By Erik Runkle
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Correcting Problems With HPS Lamps

There are many factors that can cause a high-pressure sodium lamp to fail. Here's how to diagnose and fix the most common issues.

High-pressure sodium lamps are widely used in greenhouse production, but they require maintenance for peak efficiency. After visual inspection, many growers find that some lamps in their greenhouse either aren't operating or aren't doing so at full brightness. These lamps reduce growth and increase electric consumption. Here's a list of the most common HPS lamp failures — and a little technical savvy to diagnose and repair them.

Age

Old bulbs fail by cycling on and off. When a bulb begins to fail, it is off for about 10 percent of the time and increases to about 80 percent of off-time before it fails completely. It's easy to screw a new bulb into the fixture. HPS bulbs should last four to six years, depending on the number of on/off cycles and hours of use.

Failed Capacitor

The second most common failure is the capacitor. If screwing in a new bulb does not solve the problem, the lamp must be taken down and disassembled. If the capacitor is enlarged, it has failed and needs replacement. Capacitors also can partially fail. Here, the fixture starts and runs continuously but comes up to only 10-60 percent of its maximum brightness. HPS fixtures with a partially failed capacitor have a lower light output, a lower power factor and reduced efficiency. Five to 10 percent of the HPS lamps we've purchased in the past 25 years have had partially failed capacitors. This partial failure is not always visually apparent, and lights continue to function at reduced efficiency for extended periods of time.

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HPS lamps may be dim if the supply voltage is low. First, ensure that the lamp is receiving the desired voltage. If it is, use a meter capable of measuring the power factor of the lamp, such as the Kill-A-Watt meter (about $30). This meter must be connected in line with the lamp, and the light should be at full brightness before you take the measurement. The power factor of a normally functioning lamp with a new bulb is 0.97 to 0.98. Fixtures with bulbs nearing the end of their lifetime have power factors of 0.90 to 0.94. Fixtures with partially failed capacitors have a power factor of 0.70 to 0.80.

Confirmation of a partially failed capacitor can be made by measuring it with a capacitance meter ($20 to $80). This failure cannot be measured with a standard volt-ohm meter. In our experience, the partially failed capacitors have 50 percent of their rated capacity (13 microfarads instead of the normal 26).

The lifetime of a capacitor depends on how often the lamp is started and the temperature of the capacitor (the warmer the temperature, the shorter the lifetime). New capacitors are about $25.

Failed Ignitor

A less common problem is failure of the ignitor. Metal halide lamps do not require an ignitor to start, so the test for a failed ignitor for an HPS lamp is to screw in a metal halide bulb of the same wattage and see if it starts. If the MH lamp starts and a new HPS lamp does not start, the ignitor probably needs to be replaced.

Defective Ballast

If a new bulb, ignitor, and/or capacitor do not make the fixture work, then the ballast is probably defective. Ballast replacement kits cost $130 to $150, and it can be cost effective to replace the ballast rather than purchase a new lamp. It takes the same amount of time to replace the ballast as it does to replace the capacitor (40 to 60 minutes to take the lamp down, replace the components and rehang).

If you've invested in the lamps, you should be sure they are running effectively. Be sure to cut off power to the lamps before working with them for safety reasons. If you're not electrically inclined, work with your lighting manufacturer or an electrician to diagnose problems and replace component parts. GPN

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