



Energy Star Test Report

For

L-TECH CORPORATION

(Brand Name: N/A)

Shaogangtou District, Qiaotou Town, Dongguan City

Model name(s):

LRKT565W/567W-EN-3CT-27-35

LRKT565W/567W-EN-3CT-30-50

Report Type: Testing and Report According to ENERGY STAR® Program Requirements Product Specification for Luminaires (Light Fixtures) - Version 2.2

Type of Luminaire: Downlight retrofits

Report Date: 2020-05-14

Ningbo TengLi Testing Co., Ltd

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Test & Report By:

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Review By:

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Manager: Johnson Sun

Note: 1.The results contained in this report pertain only to the tested samples.
2.This report does not imply product certification, approval, or endorsement by A2LA or any agency of the Federal Government.



| 1.1 Product Information: | | |
|---|---|-----|
| Model Number | LRKT565W/567W-EN-3CT-27-35 LRKT565W/567W-EN-3CT-30-50 | |
| Remark | According to the test data, 2700K is the most inefficient mode. | |
| Representative (Tested) Model | LRKT565W/567W-EN-3CT-27-35(0%,2700K) LRKT565W/567W-EN-3CT-27-35(50%,3000K) LRKT565W/567W-EN-3CT-27-35(100%,3500K) | |
| Model Difference | All construction and rating are the same, except CCT | |
| SKU (if available) | N/A | |
| Type of Luminaire (for integral lamps, list base type and lamp type) | Downlight retrofits | |
| LED Manufacturer | Edison Opto Corporation | |
| LED Model | 2T03X5WW11000003 | |
| Dimming | Dimmable | |
| Sample Number | JCE200410-I1 | |
| Date of Receipt | Apr.20,2020 | |
| Luminaire Aperture (for Inseparable SSL Luminaire) | -- | in. |
| Luminaire Length | -- | mm |
| Luminaires Width | -- | mm |
| Number of Units (modular products) | N/A | s |

| 1.2 Rated Values: | |
|--|-------------------|
| Rated Voltage / Frequency | 120Vac, 50/60Hz |
| Nominal Power | 13W |
| Rated Initial Lamp Lumen | -- |
| Declared CCT for LRKT565W/567W-EN-3CT-27-35 | 2700K,3000K,3500K |
| Declared CCT for LRKT565W/567W-EN-3CT-30-50 | 3000K,4000K,5000K |

1.3 Product Photos





1.4 Test Specifications:

| | |
|----------------------------|--|
| Test item | <ol style="list-style-type: none"> 1. Total Luminous Flux 2. Luminous Distribution Intensity 3. Luminous Efficacy 4. Correlated Color Temperature 5. Color Rendering Index 6. Chromaticity Coordinate 7. Electrical Parameters |
| Reference Standard | <ol style="list-style-type: none"> 1. IES LM-79-2008 Electrical and Photometric Measurements of Solid-State Lighting Products 2. ANSI C78.377-2008 Specifications for the Chromaticity of Solid State Lighting Products 3. CIE 13.3-1995 Method of Measuring and Specifying Colour Rendering Properties of Light Sources 4. CIE 15-2004 Technical Report Colorimetry 5. IESNA LM-16-93 Practical Guide to Colorimetry of Light Source 6. IESNA TM-16-05 Technical Memorandum on Light Emitting Diode (LED) Sources and Systems 7. UL1993 4th Edition, Self-Ballasted Lamps and Lamp Adapters 8. ENERGY STAR® Program Requirements Product Specification for Luminaires (Light Fixtures) – Version 2.2 |
| Reference Work Instruction | QD25 |
| Remark | Below test and data are not covered by A2LA accreditation: - Operating Frequency |



1.5 Test Methods

1) Photometric and Light Distribution Measurement – Goniophotometer Method:

Photometric parameters were measured using the goniophotometer and software. The ambient temperature shall be maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$, measured at a point not more than 1 m from the sample and at the same height as the sample. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at 1° vertical intervals and 22.5° horizontal intervals.

2) Chromaticity Measurement – Sphere-Spectroradiometer Method:

Chromaticity parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral power distribution taken at 5 nm intervals over the range of 380 to 780 nm.

3) Electrical Measurements:

Electrical parameters were measured using power meters incorporated in goniophotometer or sphere-spectroradiometer system. The ambient temperature surrounding the sample was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Voltage, frequency, current, power, power factor and total harmonic distortion were measured by and read from the power meter.



2.1 Summary of Test Result

| Criteria Item | The Type of Luminaires | Requirement (ES for Luminaires V2.2) | Measured Value | Status |
|---|---|--|----------------------|--------|
| Input Wattage | All | ≤ Rated Wattage | 12.79W | Pass |
| Luminous Efficacy | Downlight retrofits | ≥60 lm/W | 78.55lm/W | Pass |
| Luminaire Minimum Light Output | Downlight retrofits | ≤4.5" aperture: 345 lumens >4.5" aperture: 575 lumens | 1004.7lm | Pass |
| Luminaire Zonal Lumen Density Requirement | Downlight retrofits | ≥75% of total initial lumens within the 0-60° zone | 79.5 | Pass |
| Correlated Color Temperature (CCT) | Solid State | Shall be capable of providing at least one of the following nominal correlated color temperatures (CCTs): <ul style="list-style-type: none"> • 2700 Kelvin • 3000 Kelvin • 3500 Kelvin • 4000 Kelvin • 5000 Kelvin | 2718K Duv=-0.0005 | Pass |
| Color Rendering Index (CRI) | Solid State | Ra ≥ 80 R9 >0 | Ra =92.8 R9=57 | Pass |
| Color Angular Uniform | Directional Solid State Indoor Luminaires | The variation of chromaticity shall be within 0.006 from the weighted average point on the CIE 1976(u',v') diagram | 0.0009 | Pass |
| Lumen Maintenance | Solid State Option 1: | L70 lumen maintenance: ≥ 25,000 hours for indoor ≥ 35,000 hours for outdoor ≥ 50,000 hours for inseparable luminaires | | Pass |
| Light Source Life | Solid State | L70 lumen maintenance: ≥ 25,000 hours for indoor ≥ 35,000 hours for outdoor ≥ 50,000 hours for inseparable luminaires | | Pass |



| | | | | |
|------------------------------|-------------------------------------|--|------------------------------|------|
| Color Maintenance | Solid State Indoor Luminaires | $\Delta u'v' \leq 0.007$ | Max.0.0047in LM-80 report | Pass |
| Source Start Time | Solid State | <750 ms | 114ms | Pass |
| Power Factor | Solid State | Total luminaire input power ≤ 5 watts: PF ≥ 0.5 Total luminaire input power > 5 watts: PF ≥ 0.7 | 0.9469 | Pass |
| Transient Protection | Solid State | The line transient shall consist of seven strikes of a 100 kHz ring wave, 2.5 kV level, for both common mode and differential mode. | Survival | Pass |
| Standby Power Consumption | All Luminaires | Luminaires shall not draw power in the off state. | 0W | Pass |
| Operating Frequency | Solid State | Frequency ≥ 120 Hz | 120.63Hz | Pass |
| Light Source Replaceability | Solid State | LED light engines or retrofit kits shall make use of electrical interconnects that allow for consumer replacement of the engine or kit without the cutting of wires or the use of solder. | N/A | N/A |
| Driver Replaceability | Solid State: Directional | Drivers shall be accessible and removable by an electrician without the cutting of wires and without damage to the luminaire housing, trim, decorative elements or the carpentry (e.g., ceilingdrywall) to which theluminaire is attached. | N/A | N/A |
| Maximum Measured Driver Case | Solid State | shall not exceed the driver manufacturer's maximum recommended temperature | 48.3°C | Pass |



| | | | | |
|--|-----------------------------|---|--|------|
| Temperature | | during in situ operation. ≤ 105 °C | | |
| Maximum In-Situ Source Temperature | Solid State | Maximum permitted Ts temperature for L70≥50,000 hrs ≤ 105°C | 76.3°C | Pass |
| Electronic Driver Safety | Solid State: Directional | Demonstrate compliance with ANSI/UL 1310-2010, ANSI/UL 2108-2004, ANSI/UL 8750-2009, as applicable. | Driver safety report has been verified | Pass |
| Dimming | Solid State | The luminaire and its components shall provide continuous dimming from 100% to 20% of total light output. Luminaire shall not emit noise above 24dBA at 1 meter or less at the minimum output. | Pass | Pass |
| Warranty Requirements | Solid State | incorporating replaceable drivers: ≥ 3 years incorporating non-replaceable drivers: ≥ 5 years | 5 years | Pass |
| Lighting Toxics Reduction Requirements | Solid State | Luminaires and lamps shall not exceed: 1000 ppm: Mercury, Lead, Hexavalent Chromium, PBB and PBDE 100 ppm: Cadmium | RoHS report has been verified | Pass |
| CCT | Solid State | Packaging shall clearly describe the nominal color designation in units of Kelvin (e.g. 2700K, 3000K). | 2700K,3000K, 3500K | Pass |



| | |
|---|-----------------------|
| 2.2.1 Electrical, Photometric and Chromaticity Measurements <i>(Refer to Work Instruction QD25)</i> | IES LM-79 2008 |
|---|-----------------------|

| | | | |
|-------------------------|--|---------------------------------|---------|
| Test date | 2020-04-24 | Test Ambient: | 25.0 °C |
| Test Orientation | As intended | Stabilization Time (min) | 90 |
| Model Number | LRKT565W/567W-EN-3C T-27-35(0%,2700K) | | |

Electrical Measurement:

| Sample No. | Voltage (Vac) | Frequency (Hz) | Current (A) | Power (W) | Power Factor |
|--------------|---------------|----------------|-------------|-----------|--------------|
| JCE200410-I1 | 120.0 | 60 | 0.1125 | 12.79 | 0.9469 |

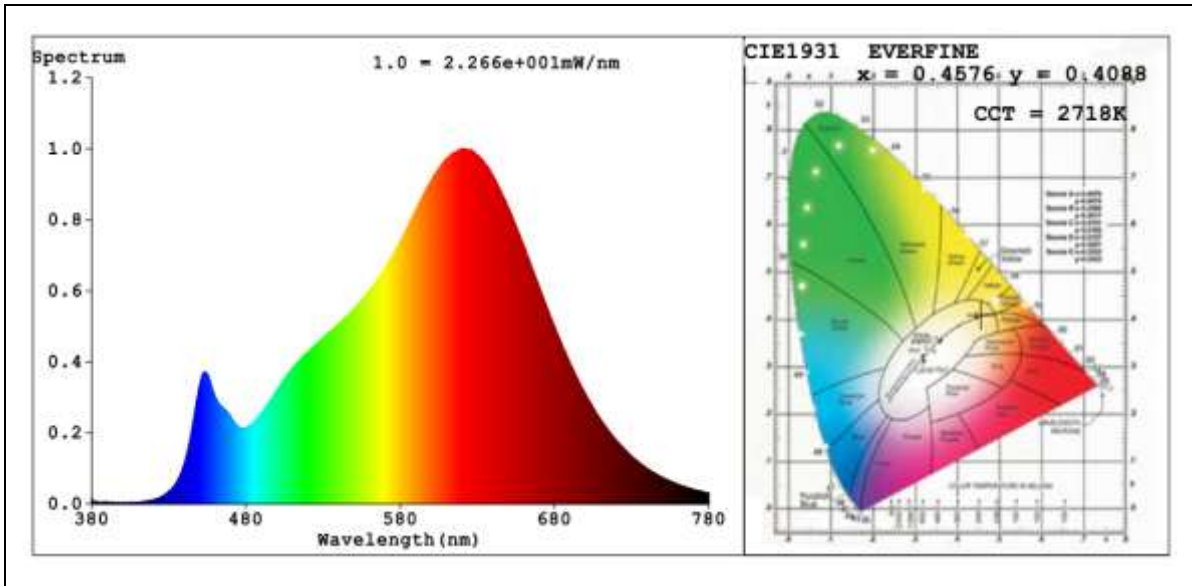
Sphere-Spectroradiometer Method:

| Parameter | Result |
|-----------------------------|---------|
| Test Voltage (V) | 120 |
| Frequency (Hz) | 60 |
| Color Rendering Index (CRI) | 92.8 |
| R9 | 57 |
| CCT (K) | 2718 |
| Duv | -0.0005 |

Goniophotometer Method:

| Parameter | Result |
|-------------------------------|--------|
| Test Voltage (V) | 120 |
| Frequency (Hz) | 60 |
| Total Luminous (lm) | 1004.7 |
| Luminous Efficacy (lm/W) | 78.55 |
| Beam Angle° | 105.1 |
| Center Beam Candle Power (cd) | 378 |

Spectral Power Distribution and Chromaticity Diagram



Colorimetric Parameters

Colorimetric Parameters

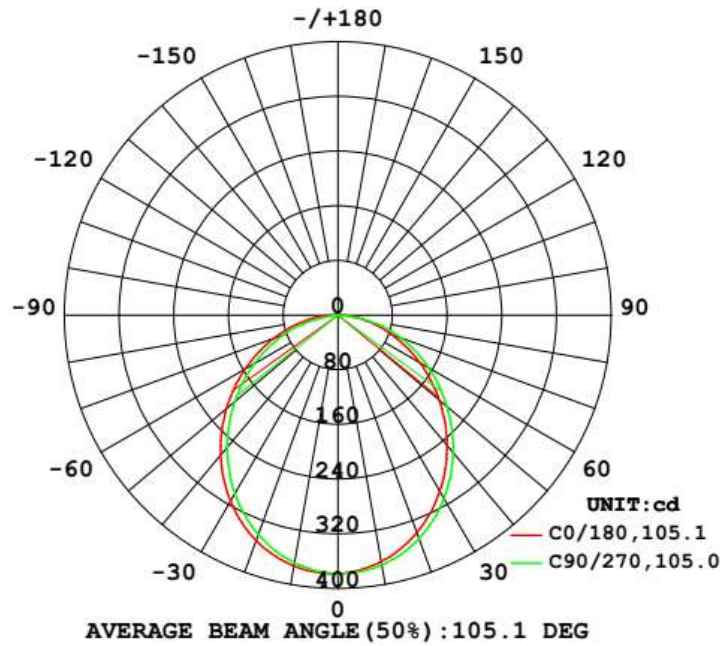
Chromaticity Coordinate: x=0.4576 y=0.4088 / u'=0.2618 v'=0.5263
 CCT=2718K (Duv=-0.0005) Dominant WL:Ld =584.3nm Purity=60.1%
 Peak WL:Lp=619.4nm FWHM=141.8nm
 Render Index: Ra=92.8 Render Index: AvgR =90.5

| | | | | | | |
|--------|--------|--------|--------|--------|--------|----------------|
| R1 =93 | R2 =98 | R3 =98 | R4 =93 | R5 =94 | R6 =97 | R7 =90 |
| R8 =79 | R9 =57 | R10=95 | R11=95 | R12=86 | R13=95 | R14=100 R15=88 |



Zonal Lumen Tabulation

LUMINOUS INTENSITY DISTRIBUTION DIAGRAM



| Zonal Lumen Summary | | |
|---------------------|---------|-------------|
| Zone | Lumens | % Luminaire |
| 0-30 | 287.3 | 28.6% |
| 0-40 | 464.1 | 46.2% |
| 0-60 | 798.9 | 79.5% |
| 60-90 | 205.6 | 20.5% |
| 70-100 | 87.6 | 8.7% |
| 90-120 | 0.1 | 0% |
| 0-90 | 1,004.4 | 100% |
| 90-180 | 0.1 | 0% |
| 0-180 | 1,004.6 | 100% |

| Lumens Per Zone | | | | | |
|-----------------|--------|---------|---------|--------|--------|
| Zone | Lumens | % Total | Zone | Lumens | %Total |
| 0-10 | 35.7 | 3.5% | 90-100 | 0.0 | 0% |
| 10-20 | 101.1 | 10.1% | 100-110 | 0.0 | 0% |
| 20-30 | 150.5 | 15.0% | 110-120 | 0.0 | 0% |
| 30-40 | 176.8 | 17.6% | 120-130 | 0.0 | 0% |
| 40-50 | 178.1 | 17.7% | 130-140 | 0.0 | 0% |
| 50-60 | 156.7 | 15.6% | 140-150 | 0.0 | 0% |
| 60-70 | 118.1 | 11.8% | 150-160 | 0.0 | 0% |
| 70-80 | 69.8 | 6.9% | 160-170 | 0.0 | 0% |
| 80-90 | 17.7 | 1.8% | 170-180 | 0.0 | 0% |



Table--1 UNIT: cd

| C (DEG) □ (DEG) | 0 | 22.5 | 45 | 67.5 | 90 | 112.5 | 135 | 157.5 | 180 | 202.5 | 225 | 247.5 | 270 | 292.5 | 315 | 337.5 | | |
|--------------------|------|------|------|------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|--|--|
| 0 | 378 | 378 | 378 | 378 | 378 | 378 | 378 | 378 | 378 | 378 | 378 | 378 | 378 | 378 | 378 | 378 | | |
| 5 | 374 | 375 | 375 | 376 | 377 | 377 | 378 | 378 | 377 | 376 | 376 | 375 | 375 | 374 | 374 | 373 | | |
| 10 | 366 | 368 | 369 | 370 | 371 | 372 | 373 | 374 | 372 | 370 | 370 | 369 | 368 | 366 | 365 | 365 | | |
| 15 | 354 | 357 | 358 | 359 | 361 | 363 | 364 | 365 | 363 | 361 | 360 | 358 | 356 | 355 | 353 | 352 | | |
| 20 | 339 | 342 | 344 | 345 | 348 | 350 | 352 | 353 | 351 | 347 | 346 | 344 | 341 | 339 | 337 | 336 | | |
| 25 | 320 | 324 | 326 | 328 | 330 | 333 | 336 | 337 | 334 | 330 | 328 | 326 | 323 | 320 | 318 | 317 | | |
| 30 | 298 | 303 | 305 | 307 | 310 | 313 | 316 | 318 | 315 | 309 | 308 | 305 | 302 | 298 | 296 | 295 | | |
| 35 | 274 | 280 | 282 | 284 | 287 | 291 | 294 | 296 | 292 | 286 | 284 | 282 | 278 | 274 | 272 | 270 | | |
| 40 | 248 | 255 | 256 | 259 | 262 | 266 | 270 | 271 | 267 | 261 | 259 | 256 | 252 | 248 | 246 | 244 | | |
| 45 | 222 | 228 | 230 | 232 | 236 | 240 | 243 | 245 | 241 | 234 | 232 | 229 | 225 | 221 | 218 | 217 | | |
| 50 | 194 | 201 | 203 | 205 | 209 | 213 | 216 | 217 | 213 | 206 | 204 | 202 | 197 | 194 | 191 | 190 | | |
| 55 | 166 | 173 | 175 | 177 | 181 | 185 | 188 | 189 | 185 | 178 | 176 | 173 | 169 | 165 | 163 | 162 | | |
| 60 | 138 | 145 | 147 | 149 | 153 | 157 | 160 | 161 | 156 | 149 | 147 | 144 | 141 | 137 | 135 | 134 | | |
| 65 | 110 | 117 | 119 | 122 | 125 | 129 | 131 | 132 | 128 | 121 | 119 | 116 | 113 | 109 | 107 | 106 | | |
| 70 | 84.2 | 91.0 | 93.0 | 95.2 | 98.5 | 102 | 104 | 105 | 100 | 93.3 | 91.3 | 88.8 | 85.7 | 82.8 | 80.7 | 80.0 | | |
| 75 | 59.6 | 66.0 | 68.0 | 70.4 | 72.7 | 76.2 | 78.0 | 78.5 | 73.6 | 67.3 | 65.4 | 61.4 | 56.2 | 56.3 | 56.0 | 55.3 | | |
| 80 | 37.3 | 43.0 | 44.5 | 43.0 | 41.7 | 47.7 | 53.2 | 53.7 | 49.1 | 43.6 | 38.2 | 27.4 | 22.2 | 25.5 | 31.7 | 33.6 | | |
| 85 | 19.4 | 23.8 | 18.7 | 11.9 | 8.61 | 13.4 | 23.4 | 32.3 | 28.4 | 19.2 | 5.03 | 1.61 | 1.08 | 1.40 | 4.68 | 15.2 | | |
| 90 | 0.10 | 3.63 | 0.11 | 0.07 | 0.08 | 0.11 | 0.27 | 3.62 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | |
| 95 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | |
| 100 | 0.00 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.10 | 0.03 | 0.09 | 0.08 | 0.00 | 0.00 | 0.00 | 0.04 | 0.04 | | |
| 105 | 0.01 | 0.04 | 0.04 | 0.01 | 0.00 | 0.02 | 0.07 | 0.07 | 0.04 | 0.06 | 0.05 | 0.02 | 0.01 | 0.01 | 0.02 | 0.03 | | |
| 110 | 0.02 | 0.03 | 0.02 | 0.01 | 0.01 | 0.02 | 0.05 | 0.06 | 0.04 | 0.06 | 0.04 | 0.02 | 0.01 | 0.01 | 0.02 | 0.02 | | |
| 115 | 0.02 | 0.03 | 0.02 | 0.01 | 0.01 | 0.02 | 0.04 | 0.06 | 0.04 | 0.05 | 0.03 | 0.01 | 0.01 | 0.01 | 0.01 | 0.02 | | |
| 120 | 0.02 | 0.02 | 0.02 | 0.01 | 0.00 | 0.02 | 0.03 | 0.05 | 0.04 | 0.04 | 0.02 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | | |
| 125 | 0.01 | 0.02 | 0.02 | 0.01 | 0.01 | 0.02 | 0.03 | 0.04 | 0.04 | 0.03 | 0.02 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | | |
| 130 | 0.01 | 0.02 | 0.02 | 0.01 | 0.01 | 0.02 | 0.03 | 0.04 | 0.03 | 0.03 | 0.02 | 0.01 | 0.00 | 0.01 | 0.01 | 0.01 | | |
| 135 | 0.01 | 0.02 | 0.02 | 0.01 | 0.01 | 0.02 | 0.03 | 0.03 | 0.03 | 0.02 | 0.02 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | | |
| 140 | 0.01 | 0.02 | 0.01 | 0.01 | 0.01 | 0.02 | 0.02 | 0.03 | 0.02 | 0.02 | 0.02 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | | |
| 145 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.02 | 0.02 | 0.02 | 0.02 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.01 | | |
| 150 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.02 | 0.02 | 0.02 | 0.01 | 0.01 | 0.01 | 0.01 | 0.00 | 0.01 | 0.01 | | |
| 155 | 0.01 | 0.01 | 0.01 | 0.00 | 0.01 | 0.01 | 0.01 | 0.02 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.00 | 0.01 | | |
| 160 | 0.01 | 0.01 | 0.01 | 0.00 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.00 | 0.00 | | |
| 165 | 0.01 | 0.01 | 0.01 | 0.00 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | | |
| 170 | 0.01 | 0.01 | 0.01 | 0.00 | 0.00 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | | |
| 175 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | |
| 180 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | |



| | |
|---|-----------------------|
| 2.2.2 Electrical, Photometric and Chromaticity Measurements <i>(Refer to Work Instruction QD25)</i> | IES LM-79 2008 |
|---|-----------------------|

| | | | |
|-------------------------|---|---------------------------------|---------|
| Test date | 2020-04-24 | Test Ambient: | 25.0 °C |
| Test Orientation | As intended | Stabilization Time (min) | 90 |
| Model Number | LRKT565W/567W-EN-3C T-27-35(50%,3000K) | | |

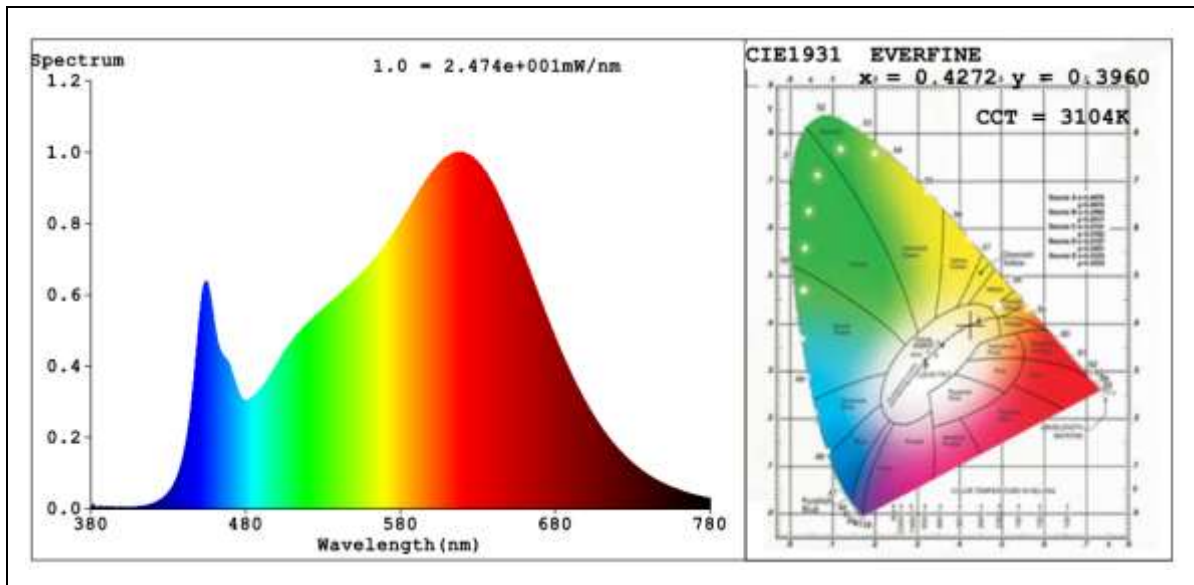
Electrical Measurement:

| Sample No. | Voltage (Vac) | Frequency (Hz) | Current (A) | Power (W) | Power Factor |
|--------------|---------------|-----------------|-------------|-----------|--------------|
| JCE200410-II | 120.0 | 60 | 0.1091 | 12.34 | 0.9425 |

Sphere-Spectroradiometer Method:

| Parameter | Result |
|-----------------------------|---------|
| Test Voltage (V) | 120 |
| Frequency (Hz) | 60 |
| Color Rendering Index (CRI) | 93.3 |
| R9 | 62 |
| CCT (K) | 3104 |
| Duv | -0.0019 |
| Total Luminous (lm) | 1215 |
| Luminous Efficacy (lm/W) | 98.46 |

Spectral Power Distribution and Chromaticity Diagram



Colorimetric Parameters

Colorimetric Parameters

Chromaticity Coordinate: $x=0.4272$ $y=0.3960$ $u'=0.2477$ $v'=0.5167$

CCT=3104K (Duv=-0.0019) Dominant WL:Ld =583.1nm Purity=47.1%

Peak WL:Lp=618.6nm FWHM=162.3nm

Render Index:Ra=93.3 Render Index:AvgR =91.2

R1 =95 R2 =99 R3 =97 R4 =93 R5 =95 R6 =96 R7 =90

R8 =82 R9 =62 R10=97 R11=94 R12=81 R13=97 R14=99 R15=91



| | |
|---|-----------------------|
| 2.2.3 Electrical, Photometric and Chromaticity Measurements <i>(Refer to Work Instruction QD25)</i> | IES LM-79 2008 |
|---|-----------------------|

| | | | |
|-------------------------|--|---------------------------------|---------|
| Test date | 2020-04-24 | Test Ambient: | 25.0 °C |
| Test Orientation | As intended | Stabilization Time (min) | 90 |
| Model Number | LRKT565W/567W-EN-3C T-27-35(100%,3500K) | | |

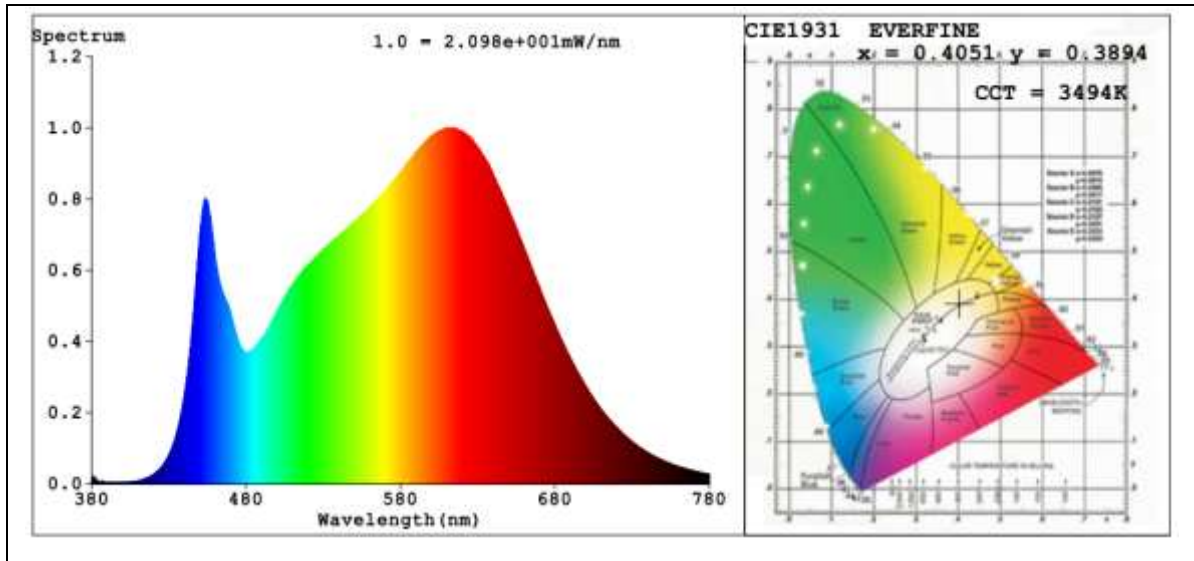
Electrical Measurement:

| Sample No. | Voltage (Vac) | Frequency (Hz) | Current (A) | Power (W) | Power Factor |
|--------------|---------------|-----------------|-------------|-----------|--------------|
| JCE200410-II | 120.0 | 60 | 0.1129 | 12.81 | 0.9458 |

Sphere-Spectroradiometer Method:

| Parameter | Result |
|-----------------------------|---------|
| Test Voltage (V) | 120 |
| Frequency (Hz) | 60 |
| Color Rendering Index (CRI) | 92.4 |
| R9 | 57 |
| CCT (K) | 3494 |
| Duv | -0.0006 |
| Total Luminous (lm) | 1134 |
| Luminous Efficacy (lm/W) | 88.52 |

Spectral Power Distribution and Chromaticity Diagram



Colorimetric Parameters

Colorimetric Parameters

Chromaticity Coordinate: x=0.4051 y=0.3894/u'=0.2361 v'=0.5107

CCT=3494K(Duv=-0.0006) Dominant WL:Ld =581.1nm Purity=38.4%

Peak WL:Lp=609.6nm FWHM=173.1nm

Render Index:Ra=92.4 Render Index:AvgR =89.4

R1 =93 R2 =97 R3 =98 R4 =91 R5 =92 R6 =95 R7 =91

R8 =81 R9 =57 R10=93 R11=92 R12=77 R13=94 R14=100 R15=89



| | |
|-------------------------------------|---|
| 2.3 Color Spatial Uniformity | IES LM-79 2008 ENERGY STAR® Program Requirements Product Specification for Luminaires (Light Fixtures) - Version 2.2 |
|-------------------------------------|---|

Test Data:

| | | | |
|--------------|-----------------------|--------------|--------|
| Test date | 2020-04-24 | Test Ambient | 25.1°C |
| Sample No. | Maximum $\Delta u'v'$ | | |
| JCE200410-I1 | 0.0009 | | |

| Gamma\C | CIE u' | CIE v' | $\Delta u'v'$ | CIE u' | CIE v' | $\Delta u'v'$ |
|---------|--------|--------|---------------|--------|--------|---------------|
| -54 | 0.2625 | 0.5263 | 0.0006 | 0.2628 | 0.526 | 0.0004 |
| -53 | 0.2625 | 0.5263 | 0.0006 | 0.2628 | 0.526 | 0.0004 |
| -52 | 0.2625 | 0.5263 | 0.0006 | 0.2628 | 0.526 | 0.0004 |
| -51 | 0.2625 | 0.5263 | 0.0006 | 0.2627 | 0.526 | 0.0004 |
| -50 | 0.2625 | 0.5263 | 0.0006 | 0.2627 | 0.526 | 0.0004 |
| -49 | 0.2625 | 0.5263 | 0.0006 | 0.2627 | 0.526 | 0.0004 |
| -48 | 0.2625 | 0.5263 | 0.0006 | 0.2627 | 0.526 | 0.0004 |
| -47 | 0.2625 | 0.5263 | 0.0006 | 0.2629 | 0.526 | 0.0003 |
| -46 | 0.2626 | 0.5263 | 0.0005 | 0.2628 | 0.526 | 0.0004 |
| -45 | 0.2626 | 0.5263 | 0.0005 | 0.2628 | 0.526 | 0.0004 |
| -44 | 0.2627 | 0.5263 | 0.0004 | 0.2628 | 0.526 | 0.0004 |
| -43 | 0.2626 | 0.5263 | 0.0005 | 0.2628 | 0.526 | 0.0004 |
| -42 | 0.2628 | 0.5263 | 0.0003 | 0.2629 | 0.526 | 0.0003 |
| -41 | 0.2628 | 0.5263 | 0.0003 | 0.2629 | 0.526 | 0.0003 |
| -40 | 0.2628 | 0.5263 | 0.0003 | 0.2629 | 0.526 | 0.0003 |
| -39 | 0.2627 | 0.5263 | 0.0004 | 0.2629 | 0.526 | 0.0003 |
| -38 | 0.2627 | 0.5263 | 0.0004 | 0.2629 | 0.526 | 0.0003 |
| -37 | 0.2627 | 0.5263 | 0.0004 | 0.263 | 0.526 | 0.0002 |
| -36 | 0.2629 | 0.5262 | 0.0002 | 0.263 | 0.526 | 0.0002 |
| -35 | 0.2629 | 0.5262 | 0.0002 | 0.263 | 0.526 | 0.0002 |
| -34 | 0.2629 | 0.5262 | 0.0002 | 0.263 | 0.526 | 0.0002 |
| -33 | 0.2629 | 0.5262 | 0.0002 | 0.263 | 0.526 | 0.0002 |
| -32 | 0.2629 | 0.5262 | 0.0002 | 0.263 | 0.526 | 0.0002 |
| -31 | 0.2628 | 0.5262 | 0.0003 | 0.2631 | 0.526 | 0.0002 |
| -30 | 0.263 | 0.5262 | 0.0001 | 0.2631 | 0.526 | 0.0002 |
| -29 | 0.263 | 0.5262 | 0.0001 | 0.2631 | 0.526 | 0.0002 |
| -28 | 0.263 | 0.5262 | 0.0001 | 0.2631 | 0.526 | 0.0002 |
| -27 | 0.2629 | 0.5262 | 0.0002 | 0.2631 | 0.526 | 0.0002 |
| -26 | 0.2629 | 0.5262 | 0.0002 | 0.2631 | 0.5259 | 0.0003 |



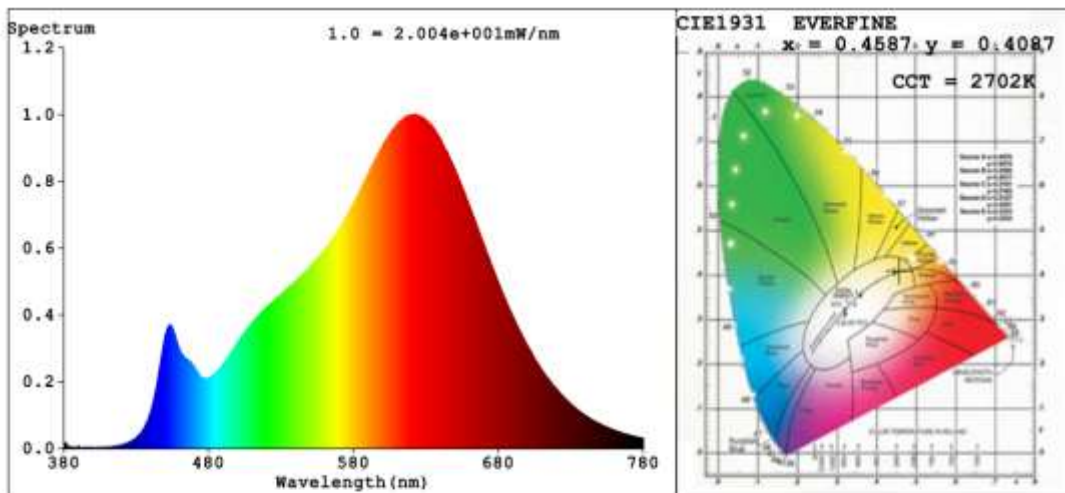
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|-----|--------|--------|--------|--------|--------|--------|
| -25 | 0.2629 | 0.5261 | 0.0002 | 0.2631 | 0.5259 | 0.0003 |
| -24 | 0.2629 | 0.5262 | 0.0002 | 0.263 | 0.5259 | 0.0003 |
| -23 | 0.2629 | 0.5261 | 0.0002 | 0.2632 | 0.5259 | 0.0003 |
| -22 | 0.263 | 0.5261 | 0.0001 | 0.2632 | 0.5259 | 0.0003 |
| -21 | 0.2631 | 0.5261 | 0.0001 | 0.2632 | 0.5259 | 0.0003 |
| -20 | 0.263 | 0.5261 | 0.0001 | 0.2632 | 0.5259 | 0.0003 |
| -19 | 0.263 | 0.5261 | 0.0001 | 0.2632 | 0.5259 | 0.0003 |
| -18 | 0.263 | 0.5261 | 0.0001 | 0.2631 | 0.5259 | 0.0003 |
| -17 | 0.263 | 0.5261 | 0.0001 | 0.2631 | 0.5259 | 0.0003 |
| -16 | 0.263 | 0.5261 | 0.0001 | 0.2631 | 0.5259 | 0.0003 |
| -15 | 0.263 | 0.5261 | 0.0001 | 0.2631 | 0.5259 | 0.0003 |
| -14 | 0.263 | 0.5261 | 0.0001 | 0.2631 | 0.5259 | 0.0003 |
| -13 | 0.263 | 0.5261 | 0.0001 | 0.2631 | 0.5259 | 0.0003 |
| -12 | 0.263 | 0.5261 | 0.0001 | 0.2631 | 0.5259 | 0.0003 |
| -11 | 0.263 | 0.5261 | 0.0001 | 0.2631 | 0.5259 | 0.0003 |
| -10 | 0.263 | 0.526 | 0.0002 | 0.2631 | 0.5258 | 0.0004 |
| -9 | 0.2631 | 0.526 | 0.0002 | 0.2632 | 0.5259 | 0.0003 |
| -8 | 0.2631 | 0.5261 | 0.0001 | 0.2632 | 0.5259 | 0.0003 |
| -7 | 0.2631 | 0.526 | 0.0002 | 0.2632 | 0.5258 | 0.0004 |
| -6 | 0.2631 | 0.526 | 0.0002 | 0.2632 | 0.5258 | 0.0004 |
| -5 | 0.2631 | 0.526 | 0.0002 | 0.2632 | 0.5258 | 0.0004 |
| -4 | 0.2631 | 0.526 | 0.0002 | 0.2632 | 0.5258 | 0.0004 |
| -3 | 0.2631 | 0.526 | 0.0002 | 0.2632 | 0.5258 | 0.0004 |
| -2 | 0.2631 | 0.526 | 0.0002 | 0.2632 | 0.5258 | 0.0004 |
| -1 | 0.2631 | 0.526 | 0.0002 | 0.2631 | 0.5258 | 0.0004 |
| 0 | 0.2631 | 0.5262 | 0 | 0.2631 | 0.5262 | 0 |
| 1 | 0.2631 | 0.526 | 0.0002 | 0.2632 | 0.5258 | 0.0004 |
| 2 | 0.2631 | 0.526 | 0.0002 | 0.2632 | 0.5258 | 0.0004 |
| 3 | 0.2631 | 0.526 | 0.0002 | 0.2632 | 0.5258 | 0.0004 |
| 4 | 0.2631 | 0.526 | 0.0002 | 0.2632 | 0.5258 | 0.0004 |
| 5 | 0.2631 | 0.526 | 0.0002 | 0.2632 | 0.5258 | 0.0004 |
| 6 | 0.2631 | 0.526 | 0.0002 | 0.2631 | 0.5258 | 0.0004 |
| 7 | 0.2631 | 0.526 | 0.0002 | 0.2632 | 0.5259 | 0.0003 |
| 8 | 0.2631 | 0.526 | 0.0002 | 0.2632 | 0.5258 | 0.0004 |
| 9 | 0.2631 | 0.526 | 0.0002 | 0.2631 | 0.5259 | 0.0003 |
| 10 | 0.2631 | 0.526 | 0.0002 | 0.2632 | 0.5259 | 0.0003 |
| 11 | 0.2631 | 0.526 | 0.0002 | 0.2632 | 0.5259 | 0.0003 |
| 12 | 0.2631 | 0.526 | 0.0002 | 0.2632 | 0.5259 | 0.0003 |
| 13 | 0.2631 | 0.526 | 0.0002 | 0.2632 | 0.5259 | 0.0003 |
| 14 | 0.2631 | 0.526 | 0.0002 | 0.2632 | 0.5259 | 0.0003 |
| 15 | 0.2631 | 0.526 | 0.0002 | 0.2632 | 0.5259 | 0.0003 |



| | | | | | | |
|----|--------|--------|--------|--------|--------|--------|
| 16 | 0.2631 | 0.526 | 0.0002 | 0.2632 | 0.5259 | 0.0003 |
| 17 | 0.2631 | 0.526 | 0.0002 | 0.2632 | 0.5259 | 0.0003 |
| 18 | 0.2631 | 0.526 | 0.0002 | 0.2632 | 0.5259 | 0.0003 |
| 19 | 0.2631 | 0.526 | 0.0002 | 0.2632 | 0.5259 | 0.0003 |
| 20 | 0.2631 | 0.526 | 0.0002 | 0.2632 | 0.5259 | 0.0003 |
| 21 | 0.2632 | 0.526 | 0.0002 | 0.2632 | 0.5259 | 0.0003 |
| 22 | 0.2632 | 0.526 | 0.0002 | 0.2632 | 0.5259 | 0.0003 |
| 23 | 0.2631 | 0.526 | 0.0002 | 0.2632 | 0.5259 | 0.0003 |
| 24 | 0.2632 | 0.526 | 0.0002 | 0.2631 | 0.5259 | 0.0003 |
| 25 | 0.2632 | 0.526 | 0.0002 | 0.2632 | 0.526 | 0.0002 |
| 26 | 0.2632 | 0.5261 | 0.0001 | 0.2631 | 0.526 | 0.0002 |
| 27 | 0.2632 | 0.5261 | 0.0001 | 0.2629 | 0.526 | 0.0003 |
| 28 | 0.2632 | 0.5261 | 0.0001 | 0.263 | 0.526 | 0.0002 |
| 29 | 0.263 | 0.526 | 0.0002 | 0.263 | 0.526 | 0.0002 |
| 30 | 0.263 | 0.5261 | 0.0001 | 0.263 | 0.526 | 0.0002 |
| 31 | 0.263 | 0.5261 | 0.0001 | 0.263 | 0.526 | 0.0002 |
| 32 | 0.263 | 0.5261 | 0.0001 | 0.263 | 0.526 | 0.0002 |
| 33 | 0.263 | 0.5261 | 0.0001 | 0.263 | 0.526 | 0.0002 |
| 34 | 0.263 | 0.5261 | 0.0001 | 0.263 | 0.526 | 0.0002 |
| 35 | 0.263 | 0.5261 | 0.0001 | 0.2629 | 0.526 | 0.0003 |
| 36 | 0.263 | 0.5261 | 0.0001 | 0.263 | 0.526 | 0.0002 |
| 37 | 0.263 | 0.5261 | 0.0001 | 0.2629 | 0.526 | 0.0003 |
| 38 | 0.263 | 0.5261 | 0.0001 | 0.2627 | 0.526 | 0.0004 |
| 39 | 0.263 | 0.5261 | 0.0001 | 0.2627 | 0.526 | 0.0004 |
| 40 | 0.2628 | 0.5261 | 0.0003 | 0.2627 | 0.526 | 0.0004 |
| 41 | 0.2628 | 0.5261 | 0.0003 | 0.2628 | 0.526 | 0.0004 |
| 42 | 0.2628 | 0.5261 | 0.0003 | 0.2628 | 0.526 | 0.0004 |
| 43 | 0.2628 | 0.5261 | 0.0003 | 0.2627 | 0.526 | 0.0004 |
| 44 | 0.2629 | 0.5261 | 0.0002 | 0.2627 | 0.526 | 0.0004 |
| 45 | 0.2628 | 0.5261 | 0.0003 | 0.2627 | 0.526 | 0.0004 |
| 46 | 0.2628 | 0.5261 | 0.0003 | 0.2627 | 0.526 | 0.0004 |
| 47 | 0.2628 | 0.5261 | 0.0003 | 0.2625 | 0.526 | 0.0006 |
| 48 | 0.2626 | 0.5261 | 0.0005 | 0.2625 | 0.526 | 0.0006 |
| 49 | 0.2627 | 0.5261 | 0.0004 | 0.2625 | 0.526 | 0.0006 |
| 50 | 0.2626 | 0.526 | 0.0005 | 0.2625 | 0.526 | 0.0006 |
| 51 | 0.2626 | 0.5261 | 0.0005 | 0.2625 | 0.526 | 0.0006 |
| 52 | 0.2626 | 0.526 | 0.0005 | 0.2625 | 0.526 | 0.0006 |
| 53 | 0.2627 | 0.526 | 0.0004 | 0.2625 | 0.526 | 0.0006 |
| 54 | 0.2627 | 0.526 | 0.0004 | 0.2623 | 0.5259 | 0.0009 |

| | |
|--|---|
| 2.4 Electrical and Photometric Measurements, with dimming | IES LM-79 2008 ENERGY STAR® Program Requirements Product Specification for Luminaires (Light Fixtures) - Version 2.2 |
|--|---|

| | | | | |
|--------------------------|---------------------------|---------------------|----------------------|----------------------|
| Test date | 2020-04-24 | | Test Ambient: | 25.1°C |
| Dimmer Technology | | | Forward phase-cut | |
| Sample No. | | | Maximum Level | Minimum Level |
| JCE200410-I1 | Input: 120.0 V / 60 Hz | Light outout(Lumen) | 909.5 | 46.64 |
| | | Percentage | 90.52% | 5.13% |



Colorimetric Parameters

Chromaticity Coordinate: $x=0.4587$ $y=0.4087$ / $u'=0.2626$ $v'=0.5265$
 CCT=2702K (Duv=-0.0006) Dominant WL:Ld =584.4nm Purity=60.4%
 Peak WL:Lp=622.7nm FWHM=140.1nm
 Render Index:Ra=92.9 Render Index:AvgR =90.7
 R1 =94 R2 =98 R3 =98 R4 =93 R5 =94 R6 =97 R7 =90
 R8 =79 R9 =57 R10=96 R11=95 R12=86 R13=95 R14=100 R15=89

The luminaires [can] ~~lean not~~ provide less than 20% of total light output with continuous dimmer.

| Dimmer | Peak Noise Reading (dBA) | Test Condition | Distance between the microphone and the UUT |
|------------------|--------------------------|--|---|
| LUTRON MACL-153M | 22.4 | Dimmer adjusted to lowest light output | < 1 m |



| | |
|--------------------|---|
| 2.5 Flicker | NEMA 77-2017 ENERGY STAR® Program Requirements Product Specification for Luminaires (Light Fixtures) - Version 2.2 |
|--------------------|---|

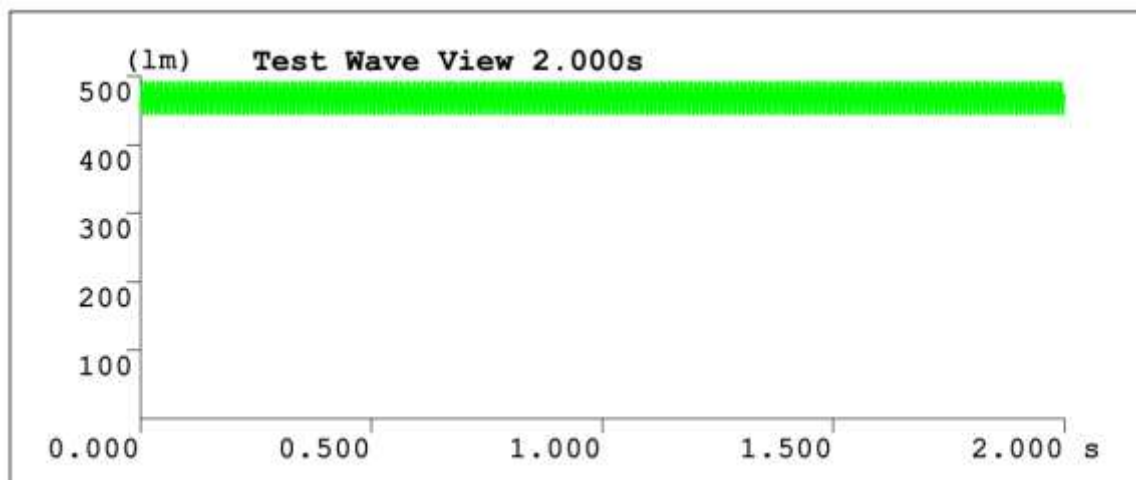
| | |
|---------------------------|------------------|
| Dimming Technology | phase-cut |
| Dimmer | LUTRON MACL-153M |

| Item | Short Term Flicker Indicator (Pst) | Stroboscopic Visibility Measure (SVM) |
|--------------------------------|------------------------------------|---------------------------------------|
| Maximum conduction | 0.050 | 0.494 |
| Intermediate conduction | 0.088 | 0.645 |
| Minimum conduction | 0.269 | 0.445 |



| | |
|--|--|
| 2.6 Operating Frequency | ENERGY STAR® Program Requirements Product Specification for Luminaires (Light Fixtures) - Version 2.2 |
| Noted: This test and data are not covered by A2LA accreditation | |

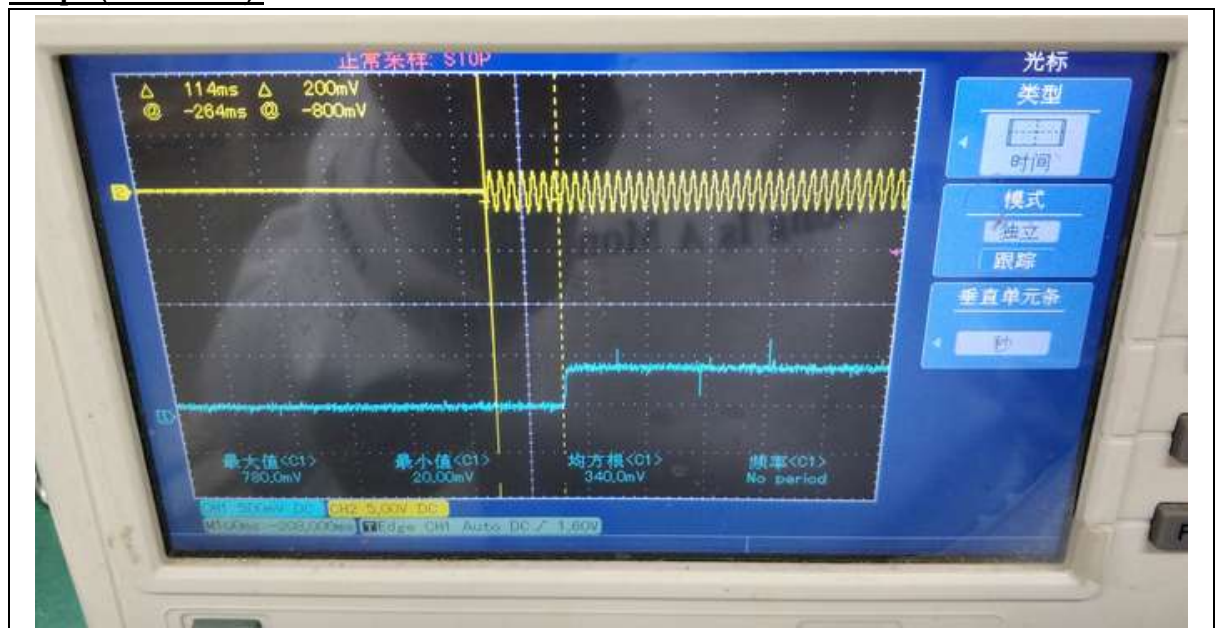
| | | | |
|--------------|--------------------------|---------------|--------|
| Test date | 2020-04-24 | Test Ambient: | 25.1°C |
| Sample No. | Operating Frequency (Hz) | | |
| JCE200410-I1 | 120.63 | | |



| | |
|---|--|
| 2.7 Starting Time <i>(Refer to Work Instruction QD28)</i> | ENERGY STAR® Program Requirements Product Specification for Luminaires (Light Fixtures) - Version 2.2 |
|---|--|

| | | | |
|--------------|-----------------|---------------|--------|
| Test date | 2020-04-24 | Test Ambient: | 25.1°C |
| Sample No. | Start Time (ms) | | |
| JCE200410-I1 | 114 | | |

Graph (Start Time):





| | |
|---|--|
| 2.8 Transient Protection Test <i>(Refer to Work Instruction QD34)</i> | ANSI/IEEE C62.41 ENERGY STAR® Program Requirements for Luminaires – Version 2.2 |
|---|--|

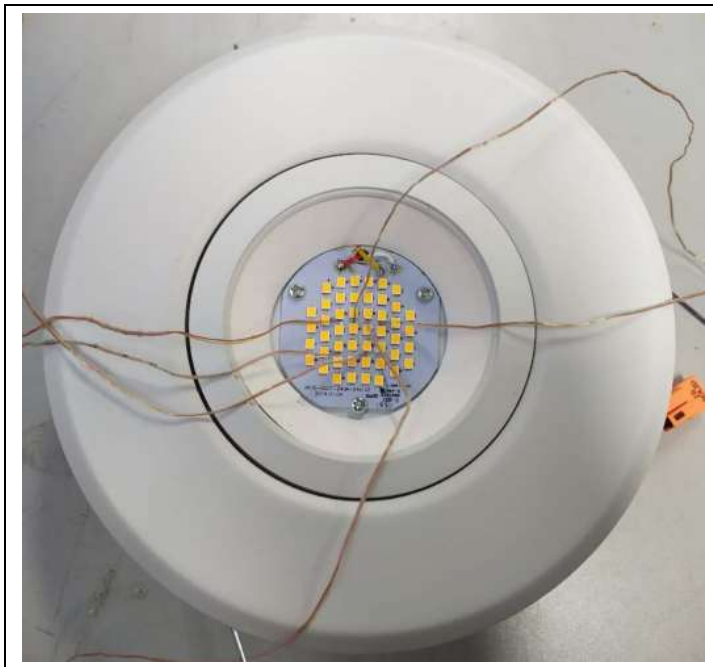
Test voltage: 120V,60Hz

| | | | |
|-------------------|------------|--|--------|
| Test date | 2020-04-24 | Test Ambient | 25.1°C |
| Sample No. | | Transient Protection Test - Seven Strikes | |
| JCE200410-I1 | | Survival | |

| | |
|---|--|
| 2.9 In-Situ Temperature Measurement Test (ISTMT) | UL1598-2008, 3rd Edition |
|---|--|

| | | | |
|----------------------|----------------------|--|--|
| Test date | 2020-04-24 | Test Ambient | 25.1°C |
| Input Vol./Frequency | 120 V / 60 Hz | Output Current of Single LED(mA) | 75 |
| Sample No. | LED Package Model | Maximum Measured LED Ts Point Temperature (°C) | Maximum permitted Ts temperature for L70 ≥ 50,000 hrs (°C) |
| JCE200410-I1 | 2T03X5WW1100000 3 | 76.3 | 105 |

In-Situ Picture - Ts:





| | |
|---|--|
| 2.10 Maximum Measured Ballast or Driver Case Temperature | UL1598-2008, 3rd Edition |
|---|--|

| | | | |
|--------------|---|--|--------|
| Test date | 2020-04-24 | Test Ambient | 25.1°C |
| Sample No. | Maximum Measured Driver Case Temperature (°C) | Maximum Driver Case Temperature Limited (°C) | |
| JCE200410-I1 | 48.3 | 105 | |

In-Situ Picture - Ts:





| | |
|--|--|
| 2.11 Off-State Power Consumption: | ENERGY STAR® Program Requirements Product Specification for Luminaires (Light Fixtures) - Version 2.2 |
|--|--|

| | | | |
|---------------------|--|---------------------------------|---------|
| Test date | 2020-04-24 | Test Ambient: | 25.0 °C |
| Model Number | LRKT565W/567W-EN-3CT-2 7-35(0%,2700K) | Stabilization Time (min) | 90 |

Electrical Measurement – when the luminaires turned off:

| Sample No. | Voltage (Vac) | Frequency (Hz) | Current (A) | Power (W) |
|--------------|---------------|-----------------|-------------|-----------|
| JCE200410-I1 | 120.0 | 60 | 0 | 0 |



3. Test Equipment

| Equipment ID | Equipment Name | Last Calibration Date | Next Calibration Date |
|---|---------------------------------------|---------------------------------|-----------------------|
| ST-R-702 | 2 meter Integrating Sphere | Verified by D204 standard lamp | |
| ST-R-701 | Spectral analysis system HAAS-2000 | Verified by D204 standard lamp | |
| ST-R-705 | D204 Standard Lamp | 2020-02-06 | 2021-02-05 |
| ST-R-704 | Power Meter for Integrating Sphere | 2020-01-05 | 2021-01-04 |
| ST-R-714 | Goniophotometer system | Verified by D908S standard lamp | |
| ST-R-710 | D908S Standard Lamp | 2020-02-11 | 2021-02-10 |
| ST-R-711 | Power Meter for Goniophotometer | 2020-01-05 | 2021-01-04 |
| ST-R-720 | Digital Luxmeter | 2020-01-05 | 2021-01-04 |
| ST-R-622 | Oscillograph | 2020-01-05 | 2021-01-04 |
| ST-R-721 | EMS61000-12C | 2020-01-05 | 2021-01-04 |
| ST-R-725 | LFA-3000 | 2020-01-05 | 2021-01-04 |
| Uncertainty Photometric Measurement (Sphere):1.74% Chromaticity Measurement(Sphere):14.3K Photometric Measurement(Goniophotometer):1.62% | | | |

******* END OF DATASHEET PACKAGE *******