



## DesignLights Consortium Test Report

### Reference Standards

UL1598-2008

ANSI C82.77-10-2014

IES LM-79-2008

### Prepared For

**P.Q.L., Inc.**

2285 Ward Avenue / Simi Valley, CA 93065

Test Laboratory:

UL-CCIC Company Limited

Test Laboratory Address:

No.2, Chengwan Road, Suzhou Industrial Park, Suzhou 21522, China

### Catalog Number

55687

### Project Number

4790562779

### Report Number

4790562779\_3

### Test Date

2022-09-15~2022-09-19

### Issue Date

2022-09-21

### Revision Date

N/A

### Prepared By

*Elaine Zhou*

Zhao, Elaine

### Approved By

*Elvis Wu*

Wu, Elvis

The results contained in this report pertain only to the tested sample.

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## Test Summary

### DLC Technical Requirements V5.1- issued 2020-02-14

| Requirement Category                                   | Test Method                      | Requirements | Tolerance | Test Result |
|--|----------------------------------|--------------|-----------|-------------|
| Minimum Light Output (lm/ft)-Luminaires                | IES LM-79-2008                   | ≥375         | -10%      | 1115.56     |
| Minimum Luminaire Efficacy (lm/W)-Luminaires           | IES LM-79-2008                   | ≥115         | -3%       | 134.61      |
| Allowable CCT (3500K)                                  | IES LM-79-2008/ANSI C78.377-2015 | 3465±245     | N/A       | 3400        |
| Allowable CCT (4000K)                                  | IES LM-79-2008/ANSI C78.377-2015 | 3985±275     | N/A       | 4138        |
| Allowable CCT (5000K)                                  | IES LM-79-2008/ANSI C78.377-2015 | 5029±283     | N/A       | 5054        |
| Allowable CCT (3500K)                                  | IES LM-79-2008/ANSI C78.377-2015 | 3465±245     | N/A       | 3398        |
| Allowable CCT (3500K)                                  | IES LM-79-2008/ANSI C78.377-2015 | 3465±245     | N/A       | 3393        |
| Minimum CRI  | IES LM-79-2008/CIE 13.3-1995     | ≥80          | -1        | 82          |
| Minimum R9   | IES LM-79-2008                   | ≥0           | -1        | 7.0         |
| Minimum Rf   | IES LM-79-2008                   | ≥70          | -1        | 82          |
| Minimum Rg   | IES LM-79-2008                   | ≥89          | -1        | 96          |
| Rcs,h1   | IES LM-79-2008                   | -12%-23%     | -1%       | -12%        |
| L70 Lumen maintenance (Hours)                          | N/A                              | ≥50000       | N/A       | ≥50000      |
| L90 Lumen maintenance (Hours)                          | N/A                              | ≥36000       | N/A       | ≥36000      |
| Power Factor   | ANSI C82.77-10-2014              | ≥0.9         | -0.03     | 0.9434      |
| Total Harmonic Distortion (A%)                         | ANSI C82.77-10-2014              | ≤20%         | 5%        | 8.80%       |
| In-Situ Temperature Measurement Test for LED 1 (°C)    | UL1598-2008                      | ≤105         | N/A       | 51.6        |
| In-Situ Temperature Measurement Test for Driver 1 (°C) | UL1598-2008                      | ≤90          | N/A       | 67.7        |
| Max Chromaticity Shift (1000-6000h)                    | N/A                              | ≤0.004       | 0.0004    | 0.0023      |
| Minimum Luminaire Warranty (Years)                     | N/A                              | ≥5           | N/A       | ≥5          |



## Test List

Sample Received Date: 2022-09-07

| Test Item                            | Test Date  | Model Number  | Tests Conducted By |
|--------------------------------------|------------|---------------|--------------------|
| Integrating Sphere Test              | 2022-09-15 | 55687-90W-35K | Yang, Gavin X      |
| Integrating Sphere Test              | 2022-09-19 | 55687-90W-40K | Yang, Gavin X      |
| Integrating Sphere Test              | 2022-09-19 | 55687-90W-50K | Yang, Gavin X      |
| Integrating Sphere Test              | 2022-09-15 | 55687-75W-35K | Yang, Gavin X      |
| Integrating Sphere Test              | 2022-09-15 | 55687-65W-35K | Yang, Gavin X      |
| THD and PF Test                      | 2022-09-16 | 55687-90W-35K | Yang, Gavin X      |
| THD and PF Test                      | 2022-09-19 | 55687-90W-40K | Yang, Gavin X      |
| THD and PF Test                      | 2022-09-19 | 55687-90W-50K | Yang, Gavin X      |
| THD and PF Test                      | 2022-09-16 | 55687-75W-35K | Yang, Gavin X      |
| THD and PF Test                      | 2022-09-16 | 55687-65W-35K | Yang, Gavin X      |
| In-Situ Temperature Measurement Test | 2022-09-16 | 55687-90W-35K | Yang, Gavin X      |

### Remark (if any)

1. UL test equipment information is recorded on Meter Use in UL's Aurora database.
2. The accuracy method decision rule is applied when the compliance or verdict is made to the results of this report.



### Product Description

**Lamp/Luminaire Description:** Direct Linear Ambient Luminaires

**Model Number:** 55687

**Electrical Parameter:** 120-277V, 50/60Hz

**LED Package:** BXEN-(A)E-11M-3AA

**Dimming Information:** Continuous dimming capability

Products Scaled Value

| Model Number  | CCT   | Luminous Flux | Power | Luminous Efficacy |
|---------------|-------|---------------|-------|-------------------|
| 55687-90W-35K | 3500K | 11970         | 90    | 133               |
| 55687-90W-40K | 4000K | 12870         | 90    | 143               |
| 55687-90W-50K | 5000K | 12150         | 90    | 135               |
| 55687-75W-35K | 3500K | 10425         | 75    | 139               |
| 55687-75W-40K | 4000K | 11175         | 75    | 149               |
| 55687-75W-50K | 5000K | 10575         | 75    | 141               |
| 55687-65W-35K | 3500K | 9230          | 65    | 142               |
| 55687-65W-40K | 4000K | 9880          | 65    | 152               |
| 55687-65W-50K | 5000K | 9360          | 65    | 144               |





## Integrating Sphere Test

|                            |               |                                  |         |
|----------------------------|---------------|----------------------------------|---------|
| <b>Model No.</b>           | 55687-90W-35K | <b>Sample ID.</b>                | 5307975 |
| <b>Operate time (Min.)</b> | 90            | <b>Stabilization time (Min.)</b> | 45      |

### Test Method

1. The sample was tested according to the IES LM-79-2008, and the product is assumed to be brand new without seasoning.

2. Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at  $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$ . The reference standard lamp is rated current 2.679A omnidirectional Incandescent lamp and was calibrated by National Institute of Metrology P.R.China.

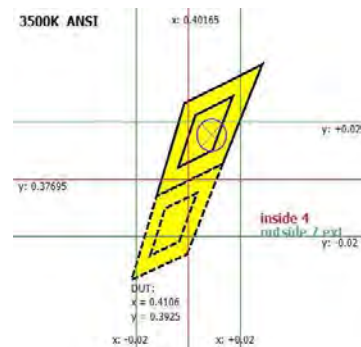
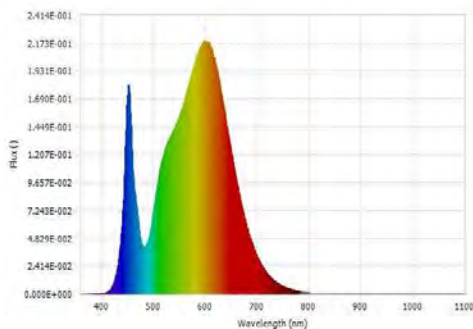
3. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. Coating reflectance of the integrating sphere was 90% to 98%. Photometric measurement conditions were using  $4\pi$  geometry. The self-absorption factor is applied in the final test result. The sample was operated at rated voltage and was stabilized before measurement. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780 nm.

### Integrating Sphere Test Conditions

| Temperature ( $^{\circ}\text{C}$ ) | Voltage (Vac) | Frequency (Hz) | Current (A) | Power (W) | Power Factor | Orientation |
|------------------------------------|---------------|----------------|-------------|-----------|--------------|-------------|
| 25.1                               | 120.01        | 60             | 0.7249      | 86.69     | 0.9965       | Horizontal  |

### Test Results

| CCT (K) | CRI (Ra) | R9  | Duv     | Flux (lm) | Luminous Efficacy (lm/W) | Efficacy(lm/ft) |
|---------|----------|-----|---------|-----------|--------------------------|-----------------|
| 3400    | 82       | 7.0 | -0.0004 | 11669.4   | 134.61                   | 1458.68         |



|                    |         |                          |         |
|--------------------|---------|--------------------------|---------|
| Luminous Flux (lm) | 11669.4 | Chrom x                  | 0.4106  |
| Chrom y            | 0.3925  | Chrom u                  | 0.2384  |
| Chrom v            | 0.3419  | Duv                      | -0.0004 |
| Chrom u'           | 0.2384  | Chrom v'                 | 0.5128  |
| CCT (K)            | 3400    | Luminous Efficacy (lm/W) | 134.61  |
| Ra                 | 82      | R1                       | 80.0    |
| R2                 | 89.0    | R3                       | 95.0    |
| R4                 | 81.0    | R5                       | 80.0    |
| R6                 | 84.0    | R7                       | 85.0    |
| R8                 | 62.0    | R9                       | 7.0     |
| R10                | 73.0    | R11                      | 80.0    |
| R12                | 62.0    | R13                      | 82.0    |
| R14                | 97.0    | R15                      | 74.0    |
| Rf                 | 83      | Rg                       | 97      |
| Rcs,h1             | -12%    |                          |         |



## Integrating Sphere Test (Cont'd)

### TM-30 Report

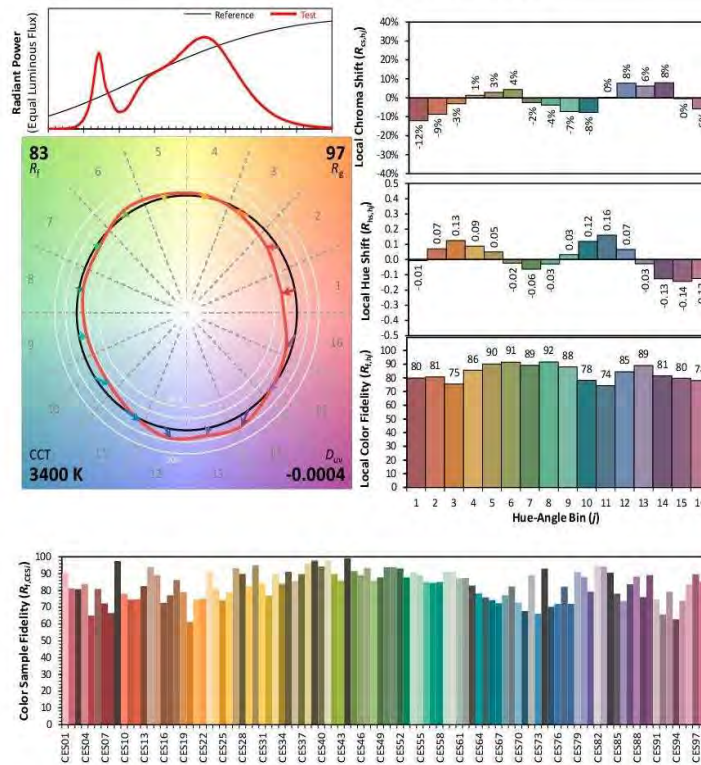
#### ANSI/IES TM-30-18 Color Rendition Report

Source: BXEN-(A)E-11M-3AA

Manufacturer: P.Q.L., Inc.

Date: 9/15/2022

Model: 55687-90W-35K



Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x 0.4106  
 y 0.3925  
 u' 0.2384  
 v' 0.5128

CIE 13.3-1995  
 (CRI)  
 $R_a$  82  
 $R_9$  7

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.





## Integrating Sphere Test

|                            |               |                                  |         |
|----------------------------|---------------|----------------------------------|---------|
| <b>Model No.</b>           | 55687-90W-40K | <b>Sample ID.</b>                | 5307975 |
| <b>Operate time (Min.)</b> | 90            | <b>Stabilization time (Min.)</b> | 45      |

### Test Method

1. The sample was tested according to the IES LM-79-2008, and the product is assumed to be brand new without seasoning.

2. Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at  $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$ . The reference standard lamp is rated current 2.679A omni-directional Incandescent lamp and was calibrated by National Institute of Metrology P.R.China.

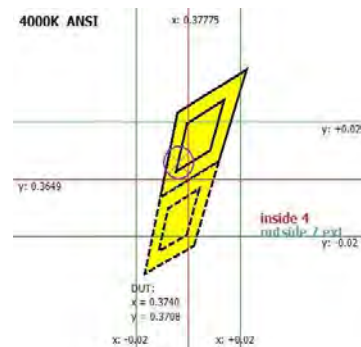
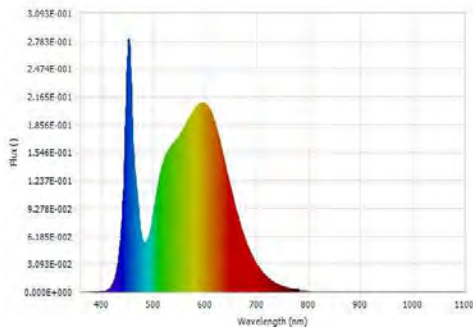
3. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. Coating reflectance of the integrating sphere was 90% to 98%. Photometric measurement conditions were using  $4\pi$  geometry. The self-absorption factor is applied in the final test result. The sample was operated at rated voltage and was stabilized before measurement. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780 nm.

### Integrating Sphere Test Conditions

| Temperature ( $^{\circ}\text{C}$ ) | Voltage (Vac) | Frequency (Hz) | Current (A) | Power (W) | Power Factor | Orientation |
|------------------------------------|---------------|----------------|-------------|-----------|--------------|-------------|
| 24.9                               | 120.05        | 60             | 0.6966      | 83.32     | 0.9962       | Horizontal  |

### Test Results

| CCT (K) | CRI (Ra) | R9   | Duv     | Flux (lm) | Luminous Efficacy (lm/W) | Efficacy(lm/ft) |
|---------|----------|------|---------|-----------|--------------------------|-----------------|
| 4138    | 83       | 13.0 | -0.0009 | 12371.6   | 148.48                   | 1546.45         |



|                    |         |                          |         |
|--------------------|---------|--------------------------|---------|
| Luminous Flux (lm) | 12371.6 | Chrom x                  | 0.3740  |
| Chrom y            | 0.3708  | Chrom u                  | 0.2233  |
| Chrom v            | 0.3320  | Duv                      | -0.0009 |
| Chrom u'           | 0.2233  | Chrom v'                 | 0.4980  |
| CCT (K)            | 4138    | Luminous Efficacy (lm/W) | 148.48  |
| Ra                 | 83      | R1                       | 82.0    |
| R2                 | 89.0    | R3                       | 93.0    |
| R4                 | 82.0    | R5                       | 81.0    |
| R6                 | 83.0    | R7                       | 87.0    |
| R8                 | 67.0    | R9                       | 13.0    |
| R10                | 72.0    | R11                      | 81.0    |
| R12                | 57.0    | R13                      | 84.0    |
| R14                | 96.0    | R15                      | 77.0    |
| Rf                 | 83      | Rg                       | 96      |
| Rcs,h1             | -12%    |                          |         |



## Integrating Sphere Test (Cont'd)

### TM-30 Report

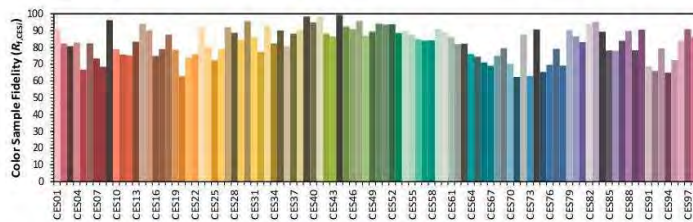
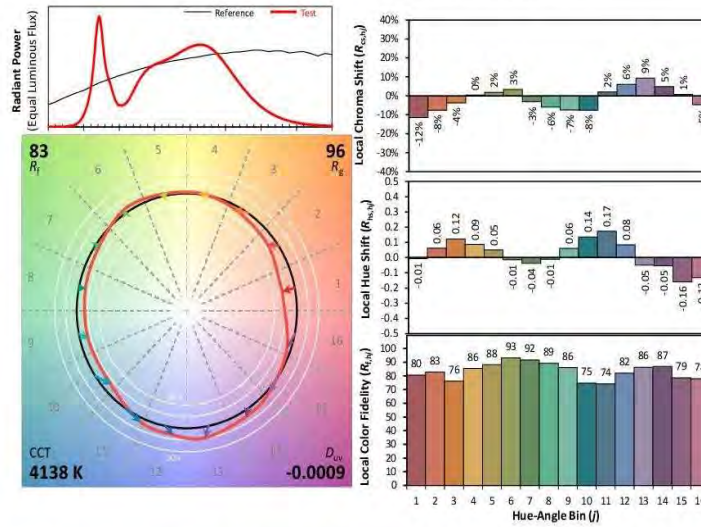
#### ANSI/IES TM-30-18 Color Rendition Report

Source: BXEN-(A)E-11M-3AA

Manufacturer: P.Q.L., Inc.

Date: 9/19/2022

Model: 55687-90W-40K



Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x 0.3740  
 y 0.3707  
 u' 0.2233  
 v' 0.4980

CIE 13.3-1995  
 (CRI)  
 $R_a$  83  
 $R_9$  13

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.





## Integrating Sphere Test

|                            |               |                                  |                   |         |
|----------------------------|---------------|----------------------------------|-------------------|---------|
| <b>Model No.</b>           | 55687-90W-50K |                                  | <b>Sample ID.</b> | 5307975 |
| <b>Operate time (Min.)</b> | 90            | <b>Stabilization time (Min.)</b> | 45                |         |

### Test Method

1. The sample was tested according to the IES LM-79-2008, and the product is assumed to be brand new without seasoning.

2. Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at  $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$ . The reference standard lamp is rated current 2.679A omni-directional Incandescent lamp and was calibrated by National Institute of Metrology P.R.China.

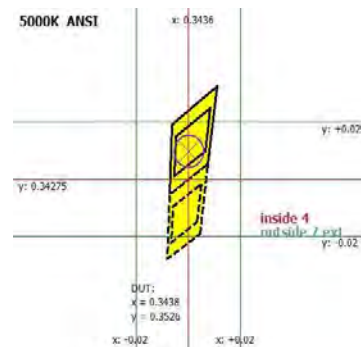
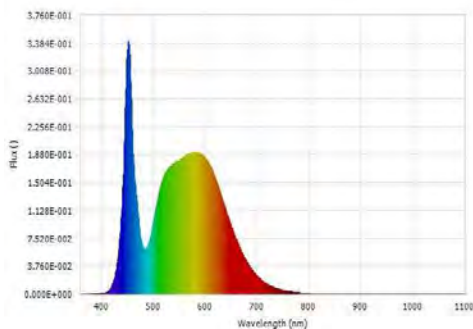
3. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. Coating reflectance of the integrating sphere was 90% to 98%. Photometric measurement conditions were using  $4\pi$  geometry. The self-absorption factor is applied in the final test result. The sample was operated at rated voltage and was stabilized before measurement. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780 nm.

### Integrating Sphere Test Conditions

| Temperature ( $^{\circ}\text{C}$ ) | Voltage (Vac) | Frequency (Hz) | Current (A) | Power (W) | Power Factor | Orientation |
|------------------------------------|---------------|----------------|-------------|-----------|--------------|-------------|
| 24.9                               | 120.02        | 60             | 0.7220      | 86.34     | 0.9963       | Horizontal  |

### Test Results

| CCT (K) | CRI (Ra) | R9  | Duv    | Flux (lm) | Luminous Efficacy (lm/W) | Efficacy(lm/ft) |
|---------|----------|-----|--------|-----------|--------------------------|-----------------|
| 5054    | 82       | 7.0 | 0.0011 | 12137.9   | 140.58                   | 1517.24         |



|                    |         |                          |        |
|--------------------|---------|--------------------------|--------|
| Luminous Flux (lm) | 12137.9 | Chrom x                  | 0.3438 |
| Chrom y            | 0.3526  | Chrom u                  | 0.2101 |
| Chrom v            | 0.3233  | Duv                      | 0.0011 |
| Chrom u'           | 0.2101  | Chrom v'                 | 0.4850 |
| CCT (K)            | 5054    | Luminous Efficacy (lm/W) | 140.58 |
| Ra                 | 82      | R1                       | 80.0   |
| R2                 | 86.0    | R3                       | 89.0   |
| R4                 | 82.0    | R5                       | 81.0   |
| R6                 | 80.0    | R7                       | 86.0   |
| R8                 | 68.0    | R9                       | 7.0    |
| R10                | 66.0    | R11                      | 81.0   |
| R12                | 57.0    | R13                      | 82.0   |
| R14                | 94.0    | R15                      | 75.0   |
| Rf                 | 82      | Rg                       | 97     |
| Rcs,h1             | -12%    |                          |        |

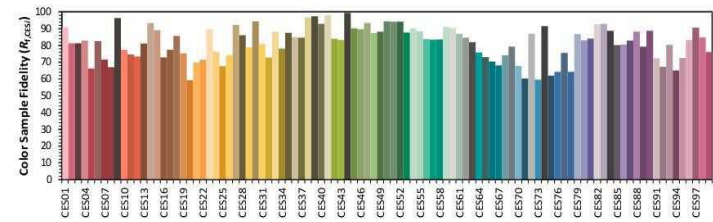
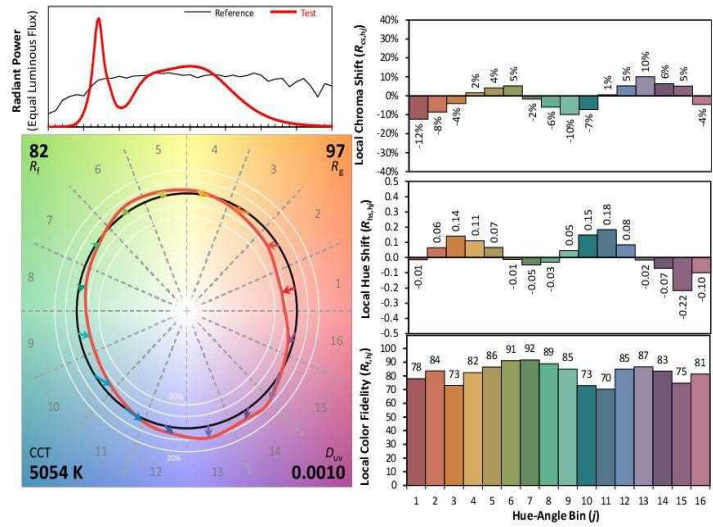


## Integrating Sphere Test (Cont'd)

### TM-30 Report

#### ANSI/IES TM-30-18 Color Rendition Report

Source: BXEN-(A)E-11M-3AA      Manufacturer: P.Q.L., Inc.  
 Date: 9/19/2022      Model: 55687-90W-50K



Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

|    |        |                        |
|----|--------|------------------------|
| x  | 0.3438 | CIE 13.3-1995<br>(CRI) |
| y  | 0.3526 |                        |
| u' | 0.2101 |                        |
| v' | 0.4850 |                        |

$R_a$  82  
 $R_9$  7

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.



## Integrating Sphere Test

|                            |               |                                  |         |
|----------------------------|---------------|----------------------------------|---------|
| <b>Model No.</b>           | 55687-75W-35K | <b>Sample ID.</b>                | 5307975 |
| <b>Operate time (Min.)</b> | 90            | <b>Stabilization time (Min.)</b> | 45      |

### Test Method

1. The sample was tested according to the IES LM-79-2008, and the product is assumed to be brand new without seasoning.

2. Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at  $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$ . The reference standard lamp is rated current 2.679A omni-directional Incandescent lamp and was calibrated by National Institute of Metrology P.R.China.

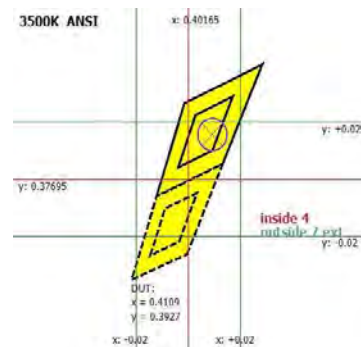
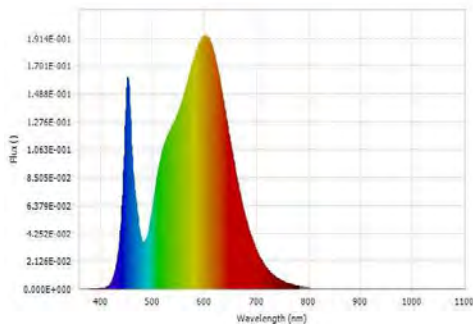
3. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. Coating reflectance of the integrating sphere was 90% to 98%. Photometric measurement conditions were using  $4\pi$  geometry. The self-absorption factor is applied in the final test result. The sample was operated at rated voltage and was stabilized before measurement. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780 nm.

### Integrating Sphere Test Conditions

| Temperature ( $^{\circ}\text{C}$ ) | Voltage (Vac) | Frequency (Hz) | Current (A) | Power (W) | Power Factor | Orientation |
|------------------------------------|---------------|----------------|-------------|-----------|--------------|-------------|
| 25.1                               | 120.09        | 60             | 0.6223      | 74.44     | 0.9961       | Horizontal  |

### Test Results

| CCT (K) | CRI (Ra) | R9  | Duv     | Flux (lm) | Luminous Efficacy (lm/W) | Efficacy(lm/ft) |
|---------|----------|-----|---------|-----------|--------------------------|-----------------|
| 3398    | 82       | 7.0 | -0.0003 | 10277.3   | 138.06                   | 1284.66         |



|                    |         |                          |         |
|--------------------|---------|--------------------------|---------|
| Luminous Flux (lm) | 10277.3 | Chrom x                  | 0.4109  |
| Chrom y            | 0.3927  | Chrom u                  | 0.2385  |
| Chrom v            | 0.3420  | Duv                      | -0.0003 |
| Chrom u'           | 0.2385  | Chrom v'                 | 0.5129  |
| CCT (K)            | 3398    | Luminous Efficacy (lm/W) | 138.06  |
| Ra                 | 82      | R1                       | 81.0    |
| R2                 | 89.0    | R3                       | 95.0    |
| R4                 | 81.0    | R5                       | 80.0    |
| R6                 | 85.0    | R7                       | 85.0    |
| R8                 | 62.0    | R9                       | 7.0     |
| R10                | 73.0    | R11                      | 80.0    |
| R12                | 62.0    | R13                      | 82.0    |
| R14                | 97.0    | R15                      | 74.0    |
| Rf                 | 83      | Rg                       | 97      |
| Rcs,h1             | -12%    |                          |         |



## Integrating Sphere Test (Cont'd)

### TM-30 Report

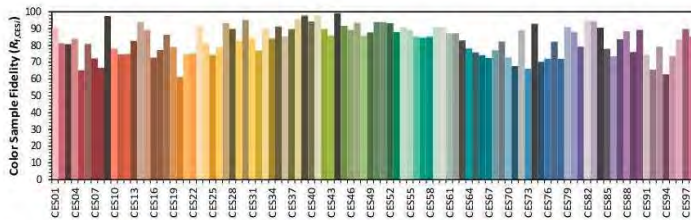
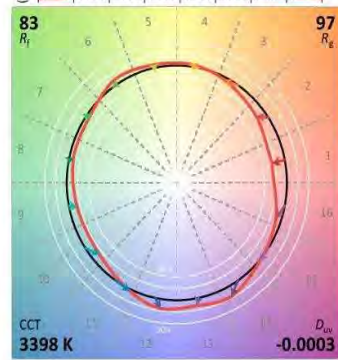
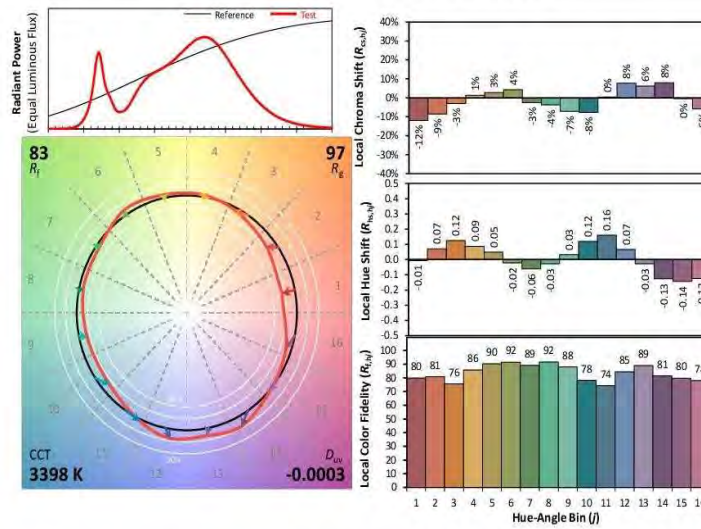
#### ANSI/IES TM-30-18 Color Rendition Report

Source: BXEN-(A)E-11M-3AA

Manufacturer: P.Q.L., Inc.

Date: 9/15/2022

Model: 55687-75W-35K



Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x 0.4109  
 y 0.3927  
 u' 0.2385  
 v' 0.5129

|                        |
|------------------------|
| CIE 13.3-1995<br>(CRI) |
| $R_a$ 82               |
| $R_9$ 7                |

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.



## Integrating Sphere Test

|                            |               |                                  |         |
|----------------------------|---------------|----------------------------------|---------|
| <b>Model No.</b>           | 55687-65W-35K | <b>Sample ID.</b>                | 5307975 |
| <b>Operate time (Min.)</b> | 90            | <b>Stabilization time (Min.)</b> | 45      |

### Test Method

1. The sample was tested according to the IES LM-79-2008, and the product is assumed to be brand new without seasoning.

2. Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at  $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$ . The reference standard lamp is rated current 2.679A omni-directional Incandescent lamp and was calibrated by National Institute of Metrology P.R.China.

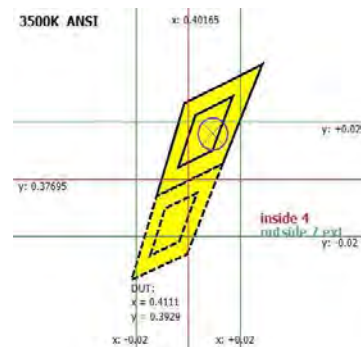
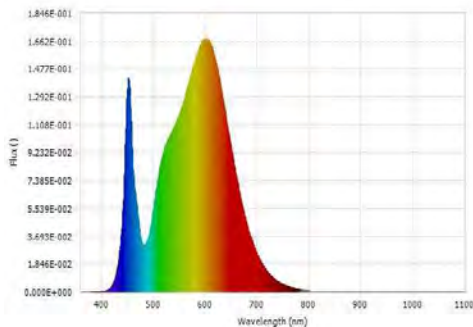
3. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. Coating reflectance of the integrating sphere was 90% to 98%. Photometric measurement conditions were using  $4\pi$  geometry. The self-absorption factor is applied in the final test result. The sample was operated at rated voltage and was stabilized before measurement. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780 nm.

### Integrating Sphere Test Conditions

| Temperature ( $^{\circ}\text{C}$ ) | Voltage (Vac) | Frequency (Hz) | Current (A) | Power (W) | Power Factor | Orientation |
|------------------------------------|---------------|----------------|-------------|-----------|--------------|-------------|
| 25.1                               | 120.16        | 60             | 0.5275      | 63.077    | 0.9952       | Horizontal  |

### Test Results

| CCT (K) | CRI (Ra) | R9  | Duv     | Flux (lm) | Luminous Efficacy (lm/W) | Efficacy(lm/ft) |
|---------|----------|-----|---------|-----------|--------------------------|-----------------|
| 3393    | 82       | 8.0 | -0.0003 | 8924.5    | 141.49                   | 1115.56         |



|                    |        |                          |         |
|--------------------|--------|--------------------------|---------|
| Luminous Flux (lm) | 8924.5 | Chrom x                  | 0.4111  |
| Chrom y            | 0.3929 | Chrom u                  | 0.2386  |
| Chrom v            | 0.3420 | Duv                      | -0.0003 |
| Chrom u'           | 0.2386 | Chrom v'                 | 0.5130  |
| CCT (K)            | 3393   | Luminous Efficacy (lm/W) | 141.49  |
| Ra                 | 82     | R1                       | 81.0    |
| R2                 | 89.0   | R3                       | 95.0    |
| R4                 | 81.0   | R5                       | 80.0    |
| R6                 | 85.0   | R7                       | 85.0    |
| R8                 | 62.0   | R9                       | 8.0     |
| R10                | 73.0   | R11                      | 80.0    |
| R12                | 62.0   | R13                      | 82.0    |
| R14                | 97.0   | R15                      | 74.0    |
| Rf                 | 83     | Rg                       | 97      |
| Rcs,h1             | -12%   |                          |         |





## Integrating Sphere Test (Cont'd)

### TM-30 Report

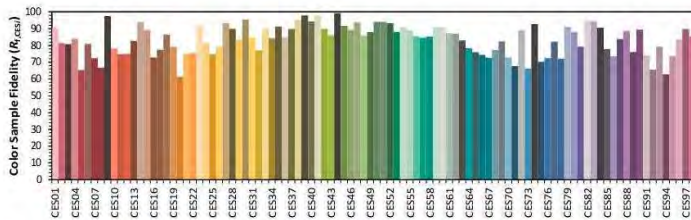
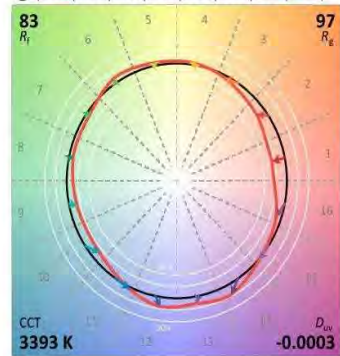
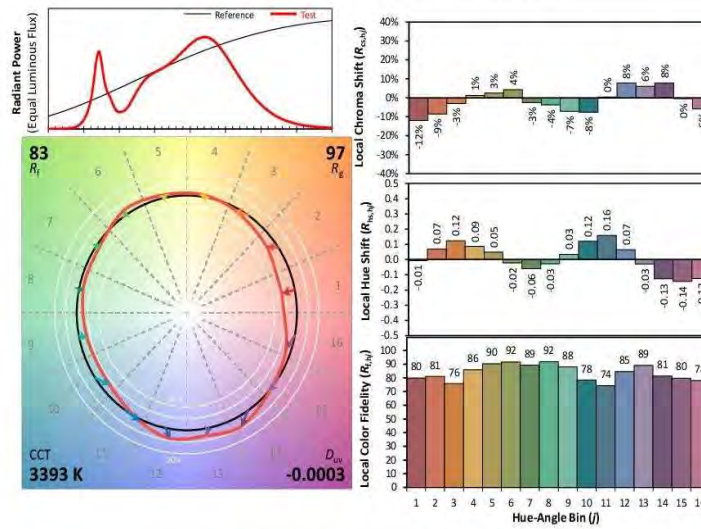
#### ANSI/IES TM-30-18 Color Rendition Report

Source: BXEN-(A)E-11M-3AA

Manufacturer: P.Q.L., Inc.

Date: 9/15/2022

Model: 55687-65W-35K



Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x 0.4111  
 y 0.3929  
 u' 0.2386  
 v' 0.5130

CIE 13.3-1995  
 (CRI)  
 $R_a$  82  
 $R_9$  8

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.





## THD and PF Test

|                            |               |                                  |         |
|----------------------------|---------------|----------------------------------|---------|
| <b>Model No.</b>           | 55687-90W-35K | <b>Sample ID.</b>                | 5307975 |
| <b>Operate time (Min.)</b> | 90            | <b>Stabilization time (Min.)</b> | 45      |

### Test Method

1. The samples were tested according to the ANSI C82.77-10-2014.
2. The ambient temperature condition was maintained at  $25\text{ °C} \pm 1\text{ °C}$ . The sample measurement was made using a digital power meter and power supply. The sample was operated at rated voltage and stabilized before measurement. The total harmonic distortion were calculated from the digital power meter.

### Test Results

| Temperature (°C) | Voltage (Vac) | Frequency (Hz) | Current (A) | Power (W) | Power Factor | Current THD | Orientation |
|------------------|---------------|----------------|-------------|-----------|--------------|-------------|-------------|
| 24,8             | 119.90        | 60             | 0.7304      | 87.32     | 0.9970       | 3.72%       | Horizontal  |
| 24,8             | 277.08        | 60             | 0.3204      | 85.70     | 0.9651       | 7.07%       | Horizontal  |



## THD and PF Test

|                            |               |                                  |         |
|----------------------------|---------------|----------------------------------|---------|
| <b>Model No.</b>           | 55687-90W-40K | <b>Sample ID.</b>                | 5307975 |
| <b>Operate time (Min.)</b> | 90            | <b>Stabilization time (Min.)</b> | 45      |

### Test Method

1. The samples were tested according to the ANSI C82.77-10-2014.
2. The ambient temperature condition was maintained at  $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$ . The sample measurement was made using a digital power meter and power supply. The sample was operated at rated voltage and stabilized before measurement. The total harmonic distortion were calculated from the digital power meter.

### Test Results

| Temperature ( $^{\circ}\text{C}$ ) | Voltage (Vac) | Frequency (Hz) | Current (A) | Power (W) | Power Factor | Current THD | Orientation |
|------------------------------------|---------------|----------------|-------------|-----------|--------------|-------------|-------------|
| 24.8                               | 120.01        | 60             | 0.6977      | 83.46     | 0.9967       | 3.75%       | Horizontal  |
| 24.8                               | 277.11        | 60             | 0.3073      | 81.79     | 0.9624       | 7.59%       | Horizontal  |



## THD and PF Test

|                            |               |                                  |         |
|----------------------------|---------------|----------------------------------|---------|
| <b>Model No.</b>           | 55687-90W-50K | <b>Sample ID.</b>                | 5307975 |
| <b>Operate time (Min.)</b> | 90            | <b>Stabilization time (Min.)</b> | 45      |

### Test Method

1. The samples were tested according to the ANSI C82.77-10-2014.
2. The ambient temperature condition was maintained at  $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$ . The sample measurement was made using a digital power meter and power supply. The sample was operated at rated voltage and stabilized before measurement. The total harmonic distortion were calculated from the digital power meter.

### Test Results

| Temperature ( $^{\circ}\text{C}$ ) | Voltage (Vac) | Frequency (Hz) | Current (A) | Power (W) | Power Factor | Current THD | Orientation |
|------------------------------------|---------------|----------------|-------------|-----------|--------------|-------------|-------------|
| 24.8                               | 119.98        | 60             | 0.7224      | 86.42     | 0.9969       | 3.73%       | Horizontal  |
| 24.8                               | 277.11        | 60             | 0.3171      | 84.75     | 0.9644       | 7.17%       | Horizontal  |



## THD and PF Test

|                            |               |                                  |         |
|----------------------------|---------------|----------------------------------|---------|
| <b>Model No.</b>           | 55687-75W-35K | <b>Sample ID.</b>                | 5307975 |
| <b>Operate time (Min.)</b> | 90            | <b>Stabilization time (Min.)</b> | 45      |

### Test Method

1. The samples were tested according to the ANSI C82.77-10-2014.  
2. The ambient temperature condition was maintained at 25 °C ± 1 °C. The sample measurement was made using a digital power meter and power supply. The sample was operated at rated voltage and stabilized before measurement. The total harmonic distortion were calculated from the digital power meter.

### Test Results

| Temperature (°C) | Voltage (Vac) | Frequency (Hz) | Current (A) | Power (W) | Power Factor | Current THD | Orientation |
|------------------|---------------|----------------|-------------|-----------|--------------|-------------|-------------|
| 24.8             | 119.95        | 60             | 0.6264      | 74.86     | 0.9964       | 4.04%       | Horizontal  |
| 24.8             | 277.10        | 60             | 0.2784      | 73.82     | 0.9566       | 7.42%       | Horizontal  |



## THD and PF Test

|                            |               |                                  |         |
|----------------------------|---------------|----------------------------------|---------|
| <b>Model No.</b>           | 55687-65W-35K | <b>Sample ID.</b>                | 5307975 |
| <b>Operate time (Min.)</b> | 90            | <b>Stabilization time (Min.)</b> | 45      |

### Test Method

1. The samples were tested according to the ANSI C82.77-10-2014.
2. The ambient temperature condition was maintained at 25 °C ± 1 °C. The sample measurement was made using a digital power meter and power supply. The sample was operated at rated voltage and stabilized before measurement. The total harmonic distortion were calculated from the digital power meter.

### Test Results

| Temperature (°C) | Voltage (Vac) | Frequency (Hz) | Current (A) | Power (W) | Power Factor | Current THD | Orientation |
|------------------|---------------|----------------|-------------|-----------|--------------|-------------|-------------|
| 24.8             | 119.99        | 60             | 0.5296      | 63.29     | 0.9959       | 3.84%       | Horizontal  |
| 24.8             | 277.12        | 60             | 0.2396      | 62.65     | 0.9434       | 8.80%       | Horizontal  |



## In-Situ Temperature Measurement Test

|                  |               |                   |         |
|------------------|---------------|-------------------|---------|
| <b>Model No.</b> | 55687-90W-35K | <b>Sample ID.</b> | 5307975 |
|------------------|---------------|-------------------|---------|

### Test Method

1. In-Situ Temperature Measurement Test is conducted according to the UL 1598-2008, Section 14.  
 2. The testing was conducted in a room with ambient temperature of 25 °C ± 5 °C. The apparatus construction followed those described in UL1598-2008 for normal temperature testing. Thermocouples were placed on the LED package in the locations indicated by LM-80 report. Thermocouples were placed on the LED driver case in the locations specified by the manufacture if necessary. The temperature was recorded after the lamp was operated by 7.5 hours.  
 3. The data and photos in LM-80 test report is provided by the customer/ The data and photos in driver specification is provided by the customer.

### In-Situ Temperature Measurement Test Conditions

| Temperature (°C) | Voltage (Vac) | Frequency (Hz) | Current (A) | Power (W) | Power Factor | Current THD | Orientation |
|------------------|---------------|----------------|-------------|-----------|--------------|-------------|-------------|
| 23.2             | 119.90V       | 60             | 0.7304      | 87.32     | 0.9970       | 3.72%       | Horizontal  |

### Test Results (LEDs)

| Thermocouple Location | Declared Light Source Current (mA) | Temperature for Light Source (°C) |                                | Max Chromaticity Shift (1000-6000h) | LED Model Number  | LM-80 Limit Current (mA) | LM-80 Limit Temp (°C) |
|-----------------------|------------------------------------|-----------------------------------|--------------------------------|-------------------------------------|-------------------|--------------------------|-----------------------|
|                       |                                    | Test Result                       | Test Result (Correct to 25 °C) |                                     |                   |                          |                       |
| Ambient TEMP          | N/A                                | 23.2                              | 25.0                           |                                     |                   |                          |                       |
| TMP of Location 1     | 70                                 | 49.8                              | 51.6                           | 0.0023                              | BXEN-(A)E-11M-3AA | 120                      | 105                   |

### Test Results (Drivers)

| Thermocouple Location | Temperature for Driver (°C) |                                | Driver Model Number           | Driver Limit Temp (°C) |
|-----------------------|-----------------------------|--------------------------------|-------------------------------|------------------------|
|                       | Test Result                 | Test Result (Correct to 25 °C) |                               |                        |
| Ambient TEMP          | 23.2                        | 25.0                           |                               |                        |
| TMP of Location 1     | 65.9                        | 67.7                           | SIL80-I2000 120-277 W D1+D3 M | 90                     |





## In-Situ Temperature Measurement Test (Cont'd)

### Test Photos for Ts Point of Light Sources & Tc Point of Drivers





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