



Fact Sheet



Commonwealth of Pennsylvania • Department of Environmental Protection

COMPACT FLUORESCENT LIGHT BULBS

Energy and the Environment

Lighting accounts for 20-25 percent of the electricity used in the United States and 30-50 percent of the electricity used in commercial buildings. Electricity generation is the largest source of carbon dioxide emissions, a greenhouse gas.

What is a Compact Fluorescent?

A compact fluorescent lighting system has two components: the bulb and the ballast. The ballast starts the bulb and maintains its operation. The bulb - just as it sounds - is a small-diameter fluorescent, folded for compactness. The compact size of these bulbs allows them to screw into common electrical sockets, making them an ideal replacement for incandescent bulbs.

Why use compact fluorescent bulbs?

Energy Savings

A standard incandescent light is very inefficient because much of the energy it uses is turned into heat instead of light. A compact fluorescent bulb turns more of its energy into light and less into heat. In fact it uses 75 percent less energy than standard incandescent bulbs. A 15-watt compact fluorescent system can supply the same amount of light as a 60-watt incandescent bulb. The reduced energy consumption prevents pollution from electricity generation.

Quality of Light

The quality of light produced by a compact fluorescent is comparable to that of the incandescent bulb. There is no flicker or hum with a compact fluorescent -- characteristics that are generally associated with fluorescent lights.

Lifetime

Compact fluorescent bulbs last 10 times longer than standard incandescent bulbs. Compact fluorescents are rated for 10,000 hours and incandescents are typically rated for 1,000 hours. If you have a bulb that is on eight hours a day, a compact fluorescent will last 3.4 years. If a standard incandescent were used, it would have to be replaced 10 times.

Application

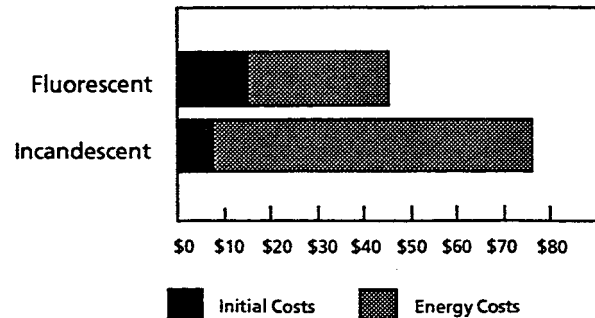
Compact fluorescents can replace the two common types of incandescent bulbs: the pear-shaped bulb and the flood bulb. The following provides examples of wattage ratings for comparable light output:

Incandescent	40w	60w	75w	100w
Fluorescent	9w	15w	20w	27w

Cost

A compact fluorescent system usually costs between \$7 and \$28, depending on the large range of features. (See the "Specifications" section.) The relatively high initial cost is recovered after only one year of operation (when used eight hours every day), and further savings are achieved over its lifetime. The following comparison shows the total cost (energy and bulb) of operating an incandescent and compact fluorescent bulb for eight hours a day for 3.5 years.

Overall Cost Comparison



Additional Savings for Commercial and Institutional Buildings

Compact fluorescents generate 75 percent less heat than standard incandescent bulbs. This will greatly reduce the cooling load in buildings with air conditioners. Also, the 10-fold increase in bulb life significantly reduces labor costs for bulb replacement.

Specifications

Magnetic or Electronic Ballast

Magnetic core and coil ballasts are the least expensive options, but they have some disadvantages. There will be a slight delay before the bulb strikes, especially in lower than normal room temperatures. Magnetic ballasts also are heavier, so they could be inappropriate for floor lamps because they would make the lamp top-heavy.

Electronic ballasts represent the latest in lighting technology. They are lightweight and allow the bulbs to light almost instantaneously. They may cost more, but since they use less energy, the higher cost is more than recovered during their lifetime.

Reflectors, Lenses and Other Enhancements

Compact fluorescents can come equipped with reflectors to control the beam spread and/or with lens covers to diffuse the light. They also are available in a variety of colors. The growing popularity of the compact fluorescent has led to an increasing variety of fixtures designed specifically for them. As the market demands adaptation for a variety of existing fixture types, new configurations of bulbs and ballasts are being introduced. New products include shorter bulbs and ballasts that are shorter, narrower or offset to the side of the bulb.

Modular or Integrated

Modular units have two separate components: bulbs and ballast/adapters. Bulbs typically last 9,000 operating hours (approximately 3.4 years if burned 8 hours per day), while the ballast can last 10 years. Modular units save money over time because bulbs can be purchased at one-third the cost of the entire system. Adapters also can be hard-wired in place thereby preventing the possibility of switching back to more costly incandescent.

Integrated units have a combined bulb and ballast. When the bulb dies, the whole unit must be replaced.

Some Words of Warning

Dimming Circuits

The compact fluorescents available today cannot be operated safely on standard dimming circuits. The

dimmer must be replaced by a standard switch before compact fluorescents may be installed.

Recently, dimmable compact fluorescent bulbs have been introduced on the market. However, they require special dimming controls.

Different Shape

Some compact fluorescent bulbs may be longer than traditional incandescents because they need a ballast and because of the unusual lamp shape (long, folded tubes). Be sure to measure the fixture (length, width and depth) before you buy a compact fluorescent.

Operation Outdoors or in Cold Temperatures

While compact fluorescents function efficiently in an enclosed heated space, most are not designed to operate outdoors or in cold indoor temperatures. Typically, electronically ballasted compact fluorescents work in colder temperatures.

Delayed Startup

Even under ideal operating conditions, bulbs with magnetic ballasts may take a second or two to turn on, and they might flicker initially. Electronic ballasted units will come on instantly, with no flicker. Also, compact fluorescent bulbs may require two to three minutes to achieve full light output.

Where to Buy Compact Fluorescents

All major light bulb manufacturers have a line of compact fluorescents. Their availability has greatly improved over the last few years. Compact fluorescents are available at home improvement, grocery and department stores as well as at commercial light bulb supply outlets.

For more information about pollution prevention approaches contact:

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