

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.

Illuminance level recommendations are provided in ASAE EP344.4, Lighting Systems for Agricultural Facilities. A copy of the standard can be purchased from the American Society of Agricultural and Biological Engineers website at <http://elibrary.asabe.org/>

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. In some cases it may be possible to install linear LED lamps

in existing linear fluorescent fixtures, but a retrofit kit may be required. Linear LED lighting is typically used in areas where ceilings are less than 12 feet in height and where lighting level requirements are lower.



Low Bay or General LED

Some examples of general LED lighting fixtures include wall mounted LED wall pack fixtures or low intensity flood or ceiling mounted fixtures. Low bay lighting is typically used when ceilings are 20 feet or less in height and usually have a diffuser mounted to the bottom of the fixture that serves to spread light over a large area.



High Bay LED

High bay lighting is typically used when ceilings are more than 20 feet in height and where fixtures are mounted at the ceiling height instead of being suspended down to a lower level. High bay fixtures usually have an aluminum or mirror-like reflector which directs light downwards to the floor area or a prismatic reflector to spread light over larger areas. These are needed to ensure that the light reaches floor or working area level where it is needed.



LED Flood

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



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.

