

THE TOOL YOU CAN USE

DIMMABLE LIGHTING BY STUART BERJANSKY

Dimmable fluorescent lighting drives broad range of benefit

Dimmable fluorescent lighting systems are becoming an increasingly popular option in today's commercial and institutional facilities. These systems offer end-users a cost-effective, energy-efficient, and controllable alternative to their existing lighting systems and represent an easy-to-install undertaking for distributors and contractors. In a nutshell, dimmable fluorescent systems combine the long life and energy efficiency of fluorescent lamps with the controllability and full range dimming capabilities of incandescent systems.

Dimmable fluorescent lighting involves the combination of fluorescent lamps, dimmable electronic ballasts, and control products such as manual dimming controls, light-level sensors, occupancy sensors, clock switches, and centralized controls. Through either manually driven technology or an automatic sensitivity to daylight levels or occupancy status, end-users can rely on fluorescent dimming systems to significantly reduce the amount of energy used in lighting a facility, an activity that can account for up to 40% of a commercial building's total electricity use, according to Department of Energy estimates.

A number of end-user benefits accrue from the installation of lighting controls and dimmable fluorescent lighting systems, including:

- **Bottom-line savings.** Because lighting controls help to better attune a facility's lighting to the most optimal foot-candle or lumen requirements (based on the tasks being performed in the space), the use of lighting controls can easily reduce energy usage by 30% to 50%.

These products yield average returns on investment of 20% or better, which equates to payback periods in the four- to five-year range or less. And the financial benefits of their use keep accruing beyond the payback period, for the average 15- to 20-year lifespan of the control and dimming hardware.

The installation of dimmable fluores-

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cent lighting has also been proven to enhance real estate valuation, particularly to the owner of a tenant-lease facility. The positive impact that the savings have on net operating income helps increase the building's appraised value by a capitalization rate factor and can differentiate the building from competitive properties.

- **Enhancement of the work environment.** Optimizing area lighting based on occupancy levels in place and the tasks at hand, lighting systems driven by controls are flexible and ultimately give employees more control over the light level and ambiance in their work spaces, an option that is particularly desirable in today's computer-driven work setting. As a result, dimmable fluorescent lighting systems increase employee comfort and have the documented effect of increasing worker productivity as well.

- **Environmental benefits.** Energy use reductions driven by the installation

of dimmable fluorescent systems benefit the environment in the form of reduced emissions of pollutants such as sulfur dioxide, nitrous oxide, and carbon dioxide. These reductions in emissions are equivalent to the removal of millions of cars from roads or the planting of millions of acres of trees.

Dimmable fluorescent lighting systems have evolved rapidly, resulting in the availability of an increasingly powerful and easy-to-use-and-install array of options optimal for retrofit as well as new construction applications. A wider variety of lamp types than ever before are capable of being dimmed, and the market's broad selection of ballast and control components have been made increasingly compatible. Advances in electronic ballast technology over time have enabled manufacturers to dim lamps to levels of 5% and lower, and the installation of dimmable fluorescent systems has been simplified by the availability of ballasts that require no extra wiring (due to the removal of additional control leads).

As dimmable fluorescent lighting continues to penetrate the nation's offices, hotels, schools, and healthcare facilities, the future of these systems continues to evolve. Digital Addressable Lighting Interface (DALI), a two-way communication system, will ultimately bring digital technology to lighting. The two-way communication will allow facility managers to proactively address such items as lamp failures and ballast failures prior to receiving phone calls from tenants. In addition to two-way communication, DALI provides flexibility to designs and installations and brings a new level of intelligence to the ballast.

Other trends in controllable lighting revolve around increased owner interest in voluntarily achieving sustainable (green) building status. Many sustainable designs utilize existing natural resources, and "daylight harvesting" refers to the popular method of strategically bringing natural daylight into a building's interior. In order

to implement a daylight harvesting system, a low-voltage control system is required (0V to 10V or DALI). Daylight harvesting systems supplement the available daylight with a varying amount of artificial light in order to meet the task requirements. The U.S. Green Buildings Council's (USGBC) LEED performance standards offer one such framework against which building owners can measure their facility's degree of sustainability.

• **Ease of conversion.** Converting an existing T8 or T12 fixed light output system to a dimming system has never been easier for distributors or contractors. Powerline, 0V to 10V, and DALI are all available to replace the standard on/off switch system. Since 0V to 10V and DALI require two additional control wires to be pulled (which can sometimes create a problem in spaces with existing closed ceilings), the powerline control option makes the most sense in these types of installations. As noted earlier, powerline

systems do not require additional control wires, as the control is provided over the existing hot wire. The conversion is complete after just a few simple steps:

Dimmable fluorescent systems offer end-users an optimal combination of benefits—from energy efficiency to improved lighting quality and environmental purification.

1. Turn off power at the breaker.
2. Remove existing fixed light output ballast.
3. Install new powerline dimming ballast, which might require some rewiring to the sockets. (Note: rapid-start sockets must be used since dimming ballasts are rapid-start or programmed-start. Fixtures utilizing T12 lamps and magnetic ballasts will already have rapid-start sockets. Existing fixtures originally supplied from a

fixture OEM with T8 lamps most likely utilize instant-start ballasts and thus instant-start sockets. If the fixture was originally a T12 fixture retrofitted to a T8 lamp with an instant-start ballast, then most likely the sockets are rapid-start if the existing sockets are still in use.)

4. Remove the existing switch.

5. Install a fluorescent dimmer that is compatible with the new ballast (a standard incandescent dimmer typically will not work).

Overall, dimmable fluorescent systems offer end-users an optimal combination of benefits—from energy efficiency, flexibility, and ease of installation and use to improved lighting quality and environmental purification. It pays to consider this powerful option on your customers' behalf. ■■■

Berjansky is product manager, dimming, at Advance Transformer, Rosemont, Ill. Download this and other blueprints at www.tedmag.com.

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