

Shedding Some Light...

Pathway Lighting's Newsletter - February 2021

welcome to our newsletter

This issue will focus on a few topics: Tech information from our Engineering Dept., product news, and fun facts about one of our staff.

what's up at Pathway

Our Spec2 downlight has received its patent! This versatile line of 2" architectural recessed downlights, wall washers, and adjustable accents redefines modular fixture construction. Available for both new construction and remodel applications. See the [brochure](#), which includes links to the video and spec sheets.



Northern Flicker

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Flicker

By Russell Budzilek, Director of Engineering

OK, we're not talking about the bird! Pathway Lighting's fixtures use state-of-the-art constant current drivers to control the illumination of their LED lighting products. Despite that, all constant current drivers have a certain level of current variation that can cause flicker. Depending on the level of dimming required, two mechanisms of current control are utilized: 1.) constant current reduction (CCR), and 2.) pulse width modulation (PWM). Products that dim to 1% typically use the CCR method, while products that dim below 1% typically use the PWM method. For either case, the drivers we specify have been thoroughly tested to ensure that flicker is undetectable.

Pathway characterizes flicker by using the percentage flicker metric defined by:

$$\% \text{ Flicker} = (\text{Max L} - \text{Min L}) / (\text{Max L} + \text{Min L}) \times 100\%$$

Where: Max L = Maximum light intensity & Min L = Minimum light intensity

Since the light intensity is directly proportional to the current driving the LED, the flicker equation can be rewritten in terms of drive current as follows:

$$\% \text{ Flicker} = (\text{Max Current} - \text{Min Current}) / (\text{Max Current} + \text{Min Current}) \times 100\%$$

Pathway Lighting's engineers accurately measure the maximum and minimum currents with a digital storage oscilloscope and precision AC/DC current probe to determine the max and min current levels.

[continued...](#)

flicker in summary

For lighting products using either the CCR or PWM drive methods, flicker-related issues will be non-existent with Pathway Lighting's products. Through a rigorous in-house testing program, great care is taken to ensure that all our products meet or exceed our performance specifications.

The level of flicker perception varies from person to person, but a general industry rule of thumb is that using a CCR drive method, a flicker percentage of less than 50% at a frequency of 120 Hz or more will not be visible to the average observer. Even if flicker is not quite visible, it has been shown that flicker can cause health-related issues such as fatigue, headaches, eye strain, and even seizures.

To ensure that our lighting products are truly free from flicker-related issues, the CCR drivers Pathway Lighting uses are characterized such that the flicker percentage is less than 22%, which is twice as good as generally accepted.

This 22% limit is achieved by ensuring that the peak-to-peak ripple current measured on the constant current supplied to the LED is no more than 35% of the peak current value. Due to the design of the constant current driver, the frequency is always 120 Hz or greater and thus in the acceptable range.

The rule of thumb for the PWM drive method is that a refresh frequency of greater than 200 Hz is required to make flicker not visible to the average observer. The flicker percentage metric cannot be used with the PWM drive method because the flicker percentage will always be 100%. However, even though the LED turns on and off with the PWM technique, the frequency at which this turn on/turn off occurs is faster than the human eye can detect. Once again, to ensure that there will be no flicker-related issues, our products using the PWM technique will always refresh frequencies greater than 260 Hz.

In summary, for lighting products using either the CCR or PWM drive methods, flicker-related issues will be non-existent with Pathway Lighting's products. Through a rigorous in-house testing program, great care is taken to ensure that all our products meet or exceed our performance specifications.

Conduit Canopy Options

New! Pathway Lighting now has conduit covers. Drivers are housed within the conduit cover instead of inside the fixture which keeps them away from the heat of the LED/heatsink and therefore, prolongs fixture life. These are powder-coated steel for a durable finish. They are available for aviation cable, cord, pendant, and surface mounting options and require a 1.5" surface junction box. The covers come with inserts that are injection molded plastic that allow for use of .5" or .75" conduit or plug used to fill in a knockout removed in error.

Conduit covers can be painted, or special effects printed with hydrographics, to complement or match any of the Pathway's fixtures you choose. For more details, ask one of our sales representatives.

Square

Square conduit covers are 5.03" SQ x 4" H



Surface Mount



Aviation Cable



Pendant

Round

Round conduit covers are 6.31" OD x 4" H



Cord Mount



Pendant



Aviation Cable



Surface Mount

Conduit covers available for C73 & C73SQ, CE8, and HL Series fixtures.

Get to Know - Todd Guertin

Todd has been with Pathway for 21+ years and is Chief Executive Design Officer. Besides lighting product design, he also used to create booths and displays for our tradeshows. A true perfectionist at heart, he always puts in 110% and seemingly never runs out of steam. Here are some fun facts:

Do you have any hobbies? So many and I put a lot of energy into them. I feel if you can't put in a great effort, there's no sense doing it. I've designed and built my own house, which I am still perfecting to this day. During the process, I developed wood-working skills and created custom finishes throughout it.

I've played the drums since the third grade and took drum lessons during college. I also play 12-string guitar. I don't perform in bands any longer, but I still play - mostly to recordings.

Favorite season? Spring, summer, autumn and winter! Why? I love to be outside and do a lot of biking and running. I run nearly every day, no matter what the weather may be. I participate in many marathons, biathlons, triathlons, and ultra marathons. I also do the polar bear plunges. These events are all fundraisers for very worthy causes.



What do you do in your spare time? I volunteer a lot. I coached all three of my boys in all their youth sports: soccer, basketball, and baseball since they were five years old through high school (16 years.) I coached high school lacrosse team in off-season tournaments. I was President of the Police Athletic League for 12 years and still serve on the board. I sit on the board for the Friendly Sons of St. Patrick, and was their VP in 2016, then President in 2018. The organization raises funds for college-bound students and we've given more than \$100,000 in scholarships. I also served on the board for Norwich Youth Lacrosse, coached for Norwich Youth Soccer Club and the Norwich Recreation Dept., and was a member of the "Pit Crew" for the Norwich Free Academy Marching Band. Additionally, I serve on the executive board for the Mohegan Striders, a running/racing club which I've been a member for 35 years.

Do you have any awards? I was inducted into the Norwich Sports Hall of Fame and received the Kapteina Service Award. And lots of metals and trophies for races I've won.

What's the biggest joy in your life right now? This little man! The "Guertin Guys" - me, my three sons, and our newest member, my grandson. I call us the "5G".

Do you have any traditions? My middle name is Anthony. I gave the same middle name to each of my sons, and now my grandson has Anthony as his middle name.

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