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A New GATEWAY Report on the Use of OLEDs in an Office Space

DOE's [GATEWAY program](#) was invited to evaluate the new lighting system for the offices of the Rochester, NY, accounting firm of DeJoy, Knauf & Blood, LLP (DKB), one of whose founding partners, David DeJoy, is also co-founder and CEO of OLEDWorks, the only U.S.-based OLED manufacturer. The large number of different OLED luminaires used in these offices makes the installation unique and well worth studying. A report on the project has just been published and is available [online](#).



In most of the DKB workspaces, OLED luminaires are installed in a supporting role, with LED luminaires and daylight providing the necessary illuminance levels for the primary work areas, and OLED products providing task lighting and decorative accents. The OLED luminaires are primarily located in visually prominent areas. In conference and break-room spaces, OLED luminaires provide both the needed task lighting and the face and room surface lighting, while serving as the focal design element. The lighting system expresses creativity and innovation, making a bold statement to clients and staff.

All of the OLED luminaires use OLEDWorks panels, and almost all are connected to 0-10V dimmers. The panels are almost all driven by dedicated OLED drivers, and two of the luminaire types incorporate OLED panels with integral drivers, eliminating the bulk of a remote driver. In nine months of operation, there have been no OLED driver or panel failures, and the

OLED luminaires do not exhibit flicker that would exceed the guidelines of the IEEE Standard P1789-2015 in either maximum or minimum output range of the dimmer.

The OLED luminaires were found to provide comfortable luminance levels; acceptable performance in terms of color quality, flicker, and controllability; and attractive design elements. Efficacy of the OLED luminaires ranges from 21 to 58 lm/W, depending on the generation of OLEDWorks panels used, as well as on the configuration of the luminaire and driver efficiency. Luminances of the exposed panels measured as high as 9318 cd/m², but it's common to find conference rooms where the OLED luminaires have been dimmed by employees to a level of 3300 to 6000 cd/m², and subsequent occupants use the dimmer/switch to turn the luminaires on or off without touching the dimming setting.

Field measurements of white OLED panel color in different luminaires yielded consistent CCT values ranging from 2911K to 3074K, with CRI values from 79 to 91.

DKB employee feedback about the OLED lighting has been very positive. The exposed OLED panels deliver a soft, minimal-shadow lighting that makes faces and expressions visible, and increases room brightness by delivering light to vertical surfaces. At the panel luminances used, this is achieved without employees reporting glare. The flexibility to dim the lighting is also appreciated.

Ongoing concerns for OLED architectural lighting include a premium luminaire price point that limits its wider use in projects and applications, low efficacy compared to LED luminaires, and rising panel voltage and power draw over time. While the efficacy range of the OLED luminaires in this project was considerably lower than that of the LED products (80-90 lm/W), projected performance for the next generation of OLED panels is 80-90 lm/W at a nominal luminance of 8300 to 3000 cd/m², lifetime between 30,000 and 50,000 hours, and CRI of 90. DOE intends to evaluate future installations of luminaires that use these next generation OLED panels once they reach the market.

OLED panels draw more power as they age, so it's important for design professionals to provide "headroom" on the OLED loads in electrical circuits, to avoid circuits becoming overloaded over time. An additional power draw of approximately 15% is also recommended in lighting power density calculations, to account for panel-to-panel variations when new, for panel changes over time, and for variations in ambient temperature.

New OLED products have entered the market in 2017, prompting DKB to remove some of the LED linear products in the open office in March and replace them with a nominal 4' linear luminaire that has a single line of 3500K LEDs delivering uplight, and eight 3000K OLED panels downward. This luminaire combines the high efficiency of the LEDs for indirect lighting with the comfort and appearance of the visible OLED panels on the downward side. The overall luminaire performance is rated at 71 lm/W, 75 lm/W, or 81 lm/W, depending on the LED package specified. DOE hasn't tested this product or verified the ratings.

For a closer look at the findings, download the [full report](#).

Best regards,
Jim Brodrick

As always, if you have questions or comments, you can reach us at postings@akoyaonline.com.