



## Minnesota Fact Sheet 670 Lighting System Improvement

### Purpose

The purpose of this practice is to implement improvements to reduce or improve energy efficiency of on-farm energy use.

### Installation

Agricultural facilities are often high moisture, dusty environments. Lighting fixtures installed in these facilities should contain appropriate moisture or dust resistant features in order to withstand the conditions where they are used.

### Fluorescent Lighting

#### Compact fluorescent

Compact fluorescent bulbs use about 25% less energy and have a longer life than incandescent bulbs. They are designed to be compatible with traditional incandescent fixtures, so replacing incandescent bulbs with more energy efficient compact fluorescent lamps may consist of simply switching the bulbs if the existing fixture is appropriate for the conditions where it is installed.



#### Linear Fluorescent

Note: The numeric value in the tube designation for linear fluorescent lamps (T12, T8, T5, etc.) refers to the diameter of the lamp in eighths of an inch.



T12 fluorescent lamps are older technologies that do not perform well at colder temperatures. They also tend to decrease in light output more over time than newer fluorescent lamps (lower lumen maintenance).

Newer linear fluorescent lamps are more energy efficient, have longer service lives, and are capable of operating at lower temperatures with less flicker and quicker startup times.

#### T8 Linear Fluorescent

T8 linear fluorescent lamps are smaller in diameter than a T12 lamp but they utilize the same size ballast, meaning that existing T12 fixtures can be retrofit to accommodate T8 lamps.

#### T5 Linear Fluorescent

T5 lamps are the newest linear fluorescent technology. They have the longest service life and maintain the most constant light output over that service life (higher lumen maintenance). T5 lamps require a different size ballast than a T12 or T8 lamp, so they cannot be retrofit into an existing T12 or T8 fixture.

### Light Emitting Diode

LED lighting is among the most energy efficient, using only 15% the energy of an incandescent light. It has a very long service life and can operate effectively at low temperatures, but they can be sensitive to heat and can experience light dimming or color change as they age.

#### LED Bulb

LED bulbs are designed to be compatible with incandescent fixtures and can be installed in existing incandescent fixtures as long as they are appropriate for the conditions where they are located.



### **Linear LED**

Linear LED lighting is often installed as a replacement to linear fluorescent lighting. They are typically used as low bay lighting where ceilings are less than 12 feet in height.



### **LED Flood**

LED flood lights are intended as a more energy efficient alternative to traditional flood lighting systems.



### **High Bay LED**

High bay LED fixtures have higher light output than low bay lighting fixtures. They are typically used with ceilings over 12 feet in height.



### **Pulse-Start Metal Halide**

Pulse-start metal halide lighting is more efficient than metal halide lights with faster warm up time and lower operating temperatures. Pulse-start metal halide lamps are not compatible with metal halide fixtures.

