



FAQs: T8 or T5-HO - “Which should I use?”

Q: “T8 or T5-HO: Which lamp type should I use?”

A: Numerous discussions surround the decision to use T8 or T5-HO lamps when replacing an HID fixture. As a manufacturer that utilizes both lamp types in our fixture designs, we would like to offer some important points you may want to consider. If you ask the right questions, you should get the answers that will help lead you to the right decision. For clarification, we are addressing the use of T8 and T5-HO lamps in industrial applications, specifically high and low-bay lighting. Indirect lighting for office space is a separate topic.

We feel T8 lamps provide a better quality of light with less glare in areas where the fixture height is lower than 20 feet. The T5-HO lamp delivers a brighter light source within a smaller diameter allowing us to design the reflector with better optic precision. This provides better quality light output and higher fixture efficiency. As a general rule of thumb, a T5-HO fixture should be used in applications above 20 feet and T8 fixtures below 20 feet.

There is a gap between 18 and 25-foot heights where either T8 or T5-HO fixtures can be used successfully. This is where you really need to pay attention to what you are asking for and what you may get. Here are some more considerations:

Lamp and Ballast Choices

If you look in a current catalog there are over 50 types of 4-foot T8 lamps available as replacements (standard CRI, Standard CRI w/ extended performance, high CRI, high CRI w/ extended performance, high-lumen extended performance, energy saver, long-life energy saver) as well as the whole selection of colors. At this point, there are only two types of T5-HO lamps – A 28-watt T5, and for our purpose, the 54-watt T5-HO. Both lamp types are 45.8”. If you remember to specify the wattage of the T5-HO, then you only have to concern yourself with the proper color selection.

To get T5-HO performance out of a T8 fixture, the high-lumen / high-performance lamps are usually specified. These lamps provide more lumens (approximately 15% more than standard 700 series lamp) without drawing any additional watts; providing the highest lumens per watt of any fluorescent lamp. Couple these lamps with a high ballast factor

ballast to safely overdrive the lamp's output another 12-15%. With this lamp and ballast combination you will have a fixture capable of producing 3658 lumens per lamp. The 700 series lamps are as common today as the T12 lamps were yesterday. Their price is very low and they can be found in most hardware and DIY stores (Home Depot, Lowe's, etc.). The higher performance T8 lamps, and for that matter, the T5-HO lamps, are only going to be stocked by lighting and electrical distributors. Keep in mind; a well-stocked distributor may stock all of the lamp types we spoke about earlier, so be specific about what you want.

Re-Lamping and Attention to Detail

When it comes time to re-lamp it is important to understand that if you want the same or equal performance as the original installation, you must re-install the same type of lamp. If you had previously used the high-lumen / high-performance lamp (800 XPS series) there will be somewhere between 8-10% lumen depreciation at end of life (not counting lamp outages). If you re-lamp with the less expensive 700 series lamp you'll end up with lower lighting levels than you had prior to the re-lamp. Remember, a standard 700 series starts out with 15% less lumens as compared to an 800 series lamp. This means the chances are good that you may end up with a 5% decrease in lighting levels and still not save any energy.

What T8 Lamps Are Being Used Elsewhere in Your Facility?

We've heard several customers and specification technicians suggest standardizing on lamps for their facilities. They've chosen T8 lamps over T5-HO solely on the basis that T8 lamps are presently being used in the office areas or elsewhere in the facility. Frequently we find that the less expensive T8 lamps are being used because the purchasing department has a pre-arranged buying agreement or there is no apparent need for the additional lumen output (as well as the cost involved) delivered from high performance lamps.

Keeping the purchasing routine of replacement lamps simple should be a priority. We suggest checking with the folks who will be purchasing the replacement lamps as well as those who will be responsible for the installation. If they are set on buying what is currently under contract, or what is available, you have three choices:

1. Change the lamp specification of the new fixture to correspond with future purchases (this may change the light output of your fixture selection).
2. Try to educate the purchasing and maintenance departments on the value of new lamp types and have replacement stock added into inventory.
3. Offer fewer T8 lamp options (along with the opportunities to install the wrong lamp) and go with T5-HO.

The next points to consider are the controls and frequency of switching.

Because fluorescent lamps have instant start capability, it is often recommended that occupancy sensors be installed to maximize energy savings. Occupancy or motion sensors allow the fixture to be automatically turned on when a space is occupied and off when unoccupied.

The most commonly used T8 electronic ballasts used to overdrive T8 lamps utilize an instant start technology. These ballasts rely on an immense amount of electrical current being applied to the cathode to start the lamp, possibly contributing to lamp degradation (shorter lamp life), especially with frequent on/off cycles.

The T5-HO electronic ballast uses programmed start technology resulting in a gentler lamp start, which will provide 100,000 starting cycles without any lamp degradation. If sensors are used on fixtures supplied with T8 lamps and instant start ballasts, you can expect to re-lamp sooner than a comparable system with a T5-HO lamp and ballast system. Although a T8 lamp is less expensive than a T5-HO, any potential savings may be negated by the cost of having to re-lamp sooner than expected. Keep in mind - If the on cycles are longer or the lamps are on constantly, then the T8 lamps may actually outlast a T5-HO.

Beware!

Not all fixtures are created equal. Now that you've made the decision to use either T8 or T5-HO lamps, you need to concern yourself with performance of the fixture. A fixture that was originally designed for T12 lamps and converted to operate T8 or T5-HO lamps will probably not achieve what is expected. In order to get the most out of any lamp, the optics of the fixture must be designed for the specific lamp type. One of the things you should consider when comparing T5-HO fixtures and those that use T8 lamps is the difference in fixture size. With the same number of lamps a T8 fixture should be wider than a T5-HO fixture. The lamps are larger so the proper design should be larger.

We've provided some additional articles located in our FAQs folder for review. Checkout: **"What about heat" T5-HO Heat Issues** and **Reflector Design -"Why is it important"**.

These articles further explain the need to research your options in order to make an informed decision.

A properly designed fixture may cost more initially, but with better performance you may end up having to use fewer fixtures resulting in lower installation costs. You may also find that a better-designed fixture might provide satisfactory lighting levels with fewer lamps resulting in higher energy savings. Finally, when you have locked up all of your options, whether it's fewer fixtures with fewer lamps, the proper lamp type for your facility, and, a fixture that keeps the ballast cool, you'll end up with less replacement and maintenance costs.

Wrapping It Up!

The last part of this article relates to the number of lamps that are required to achieve your desired lighting levels. Another general rule of thumb is a 4-lamp T5-HO fixture will replace a standard 400-watt metal halide or high-pressure sodium fixture, while you will need 6 T8 lamps in the proper fixture to achieve the same results. Certainly, the T8 lamp with its various ballast types (ballast factors) will offer more options to finely tune the lighting levels along with desired savings.

Refer to another one of our articles: **Fluorescents - More with Less!**, for more in-depth detail on how lamps, ballast factors, fixture efficiency ratings, CRI and S/P Ratios figure into the equation.

When the time comes to make your decision, ask around to find out what others are doing and how well it has worked for them. If there is still any doubt, ask for a demonstration or some sample fixtures that you can install. Even with exhaustive research and calculation, Ultimately, there is nothing as convincing as actually seeing a fixture installed and performing.