

SEEING THE LIGHT

USAI's thorough research and development pays off with the design of the nanolumen

Source: ARCHITECTURAL LIGHTING Magazine
Publication date: 2010-06-01

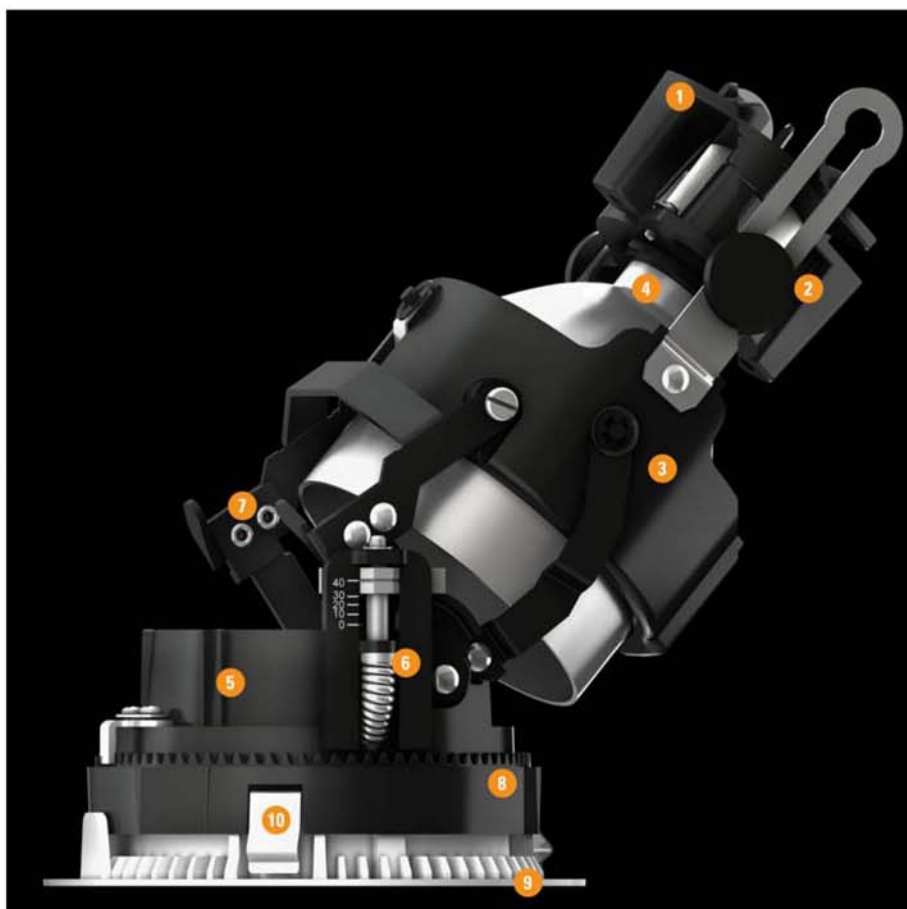
By Kimberly R. Griffin

It began with a seemingly impossible task: design a T4 ceramic metal halide (CMH) recessed luminaire that would include a wish list of features suggested by lighting specifiers in a 2½ -inch aperture. Seemingly impossible because, to date, the smallest market-available CMH fixtures had only been able to accomplish this feat in a 3-inch aperture. And although the engineering department at USAI petitioned to make it ¼ -inch larger, Bonnie Littman, president of this family-owned New Windsor, N.Y.-based lighting company, would not compromise. USAI's quest to design, fabricate, and produce the smallest CMH recessed downlight is based on three generations of lighting expertise coupled with extensive market research. The hard-earned result is the company's latest product offering: NanoLumen.

The family's history with the lighting industry dates back to the 1938 World's Fair, when Littman's grandfather—William—introduced fluorescent lighting at the General Electric exhibit. Nearly 25 years ago, Littman's father, Eugene, formed USA Illumination, which Littman and her brother David, who is CEO, rebranded under the name USAI in 2005.

Officially launched in January, the NanoLumen underwent intense testing. The company's research showed that architects and lighting designers wanted a fixture that was small, attractive, and used a T4 CMH lamp. The T4 is popular with the design community because of its small size and high efficiency, according to Al Near, senior vice president of sales and marketing for USAI. Feedback from the market also indicated there was a need for an attractive, miniature recessed fixture specifically designed for the T4. Easy maintenance was also a factor in the new luminaire's design. Research revealed concern about relamping from a ladder, particularly for less experienced store personnel.

USAI's engineering department developed the NanoLumen to have three different configurations—downlight, adjustable, and wallwash. The octagonal housing is universal to accommodate all three versions, as are the round and square trims. And while the NanoLumen was designed around the T4 lamp, it can also house a T4.5, CDM-Tm, MH MR16, or MR16 lamp to meet designers' requests for a residential version after seeing the prototype in person.



ADJUSTABLE NANOLUMEN1 DIE-CAST ALUMINUM SOCKET HEAT SINK2 SLIDE-AND-TWIST RELAMPING3 LENS ACCESSORY HOLDER4 INTERCHANGEABLE REFLECTORS5 INTERCHANGEABLE Baffles6 VERTICAL AIMING ADJUSTMENT7 VERTICAL AIMING MEMORY8 HOT AIMING HORIZONTAL ROTATION9 TOOLLESS, INTERCHANGEABLE TRIM10 TRIM-MOUNTING CLIPS

The real beauty of the NanoLumen's design lies in its behind-the-scenes details. For the adjustable configuration, it was important that, in addition to being less noticeable than a traditional 6-inch fixture, the luminaire not let any of its internal workings be visible. To this end, the design features an injection-molded, custom-designed, interchangeable baffle that hides most of the hardware on the inside of the trim, out of view from the average onlooker but still visible for maintenance purposes. There are four interchangeable reflectors with custom-designed facets for 10-, 20-, 35-, 60-degree beam spread coverage and one diamond-faceted wallwash reflector. When developing the reflectors, the company, along with input from outside product development research firms, examined three manufacturing methods and four different materials. "We were actually willing for each reflector to be made out of a different material and from a different manufacturing method if it made sense and maximized performance," Littman says. "It was all about achieving maximum performance." The winning reflector combination helps the wall-wash version span a 10- to 60-degree distribution. When coupled with a 39W lamp, it achieves 67.8 percent energy efficiency, which, according to USAI, is approximately 15 percent greater than the nearest competitor.



The wallwash version of the NanoLumen comes with a diamond-faceted reflector and a low-iron, triple-textured lens to achieve maximum uniformity.

In terms of maintenance, USAI addressed the wide range of individuals who could be tasked with installing the fixture or changing the lamp—everyone from maintenance staff to a store employee. As a result, all of NanoLumen's trims are designed to detach without the need for separate tools or rewiring. Vertical aiming memory assures the light source in the adjustable configuration will settle into the housing exactly how the lighting designer or architect intended it to. Finger tabs align the fixture in a vertical position for removal or relamping when pulled down, then spring it back into place when released.

Another novelty of the design is the ballast location. The ballast fits through the 3½ -inch ceiling opening and can be replaced via a patent-pending slide-and-replace tray that allows the installer easier access to the ballast. "[In a] typical light fixture, when you're looking through a hole, your ballast is probably going to be 3 to 4 inches away, so you have to reach through a hole, then reach back 3, 4, or 5 inches and try to manipulate removing the ballast from its fixed position," says Frank Cogliano, vice president of engineering. Plates and thumbscrews are colored with a silver finish that makes them easy to see without a flashlight, which also helps when examining the wiring. The screws were engineered to a specific size and shape so they can be easily handled and removed by different-sized hands. Cogliano recalls one naysaying lighting designer: "He looked at me and said, 'There's no way you're going to be able to replace that ballast through that 3½ -inch hole.' So I went through a couple of steps, pulled it right out of the aperture, and in a few minutes he looked at me and said, 'Wow. If I didn't see it, I wouldn't have believed it.'"

Over the course of 4 months, Cogliano traveled with a NanoLumen prototype to more than 50 lighting designers, architects, and specifiers' offices, allowing them to test and examine it. One designer even attempted to break it. One individual's suggestion led to the addition of a shallow housing option for the downlight configuration for use in low-plenum ceilings. In all, it took USAI two years to research, develop, tool, and test the NanoLumen. Littman admits, "[Eliminating] that extra ¼ inch probably added close to a year to the design cycle because we just were not willing to compromise on our target size." But the positive feedback USAI has received since releasing NanoLumen proves it was well worth the wait.



The downlight configuration adds a twist-and-lock interchangeable reflector, available in 10-, 20-, 35-, and 60-degree custom-designed facet options, to the basic die-cast model.