770 |
| Radiometer/Photometer | Optronics Laboratories, Inc. | OL730/CV |
| Power Analyzer | Yokogawa, Inc. | WT210 |
| Digital Thermocouple Meter | Extech | 421509 |
| High Voltage DC Power Source | Xantrax | XHR 150-7 |
| Precision shunt | Guildline | 9230A-30-0.1 |
| 6 1/2 Digit Multimeter | Agilent | 34401A |
| Lamp Reference Standard | GE | 100watt, 120volt |
| Oscilloscope | Yokogawa, Inc. | DL1520L |
| EMC Transient Test System | KeyTek | EMC Pro |
| Preburn test rack | AITL | na |
| Life Test rack | AITL | na |
| Rapid Cycle Test rack | AITL | na |
| Draft free enclosure | AITL | na |
| Thermal chamber | ESPEC | LU113 |
| Elevated Temperature Life Test Rack | AITL | na |
| Sound Meter | Larson Davis | System 824 |
| PC | Dell | various |
| | | |

Testing Technician: Tyler Thompson **Date:** 12/6/11

Approved Signatory: Angela Benton-Smith **Date:** 12/6/11

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U.S. Department of Energy
Lighting Facts^{CM} Uniform LM-79 Reporting Template



Laboratory Information

| | |
|-------------------------------|---------------------------------|
| Name of test lab | Aurora International Laboratory |
| Date of test report | 12/6/11 |
| Test report number | TCP-7633 |
| Laboratory contact name | Angela Benton-Smith |
| Laboratory contact signature* | <i>Angela Benton-Smith</i> |

* By signing this form, the signatory is attesting that the information on the form is correct and the same as on the original, complete test report(s). The signatory also attests that all of the results on this form were measured entirely in accordance with IES LM-79-08.

Product Information

| | | |
|--|---------------|-----|
| Manufacturer | TCP | |
| Brand name | | |
| Model number | LED8E26A1941K | |
| SKU (if available) | | |
| Type of luminaire (for integral lamps, list base type and lamp type) | | |
| Luminaire aperture (downlights) | | in. |
| Luminaire length | | in. |
| Luminaire width | | in. |
| Number of units (modular products) | | |

Electrical Measurements

| | Integrating sphere output | Goniophotometer output | |
|-----------------|---------------------------|------------------------|---|
| Input wattage | 8.09 | | W |
| Input current | 0.07 | | A |
| Input voltage | 119.97 | | V |
| Power factor | 0.934 | | |
| Off-state power | | | W |

Photometric Characteristics

| | | | |
|------------------------------------|---------|---|------|
| Total initial lumen output | 541 | | lm |
| Initial luminaire efficacy | 66.9 | | lm/W |
| Correlated color temperature / CCT | 4051 | K | |
| Color rendering index / CRI | 86 | | |
| R ₉ value | 22.00 | | |
| Duv | -0.0017 | | |

Luminous Intensity Distribution

| | | Goniophotometer output | |
|---|--|------------------------|----|
| Center beam candlepower (if applicable) | | | cd |
| Beam angle (if applicable) | | | ° |
| Zonal lumens in the 0°-60° zone | | | % |
| Zonal lumens in the 60°-90° zone | | | % |
| Zonal lumens in the 90°-120° zone | | | % |
| Zonal lumens in the 120°-180° zone | | | % |