



Les Industries Spectralux Inc. Spectralux Industries Inc.

2750 Sabourin, Saint-Laurent (Quebec) H4S 1M2 Canada
Tel.: (514) 332-0082 Fax: (514) 332-3590 www.spectralux.ca



Sphere Test Calibration Report

Standard(s) CIE 84-1989, IESNA LM-16-93, IESNA LM-58-94, ANSI C78.81-2005, ANSI C78.376-2001

Customer [Illegible text]

| General Information | | Lamp Details | | Ballast Details | |
|---------------------------|-----------------|---------------------|--------------------|---------------------|-------------|
| Test Report | L1001292-C1 | Description | Fluorescent T8 32W | Type | Commercial |
| Tested | 29 January 2010 | Manufacturer | [Illegible] | Description | 32FLU |
| Created | 2 February 2010 | Catalog No. | F32T8/41K/8 | Manufacturer | [Illegible] |
| Sphere Temperature | 24.8 °C | Designation | C78.81-2005 | Catalog No. | E000 A |
| Humidity | 13.1 % | Position | Horizontal | Voltage | 347.00 V |
| Lamp Type | Fluorescent | Quantity | 2 | Power Factor | 0.9800 |

Stabilization Time: 30 Minutes

Tested By:

Approved Signatory:

Signature:

Notes

- 1) Field performance may differ from laboratory measurements. Results are valid for tested material only.
- 2) The original electronic file or paper report cannot be edited in whole or in part without written consent of Spectra Lux Industries Inc.



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Lamp Calibration Method

The calibration was performed in a 1.93 meter diameter Ulbricht sphere with a spectrophotometer covering the full visible spectrum range from 380 to 780 nanometers. During the test, a commercial ballast was used and adjusted to ANSI (American National Standards Institute) recommended electrical characteristics.

Good electrical contacts have been used to ensure the control of electrical parameters and an adequate stabilization period prior to collecting data. The self-absorbance was measured and a geometrical correction factor was applied to the luminous flux value to take into account the sphere configuration.

Equipment, reference standards and methods are traceable to NIST (National Institute of Standards and Technology).





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Equipment List

| Equipment | Manufacturer | Model | Serial Number | Calibration Date | Calibration Due Date |
|-----------------------------|---------------------|--------------|----------------------|-------------------------|-----------------------------|
| Auxiliary Power Supply | American Reliance | SPS150-7 | B10155 | 2009/12/29 | 2010/12/29 |
| Test Power Supply | iRDC | CIF-3000A | 974997 | 2009/04/22 | 2010/04/22 |
| Input Power Meter | Yokogawa | WT210 | 27E116584 | 2009/12/30 | 2010/12/30 |
| Output Power Meter | Yokogawa | WT210 | 27E224420 | 2009/12/30 | 2010/12/30 |
| Shunt Resistor | Fluke | Y5020 | 5675014 | 2010/01/05 | 2011/01/05 |
| Current Multimeter | HP | HP3458A | 25B746 | 2010/01/06 | 2012/01/06 |
| Voltage Multimeter | HP | HP3458A | 25B747 | 2010/01/06 | 2012/01/06 |
| Spectrometer | Ocean Optics | USB2000N | USB2E3864 | 2009/08/24 | 2010/08/24 |
| Temperature Humidity Sensor | Omega | HH311 | 060703153 | 2009/06/08 | 2010/06/08 |



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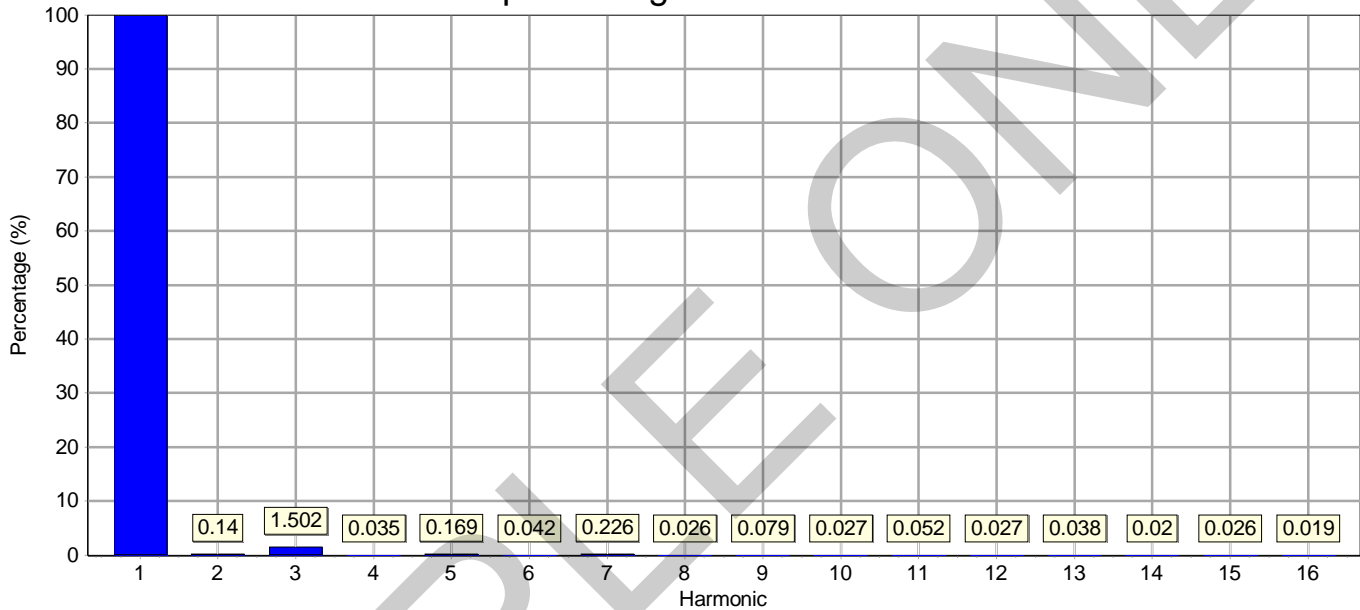
NVLAP LAB CODE: 200899-0

Electrical Measurements

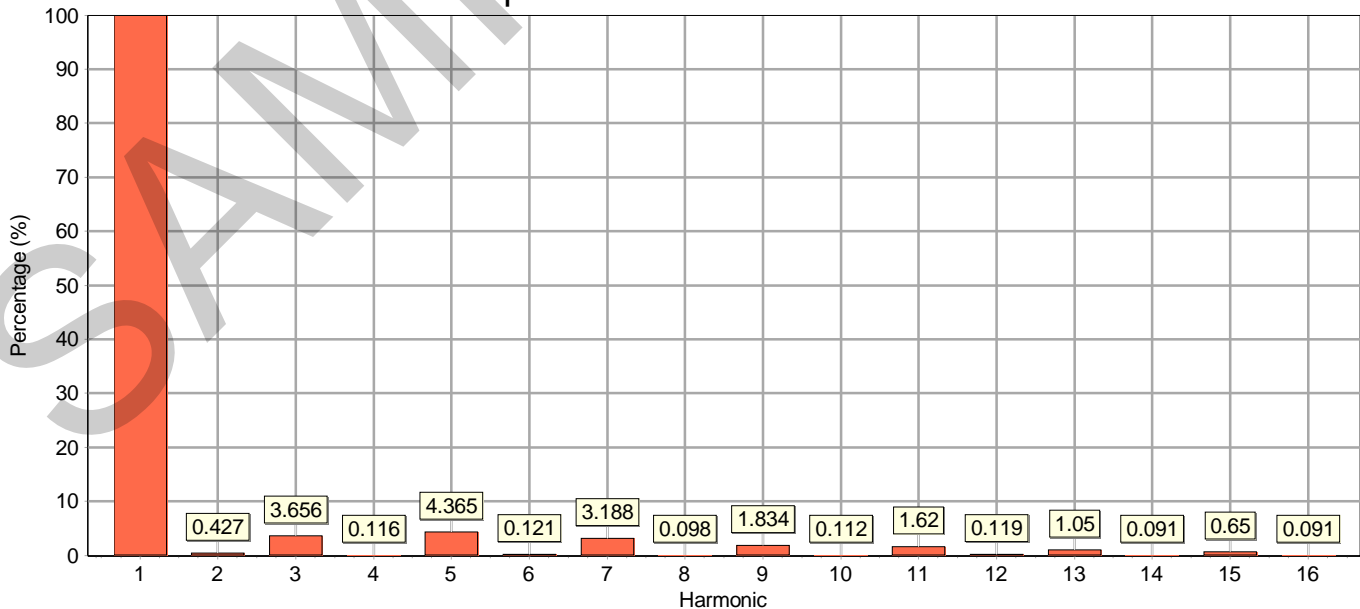
Input

| | | | | | |
|-----------|---------------|----------------|----------|------------------|-----------|
| Frequency | 60 Hz | Active Power | 50.39 W | THDV [CSA] | 1.55 % |
| Voltage | 347.0 V(rms) | Apparent Power | 51.63 VA | THDA [CSA] | 7.22 % |
| Current | 0.1488 A(rms) | Power Factor | 0.976 | Max. Harmonic At | 5th order |

Input Voltage Harmonics



Input Current Harmonics





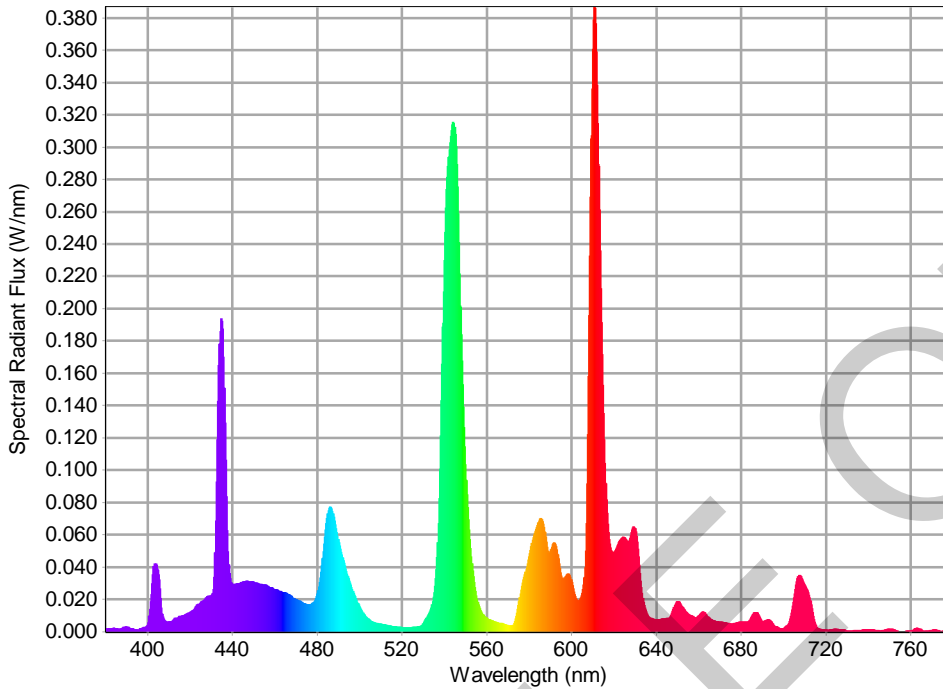
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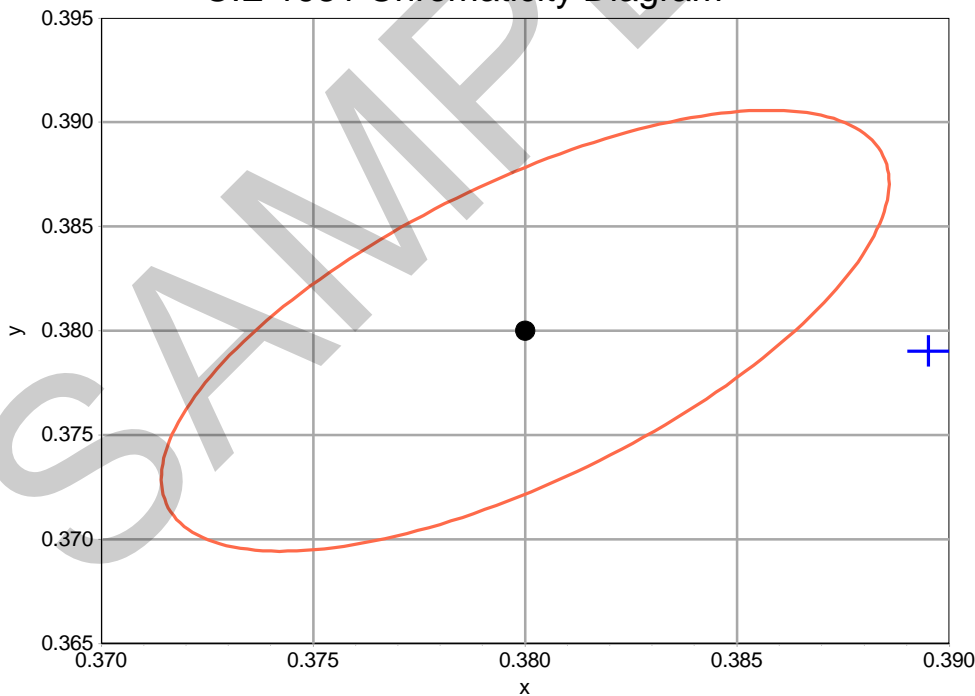
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Spectral Power Distribution



Peak Wavelength 611 nm
Luminous Flux 4204 lm
Input Power 50.39 W
Lumens/Watt 83.4
Ballast Factor 0.7887

CIE 1931 Chromaticity Diagram



x 0.3895
y 0.3790
CCT 3778 °K
CRI 83
R1 97.2
R2 95.2
R3 51.4
R4 88.0
R5 88.9
R6 81.5
R7 88.7
R8 75.6

— 4 MacAdam Color Steps for 4100K lamp and (0.380, 0.380) chromaticity coordinates