

## Ask iAIM

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What are the advantages of fluorescent fixtures over traditional metal halide lighting?

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High-intensity discharge (HID) metal halide fixtures are the most prevalent form of ice lighting used. Their light output is superior to HID mercury vapor fixtures and the coloration is superior to high-pressure sodium fixtures. Advancements in fluorescent lighting lamp and ballast technology over the last decade have made linear fluorescent ice lighting a very appealing option for new arenas or retrofit of existing HID lighting.

T5 high-output (HO) fluorescent fixtures are high bay luminaries that deliver the same light output for about 50 percent of the power consumed by metal halide fixtures. They have minimal warm-up time and can be switched on and off the same way you would a normal room light. An ambient temperature above 90 degrees Fahrenheit is required around the T5 lamps to produce full lumen output. In the unheated ice arena application, this can be achieved by specifying a fully enclosed fixture with a high-impact polycarbonate lens that will contain the lamp and ballast heat to warm the air around the lamp.

The advantages of T5 HO fixtures over traditional metal halide lighting include:

- Better light quality. The coloration and dispersion of the light is superior to metal halide. T5 lamps have a color-rendering index (CRI) of 85 vs. a CRI of 65 for metal halide. This makes colors appear more vivid and whites appear brighter with T5. A CRI of 85 provides similar brightness impressions using 25 percent fewer lumens than lamps with a CRI of 60. Since the fluorescent light is not as directional as HID, it disperses far better, virtually eliminating the bright spots and shadows that are inherent in HID.
- Lower radiant heat load. Fluorescents operate at a substantially lower temperature than HID, significantly reducing the radiant heat load that is transferred to the ice sheet (lighting radiation accounts for 7 percent of the total refrigeration heat load).
- Better control options. Dimming HID fixtures results in power losses greater than the light output reduction. With T5 technology, individual lamps in a fixture can be turned off with a direct power savings that is commensurate with the light reduction. If 50 percent of the lamps are turned off, the light output and energy consumption are reduced by 50 percent. While HID dimming has been known to shorten ballast and lamp life, switching off the T5 lamps will lengthen both the lamp and ballast life. The instant-on operation of the lamps allows greater switching flexibility without the warm-up time required for HID fixtures.
- Improved power factor. T5 fixtures use high power factor electronic ballasts that reduce power losses and utility penalties that result from low power factor.
- Reduced lamp depreciation. The lumen output depreciation factor for T5 lamps is substantially less than for HID lamps. A T5 lamp loses approximately 5 percent of its light output over the 20,000-hour life; metal halide lamps lose approximately 40 percent of their light output over

the same 20,000-hour life. This increases the average maintained lumen output over the life of the lamp and eliminates the need for intermittent re-lamping to maintain light output.

- Ice rink applications. Be sure to use a fixture that is appropriate for humid environments (aluminum construction, gasketed covers, etc.).
- Lamp options. In direct retrofit applications, select the number of lamps in the fixture (four or six) based on the required light level for activities. Generally speaking, four-lamp fixtures will produce the equivalent mean lumen output of a 400-watt metal halide fixture; this is usually sufficient for community and recreational ice arenas. Arenas that may host high school or college hockey or televised events should consider replacing the 400-watt HID fixture with a six-lamp T-5 fixture. If you are replacing 1,000-watt HID fixtures, eight-lamp T-5 fixtures are available from some manufacturers.
- Retrofit cost. Installed costs for T5 high output fixtures average \$450 to \$650 per fixture, depending on the fixture model, additional wiring required and accessories. Controller costs average \$75 to \$125 per fixture controlled, depending on the features and complexity of the system. An NHL-size ice surface (85' by 200') would normally require 40 total fixtures (four rows of 10).
- Utility incentives. Electric utility rebates are offered by many utilities to help defray the cost of upgrading from HID to fluorescent lighting. The utility programs tend to be prescriptive (averaging about \$125 per fixture). Some utilities also offer a customized lighting incentive program. A customized program may allow you to receive a rebate of up to 50-80 percent of the installed cost. In addition, some utilities will also finance the net cost of the lighting upgrade after rebates.

Response excerpted from the "Facility Facelifts" manual by Rob McBride, CAE, President of Facility Management Corp.

Do you have a management, operations or programming question for iAIM? Send it to [editor@skateisi.org](mailto:editor@skateisi.org).