Shedding Some Light...

Pathway Lighting's Newsletter - October / November 2021

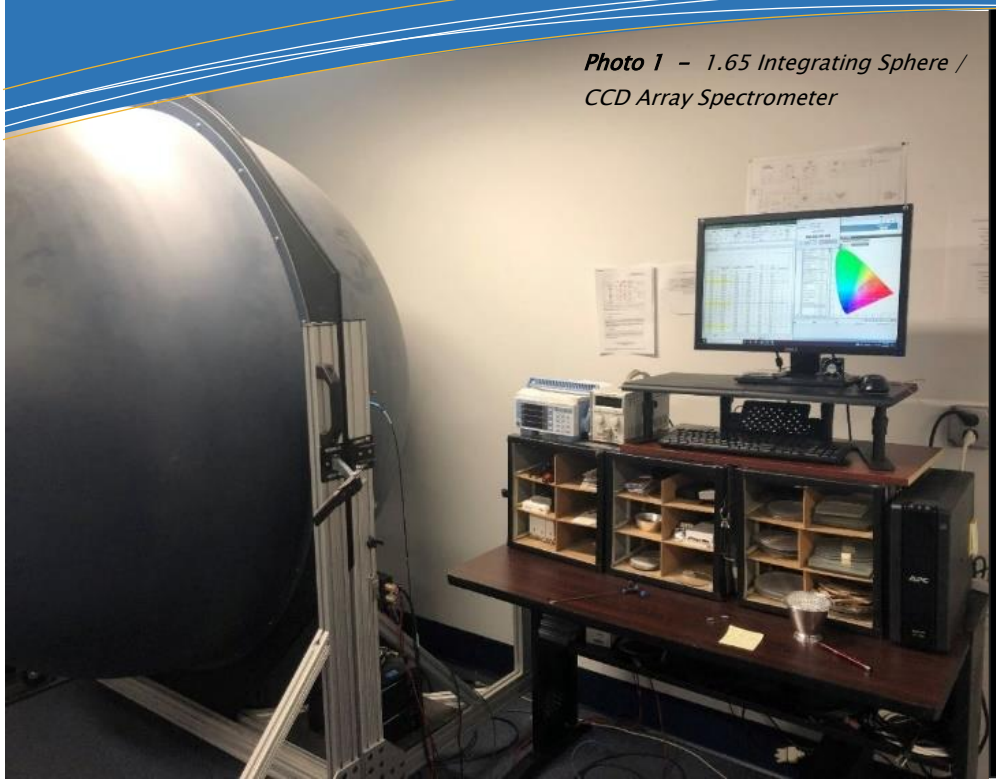


Photo 1 *– 1.65 Integrating Sphere / CCD Array Spectrometer*

this issue

Pathway Lighting's In-House Photometric Lab Facilities

By Russell Budzilek, Director of Engineering

Pathway Lighting takes pride in providing accurate performance specifications for their lighting fixtures. We believe that accurate photometric data is paramount to enable lighting designers to provide their customers with attractive, high performance lighting layout designs that enhance users' productivity, attitude, and sense of well-being. To provide this information in an economical and timely fashion, Pathway has chosen to have its own in-house photometric testing facility. This facility enables us to provide photometric data on every fixture we sell as well as streamline and accelerate the engineering design process. Pathway takes accuracy seriously and all in-house photometric equipment is regularly calibrated by an independent third-party calibration lab and/or the equipment manufacturer, as applicable.

Pathway's photometric facility is currently equipped with a 1.65 meter integrating sphere with a multi-channel CCD array spectrometer. The sphere is used to analyze luminous flux output and colorimetry (photos 1 and 2). Also, located in a specially constructed dark room is a dual axis near-field goniometer (photo 3) used to analyze beam distribution patterns. Photometric analytical software is used to integrate this information to create IES files. These IES files can then be input into lighting layout design software for use by lighting designers to optimize lighting layouts. Other ancillary photometric measurement tools include a miniature portable professional spectrometer, an illuminance meter, and a colorimeter to name a few. Electronic support equipment such as lab quality constant current sources, DC power supplies and power analyzers round out the equipment used in the photometric lab. This equipment represents approximately $150,000 investment in capital equipment for product design and development.

Staying current with measurement capabilities is critical, so during this summer, Pathway upgraded the integrating sphere hardware and software suite to enable more data collection and analysis.

continued...

Photo 2 *(above) – Integrating Sphere with Pathway Model P31 Fixture Set Up for Testing*

Photo 3 *(right) – Near-Field Goniometer in Darkroom*

A flicker sensor was added to enable analysis of lamp flicker parameters such as those required by California's Title 24 and the NEMA 77 standard. In addition, new software enables calculating a complete set of TM-30 color rendition data as specified by a recent ANSI/IES TM-30-20 standard and making this information available to our customers.

For those interested in a few technical details, Pathway can now provide the following data on fixtures per customer request.

Flicker Data

- Flicker Index
- Percent Flicker from 40 Hz to 1000 Hz
- Fundamental Flicker Frequency
- Stroboscopic Visibility Measure (SVM)
- ASSIST Mp-Flicker Perception Metric

TM-30 Data

- Rf Color Fidelity
- Rg Gamut Index
- Color Vector Diagram
- R_{fh1}-R_{fh16} Local Color Fidelity for Hue Bins 1-16
- R_{csh1}-R_{csh16} Local Color Shift for Hue Bins 1-16

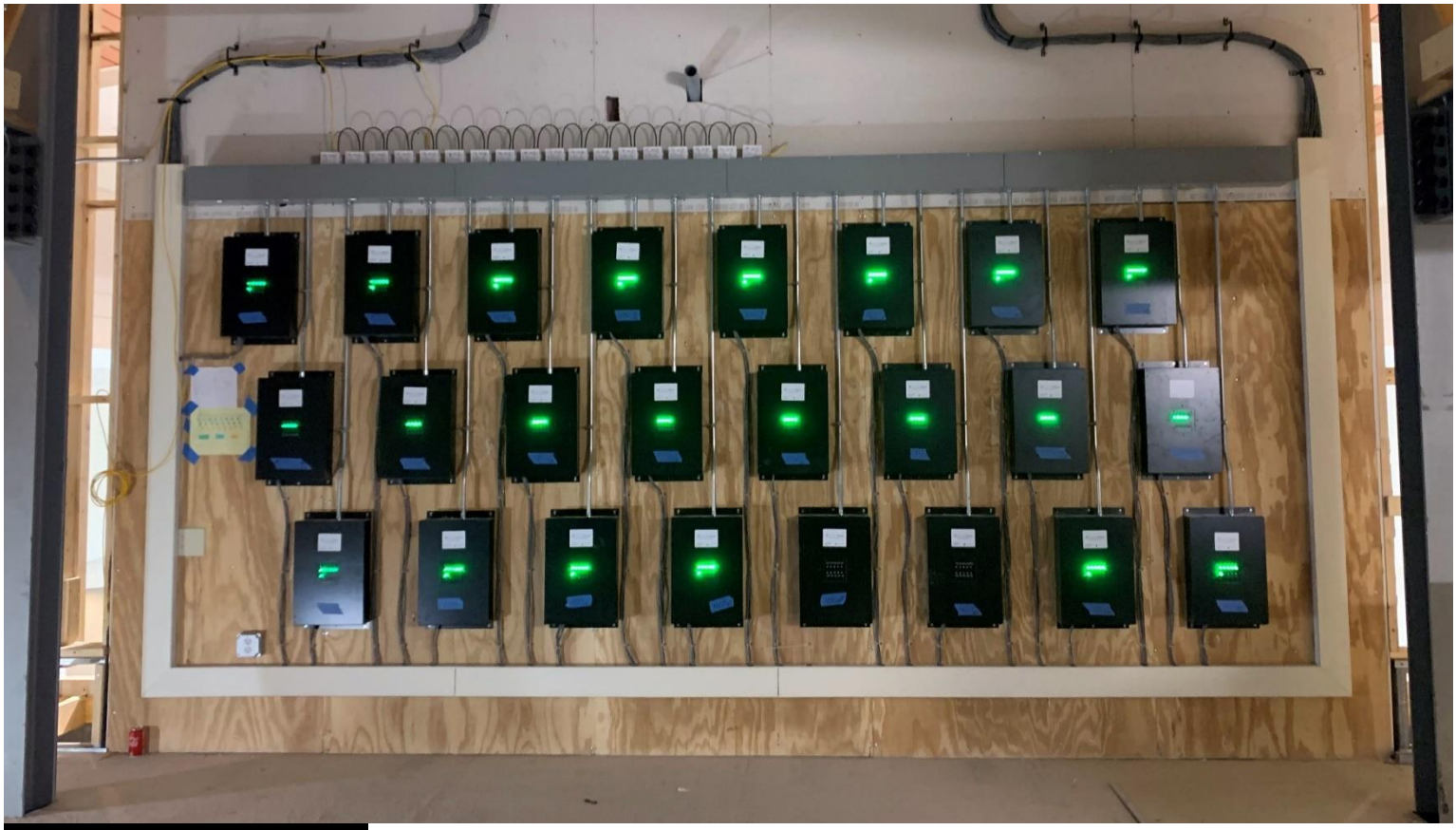
Please remember that Flicker and TM-30 data is available upon request and will not be found on our existing specification sheets. Please allow Pathway staff a few days to gather the data needed for these special data requests. Newly developed products will be characterized during the design phase with these new characteristics and data will be available immediately.

Pathway Lighting's Engineering Department is constantly looking ahead to modernizing and enhancing our in-house photometric and electrical test facilities to better serve our customers. For additional information on our photometric and electrical test capabilities, feel free to contact Russell Budzilek at rbudzilek@pathwaylighting.com or by phone at 860-388-6881.

Sales Update

Pathway Lighting's lead times have improved, please reach out to our Sales Department for more details!

CentralDrive Installation



St. John Paul II Catholic Church, Sellersburg, IN

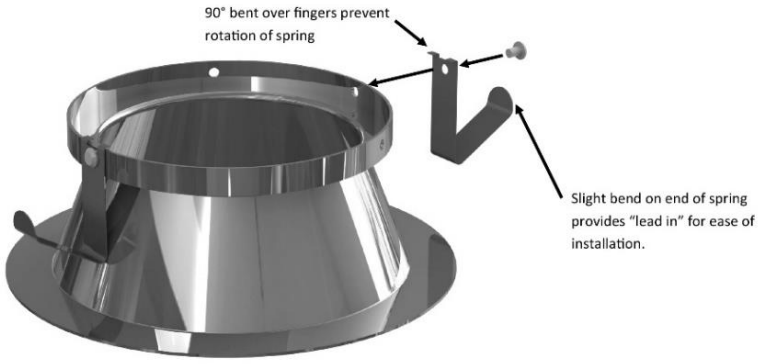
BIG THANKS to our rep, **LHI Lighting**, for getting our fixtures and CentralDrive remote driver specified in this new construction house of worship!

More photos on this project will be posted on our online photo Gallery soon.

Engineering Bulletin

Pathway has a new enhancement designed for 4PLED trims in our recessed products. We have replaced the existing clips with a riveted spring clip that connects to the reflector lens shelf. The spring assembly works well when a lens is utilized in the lens shelf (or without) and for IEM product configurations. This redesign gives a nice “click” as it snaps into place and has been applied to units which utilize a Bridgelux engine.

Pathway Lighting is continuing to work on enhancements for other products which will be announced in upcoming newsletters.



Pathway updates

terms & conditions

There have been a few updates to our Sales Representative Terms & Conditions; these were distributed to principals in August. Two-column pricing for USA is now published at 15% and 7% commission rates; any amount above a published 15% level will receive 100% overage amount. Additionally, our freight allowance minimum is now $5000. Please contact our Sales team if you have any questions.

price increase

As we navigate the current supply chain pressure and logistic capacity issues, we have seen continuing cost increases across several commodity markets such as steel, aluminum, electronics, and logistics.

Despite our best efforts to optimize our costs and productivity, we will institute a price increase effective November 1.

We value your support as we continue to adapt to these unprecedented external issues.

Modular Accent Series

Eliminates ceiling clutter
Virtually glare free

You've Never Seen a Modular Like This!

The Modular Accent™ Series is a collection of multiple-head recessed accent fixtures which come with a choice of one to four independently adjustable heads that deliver light only where needed and directing people's attention to visual interests and focal points.

Each head rotates 180 degrees and maintains its position with a friction-lock device and a 35 degree dual-axis tilt with a locking knob. It has high-performance StellarGlo™ TIR optics delivering three beam distribution options ensuring superb cut-off, providing clutter-free ceilings and glare-free illumination.

The architectural square heads are diecast in aluminum and finished with a durable powder coat finish.

Features & Benefits

- ✓ Bluetooth enabled
- ✓ 4 TIR optics per head provide nearly glare-free illumination
- ✓ Aesthetically pleasing square diecast aluminum lighting head
- ✓ 180° head swivel and 35° head tilt from nadir
- ✓ Sturdy sheet metal body with durable powder coat finish (variety of colors available)
- ✓ Heads available with black or white faceplate
- ✓ Configurations: 1 head, 2 head linear, 3 head linear and 4 head square
- ✓ Independent head articulation
- ✓ 1" flange offered in multiple colors
- ✓ Flangeless "mud in" option for a clean, seamless look after install

More Details

Spec Sheets
Video

Modular Accent

Factors Accounting for System Wattage Variance

By Russell Budzilek, Director of Engineering

LED fixture system wattage can vary over a fairly wide range due to three main factors:

1. **LED Forward Voltage Range:** All constant current powered LED light engines operate over a specific forward voltage range determined by the LED matrix configuration within the light engine. Since many LEDs are connected in series within the light engine and each LED has a specific tolerance on the forward voltage, the total forward voltage tolerance for the light engine is the cumulative result of the individual tolerances. For example, the Bridgelux Vero 29 when driven at a constant 2.1A has a forward voltage range of 35.2 to 40.9 volts. If the LED engine drive power is calculated at these two extremes of the forward voltage range, the resulting powers are:

   Vero 29 #1 (Vf=35.2V) LED drive power = 2.1A x 35.2V = 73.9W
   Vero 29 #2 (Vf=40.9V) LED drive power = 2.1A x 40.9V = 85.9W

   Therefore, in this example, the power varies by 12W depending on which Vero 29 is used.

2. **LED Driver Current Tolerance:** All constant current drivers have a specific tolerance associated with the drive current. This tolerance is commonly ±5%. Therefore, in the example above, where the specified current is 2.1A, the actual current may be anywhere in the range from 2.0 to 2.2A. This ±5% variation in current produces a corresponding ±5% variation in LED drive power. For the example described here, an additional 5% variation in current can result in an additional 4W variation in LED drive power.

3. **LED Driver Efficiency:** Constant current LED drivers convert AC line voltage to a DC constant current that is used to drive the LED light engine. This conversion cannot be done with 100% efficiency and consequently some power is consumed by the driver itself. Typical driver efficiencies are in the 80 to 90% range when the driver is used near its maximum power rating. Once again, the efficiency has a tolerance of a few percent. This tolerance in efficiency also produces a corresponding percentage variation in the resulting total system power for the fixture.

In conclusion, due to the tolerances described, the actual overall fixture system power can potentially vary quite a bit (approx. 10 to 15W in the example above) from one fixture to another. The higher the system wattage, the larger the potential for variation, since a good portion of the variation is directly due to tolerance percentages.

Pathway Lighting specifies the typical system wattage as measured during product design verification. It is an average from several fixtures under test. LM79 testing performed by third-party laboratories is not done on the same fixtures used for design verification. Consequently, the power listed in the LM79 report may be different than the typical value given on our spec sheet. The actual variation in practice is not nearly as large as calculated in this example because LED forward voltages are not normally at the extreme ends of the range and the various tolerances can add or subtract and cancel each other out to a certain extent in some instances.

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