FOR THE SCOPE OF ACCREDITATION UNDER NVLAP LAB CODE 600186-0.

# PHOENIX PRODUCTS LLC

# TEST REPORT

**SCOPE OF WORK**
Electrical and Photometric tests as required to the IESNA LM-79 test standard.

**MODEL NUMBER**
RCF-125-MF-120-277-CW

**REPORT NUMBER**
103740339CHI-007

**ISSUE DATE**
December 11, 2019

**REVISION DATE**
None

**DOCUMENT CONTROL NUMBER**
TBD


545 E. Algonquin Rd
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**REPORT NO.: 103740339CHI-007**

**TEST REPORT** **REPORT DATE: December 3, 2019**

TEST OF ONE OUTDOOR FLOODLIGHT

MODEL NO. RCF-125-MF-120-277-CW
LED MODEL NO. LUXEON/5050
DRIVER MODEL NO. INVENTRONICS/EUD-150S105DVA

RENDERED TO:

PHOENIX PRODUCTS LLC
8711 W. PORT AVE
MILWAUKEE, WI 53224

**STATEMENT OF LIMITATION**

NVLAP Lab Code 600186-0. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

**AUTHORIZATION**

The testing performed was authorized by signed quote number Qu-00935344-2.

**STANDARDS USED**

IESNA LM-79 - 2008: Electrical and Photometric Measurements of Solid State Lighting
ANSI NEMA ANSLG C78.377: 2015: Specifications of the Chromaticity of Solid State Lighting Products

**DESCRIPTION OF SAMPLE**

The client submitted one production sample of model number RCF-125-MF-120-277-CW. The sample was received by Intertek on November 22, 2019 in undamaged condition and one sample was tested as received. The sample designation was AH11222019112120-001.

**DATE OF TESTS**

December 2, 2019

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**TEST REPORT** **REPORT DATE: December 3, 2019**

## SUMMARY

| | |
|---|---|
| **MODEL NO:** | RCF-125-MF-120-277-CW |
| **DESCRIPTION:** | Outdoor Floodlight |

| CRITERIA | RESULTS | |
|---|---|---|
| | INTEGRATING SPHERE | GONIOPHOTOMETER |
| Lumen Output (lumens) | 15330.9 | 15374.9 |
| Input Power (W) @ 120 (VAC) | 116.41 | 116.61 |
| Lumen Efficacy (lm/W) | 131.7 | 131.9 |
| Input Power Factor @ 120 (VAC) | 0.996 | 0.996 |

| CRITERIA | RESULTS |
|---|---|
| Input Current ATHD (%) @ 120 (VAC) | 7.37 |
| Correlated Color Temperature (K) | 5061 |
| Color Rendering Index - Ra | 73.0 |
| Color Rendering - R9 | -25.0 |
| DUV | 0.0017 |
| Chromaticity Coordinate (x) | 0.344 |
| Chromaticity Coordinate (y) | 0.354 |
| Chromaticity Coordinate (u') | 0.210 |
| Chromaticity Coordinate (v') | 0.486 |

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## EQUIPMENT LIST

| EQUIPMENT USED | MODEL NO. | CONTROL NO. | LAST CAL DATE | CAL DUE DATE |
|---|---|---|---|---|
| Yokogawa Power Meter | WT210 | 146919 | 7/1/2019 | 7/1/2020 |
| Omega Thermometer | DPI8-C24 | 146920 | 10/3/2019 | 10/3/2020 |
| LSI High Speed Mirror Goniometer | 6440T | 146928 | VBU | VBU |
| Newport Thermohygrometer | iServer | 146957 | 12/11/2018 | 12/11/2019 |
| Elgar, AC Power Supply | CW1251 | 146111 | VBU | VBU |
| Labsphere Spectroradiometer | CDS1100 | CHI0091 | VBU | VBU |
| 3 Meter Sphere | SPR600 | CHI0088 | VBU | VBU |
| Elgar AC Power Supply | CW1251 | 146112 | VBU | VBU |
| Sorenson DC Power Supply | XFR150-8 | 146846 | VBU | VBU |
| Newport Humidity Recorder | iTHX-SD | 146382 | 4/17/2019 | 4/17/2020 |
| Yokogawa Power Meter | WT1600 | 146769 | 4/3/2019 | 4/3/2020 |
| Extech K Temperature Meter | SD200 | CHI0207 | 4/3/2019 | 4/3/2020 |

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## TEST METHODS

### SEASONING IN SAMPLE ORIENTATION - LED PRODUCTS

No seasoning was performed in accordance with IESNA LM-79.

### PHOTOMETRIC AND ELECTRICAL MEASUREMENTS - INTEGRATING SPHERE METHOD

A Spectroradiometer and integrating sphere was used to measure correlated color temperature, chromaticity coordinates, and the color rendering index for each SSL unit.

Ambient temperature was measured at a position inside the sphere. Each SSL unit was operated on the client provided driver at the rated input voltage in its designated orientation. Each SSL unit was allowed to stabilize for at least thirty minutes before measurements were made. Stabilization procedures to LM-79 were followed. Electrical measurements including voltage, current, and power were measured using a power analyzer.

The calibration of the sphere photometer-spectroradiometer system is traceable to the National Institute of Standards and Technology.

### PHOTOMETRIC AND ELECTRICAL MEASUREMENTS - DISTRIBUTION METHOD

A Type C Mirror Goniometer was used to measure the intensity (candelas) at each angle of distribution for the SSL sample.
IES Files were converted to display a Type B pattern.
Ambient temperature was measured equal to the height of the sample mounted on the goniometer equipment. The SSL sample was operated on the client provided driver at rated input volts in its designated orientation. The SSL sample was allowed to stabilize for at least thirty minutes before measurements were made. Stabilization procedures to LM-79 were followed. Electrical measurements including voltage, current, and power were measured using a power analyzer.

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**TEST REPORT**

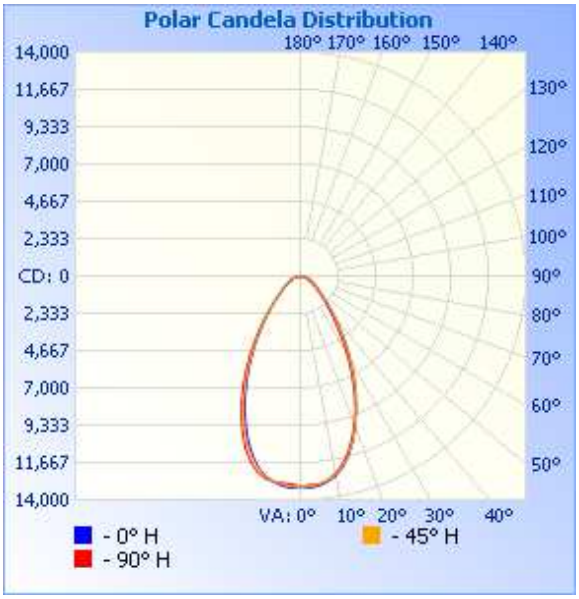
## RESULTS OF TESTS

### PHOTOMETRIC AND ELECTRICAL MEASUREMENTS - DISTRIBUTION METHOD (25°C +/- 1°C)

| INTERTEK CONTROL NO. | BASE POSITION | INPUT VOLTAGE (VAC) | INPUT CURRENT (mA) | INPUT POWER (W) | INPUT POWER FACTOR | LIGHT OUTPUT (lm) | LUMEN EFFICACY (lm/W) |
|---|---|---|---|---|---|---|---|
| AH11222019112120-001 | Base Up | 120.1 | 974.8 | 116.61 | 0.996 | 15374.9 | 131.9 |

### INTENSITY SUMMARY - CANDELAS

| Angle | -90 | -67.5 | -45 | -22.5 | 0 |
|---|---|---|---|---|---|
| 90 | 17 | 14 | 14 | 12 | 10 |
| 85 | 17 | 58 | 98 | 109 | 109 |
| 80 | 17 | 110 | 215 | 245 | 251 |
| 75 | 17 | 163 | 320 | 462 | 511 |
| 70 | 17 | 212 | 432 | 614 | 657 |
| 65 | 17 | 254 | 545 | 720 | 778 |
| 60 | 17 | 294 | 643 | 875 | 982 |
| 55 | 17 | 332 | 731 | 1102 | 1268 |
| 50 | 17 | 364 | 836 | 1384 | 1661 |
| 45 | 17 | 394 | 963 | 1783 | 2314 |
| 40 | 18 | 420 | 1102 | 2357 | 3274 |
| 35 | 18 | 444 | 1245 | 3157 | 4639 |
| 30 | 18 | 465 | 1406 | 4156 | 6309 |
| 25 | 18 | 483 | 1597 | 5344 | 8127 |
| 20 | 18 | 500 | 1802 | 6566 | 9952 |
| 15 | 18 | 511 | 1982 | 7681 | 11573 |
| 10 | 18 | 524 | 2136 | 8555 | 12668 |
| 5 | 18 | 541 | 2230 | 9090 | 13160 |
| 0 | 18 | 549 | 2391 | 9594 | 13145 |
| -5 | 18 | 541 | 2231 | 9090 | 13160 |
| -10 | 18 | 524 | 2136 | 8555 | 12668 |
| -15 | 18 | 511 | 1982 | 7681 | 11573 |
| -20 | 18 | 500 | 1802 | 6566 | 9952 |
| -25 | 18 | 483 | 1597 | 5344 | 8127 |
| -30 | 18 | 465 | 1406 | 4156 | 6309 |
| -35 | 18 | 444 | 1245 | 3157 | 4639 |
| -40 | 18 | 420 | 1102 | 2357 | 3274 |
| -45 | 18 | 394 | 963 | 1783 | 2314 |
| -50 | 17 | 364 | 836 | 1384 | 1661 |
| -55 | 17 | 332 | 731 | 1102 | 1268 |
| -60 | 17 | 294 | 643 | 875 | 982 |
| -65 | 17 | 254 | 545 | 720 | 778 |
| -70 | 17 | 212 | 432 | 614 | 657 |
| -75 | 17 | 163 | 320 | 462 | 511 |
| -80 | 17 | 110 | 215 | 245 | 251 |
| -85 | 17 | 58 | 98 | 109 | 109 |
| -90 | 17 | 14 | 14 | 12 | 10 |



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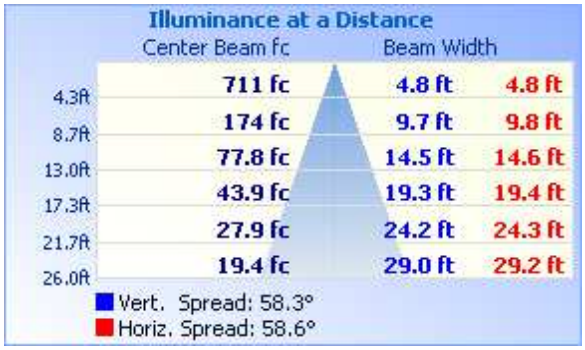
**TEST REPORT**

## RESULTS OF TESTS

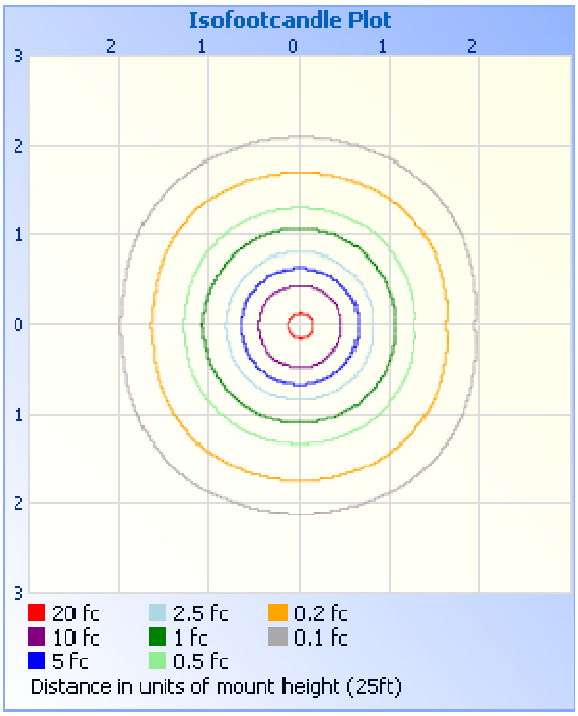
### PHOTOMETRIC AND ELECTRICAL MEASUREMENTS - DISTRIBUTION METHOD (25°C +/- 1°C)

**MOUNTING HEIGHT: 25ft**

**ILLUMINANCE - CONE OF LIGHT**




**ISOILLUMINATION PLOT**




**ZONAL LUMEN SUMMARY AND PERCENTAGES**

| ZONE | LUMENS | % LUMINAIRE |
|---|---|---|
| 0-30 | 8201.2 | 53.3 |
| 0-40 | 11115.1 | 72.3 |
| 0-60 | 14025.8 | 91.2 |
| 60-90 | 1349.2 | 8.8 |
| 70-100 | 15374.9 | 100.0 |
| 90-120 | 0.0 | 0.0 |
| 0-90 | 0.0 | 0.0 |
| 90-180 | 0.0 | 0.0 |
| 0-180 | 0.0 | 0.0 |

| ZONE | LUMENS | % LUMINAIRE |
|---|---|---|
| 0-10 | 1233.9 | 8.0 |
| 10-20 | 3220.8 | 20.9 |
| 20-30 | 3746.5 | 24.4 |
| 30-40 | 2913.9 | 19.0 |
| 40-50 | 1798.2 | 11.7 |
| 50-60 | 1112.4 | 7.2 |
| 60-70 | 735.9 | 4.8 |
| 70-80 | 466.1 | 3.0 |
| 80-90 | 147.2 | 1.0 |

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**TEST REPORT**

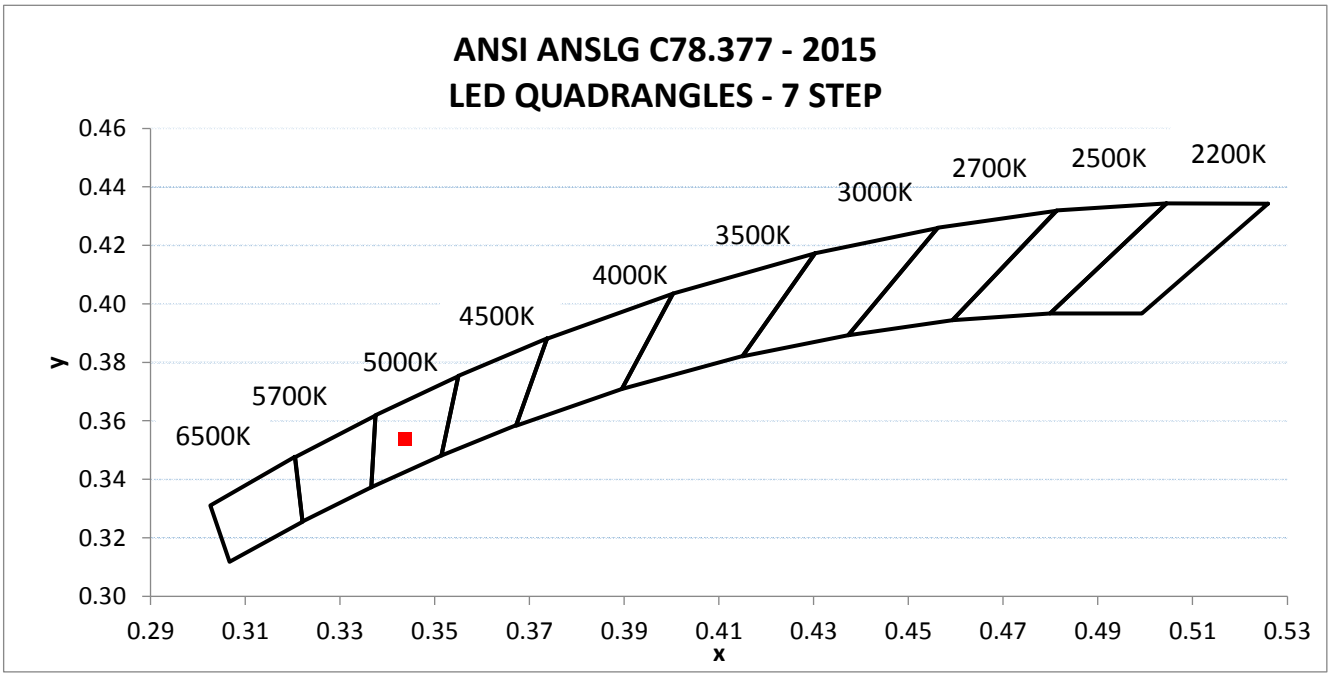
**RESULTS OF TESTS**

**PHOTOMETRIC AND ELECTRICAL MEASUREMENTS - INTEGRATING SPHERE METHOD (25°C +/- 1°C)**

| INTERTEK CONTROL NO. | BASE POSITION | INPUT VOLTAGE (VAC) | INPUT CURRENT (mA) | INPUT POWER (W) | INPUT POWER FACTOR | INPUT CURRENT ATHD (%) |
|---|---|---|---|---|---|---|
| AH11222019112120-001 | Base Up | 120.02 | 973.60 | 116.41 | 0.996 | 7.37 |

| LIGHT OUTPUT (lm) | LUMEN EFFICACY (lm/W) | CORRELATED COLOR TEMPERATURE - CCT (K) | CRI - Ra | CRI - R9 | DUV |
|---|---|---|---|---|---|
| 15330.9 | 131.7 | 5061 | 73.0 | -25.0 | 0.0017 |

| CIE 1931 CHROMATICITY COORDINATE (x) | CIE 1931 CHROMATICITY COORDINATE (y) | CIE 1976 CHROMATICITY COORDINATE (u') | CIE 1976 CHROMATICITY COORDINATE (v') |
|---|---|---|---|
| 0.344 | 0.354 | 0.210 | 0.486 |



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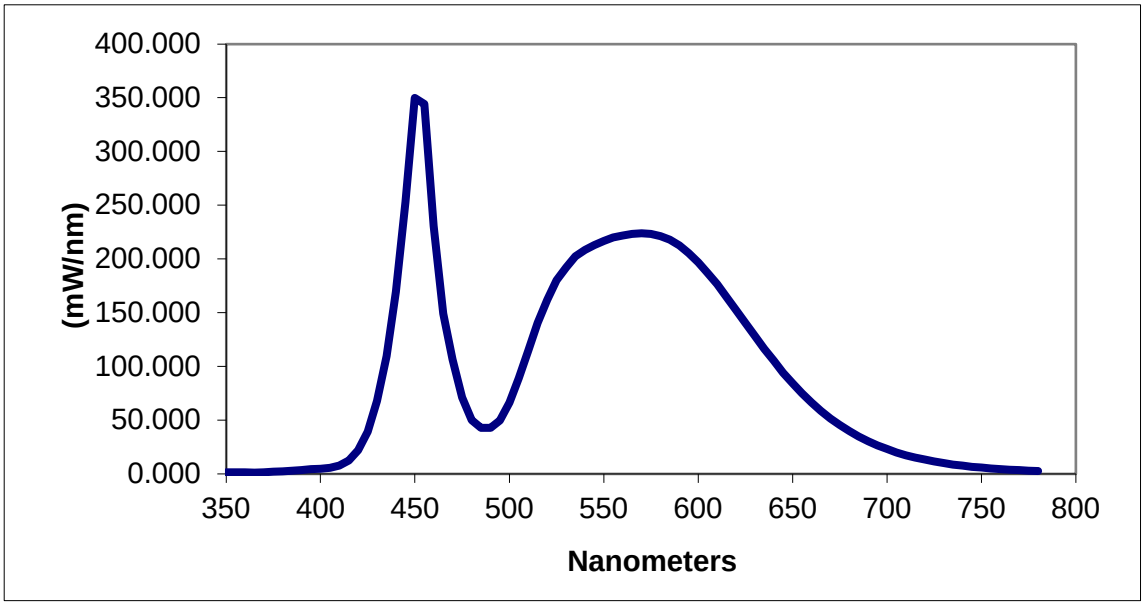
## RESULTS OF TESTS

### PHOTOMETRIC AND ELECTRICAL MEASUREMENTS - INTEGRATING SPHERE METHOD (25°C +/- 1°C)

| SPECTRAL DISTRIBUTION OVER VISIBLE WAVELENGTHS* | | | | | | | |
|---|---|---|---|---|---|---|---|
| nm | mW/nm | nm | mW/nm | nm | mW/nm | nm | mW/nm |
| 350 | 1.477 | 460 | 230.740 | 570 | 223.816 | 680 | 39.855 |
| 355 | 1.345 | 465 | 149.068 | 575 | 223.215 | 685 | 34.832 |
| 360 | 1.440 | 470 | 106.474 | 580 | 221.186 | 690 | 30.405 |
| 365 | 1.341 | 475 | 71.205 | 585 | 217.855 | 695 | 26.506 |
| 370 | 1.557 | 480 | 50.057 | 590 | 212.566 | 700 | 23.225 |
| 375 | 1.954 | 485 | 42.867 | 595 | 205.271 | 705 | 19.999 |
| 380 | 2.237 | 490 | 42.700 | 600 | 196.814 | 710 | 17.345 |
| 385 | 2.879 | 495 | 49.760 | 605 | 186.852 | 715 | 15.194 |
| 390 | 3.550 | 500 | 66.348 | 610 | 176.437 | 720 | 13.228 |
| 395 | 4.332 | 505 | 88.932 | 615 | 164.515 | 725 | 11.573 |
| 400 | 4.748 | 510 | 115.002 | 620 | 152.428 | 730 | 10.045 |
| 405 | 5.647 | 515 | 140.363 | 625 | 140.322 | 735 | 8.650 |
| 410 | 7.678 | 520 | 162.014 | 630 | 128.314 | 740 | 7.599 |
| 415 | 12.314 | 525 | 180.104 | 635 | 116.347 | 745 | 6.626 |
| 420 | 22.049 | 530 | 192.037 | 640 | 105.364 | 750 | 5.861 |
| 425 | 39.183 | 535 | 202.432 | 645 | 94.066 | 755 | 5.061 |
| 430 | 67.964 | 540 | 208.437 | 650 | 84.308 | 760 | 4.449 |
| 435 | 109.642 | 545 | 212.703 | 655 | 74.878 | 765 | 3.910 |
| 440 | 169.335 | 550 | 216.517 | 660 | 66.281 | 770 | 3.435 |
| 445 | 252.939 | 555 | 219.947 | 665 | 58.666 | 775 | 2.929 |
| 450 | 349.762 | 560 | 221.823 | 670 | 51.523 | 780 | 2.621 |
| 455 | 344.104 | 565 | 223.174 | 675 | 45.526 | | |

*Without correction of sample absorption.




**End Of Test Results**

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**TEST REPORT**

**PICTURES**

**CONCLUSION**

The results tabulated in this report are representative of the actual test samples submitted for this report only. The data is provided to the client for further evaluation. Compliance to the referenced specification requirements was not determined in this report.

In Charge Of Tests:

Timothy Quigley
Project Engineer
Lighting Division

Report Reviewed By:

Jeff Davis
N.A. Technical Lead
Lighting Division

Attachments: IES File

**REVISION HISTORY**

| JOB NUMBER | DATE OF REVISION | PROJECT HANDLER | REVIEWED BY | REVISION NOTE |
|---|---|---|---|---|
| None | | | | |