

# Lamps

Commonly known as “light bulbs,” electric light sources are called “lamps” in this book to conform to the lighting profession’s convention. Lamps discussed in this chapter are organized into three groups: Incandescent, Fluorescent, and High-Intensity Discharge. Within these groups, the following information is given for each type of lamp: Qualities – Color and Light Output; Energy and Cost – Wattage, Efficacy, Life, Cost, and Where to Buy; Use – Installation, Luminaires, Controls, and Cautions; For more information – Designs and Other Lamps. These categories of information are explained below. Use them to compare different lamps. The tables give specific data about the various lamps.

The introductory section for each lamp type describes the directionality of the lamp; some lamps focus their light output in a specific direction. Reflector lamps are directional. Others are nondirectional or diffuse and emit light uniformly in all directions. The common A-lamp is a nondirectional lamp.

## Qualities

**Color:** Some lamps appear “warmer” than others, as explained in the People, Energy, and Light chapter. Lamps also vary in how well they render color in homes. Residents are most accustomed to the warmth and excellent color rendering of incandescent lamps. When selecting lamps, be sure to evaluate correlated color temperature (CCT) and color rendering index (CRI).

**Light Output:** The total amount of light emitted by a lamp is measured in lumens. Lamps differ in light output. They also differ in the rate at which light output decreases as the lamp ages, a phenomenon called lamp lumen depreciation. A light output rating on a lamp’s package is the initial light output rating before the decrease begins. Use lumens to compare the light output of lamps that have similar distributions. The tables in this chapter include the light output for different kinds of lamps.

## Energy and Cost

**Wattage:** The rate at which power is used by a lamp is measured in watts. Energy use and cost are directly related to the wattage and hours of use of a lamp. A lower-wattage lamp will use less energy than a higher-wattage lamp that is operated for the same amount of time. Lamp wattages can be found on the lamp itself and on its packaging; actual wattages for lighting systems that use fluorescent and high-intensity discharge lamps will vary from the listed wattage due to the additional watts that are consumed by the ballast. Low-voltage lamps also require slightly more watts than that which is stated on the lamp or package due to transformer losses.

**Efficacy:** Some lamps produce more lumens for each watt of power than other lamps. High-efficacy lamps consume less energy than low-efficacy lamps of equal light output. Use efficacy ratings, listed in lumens per watt, to identify lamps that more effectively convert the energy you pay for into light.

**Life:** Some lamps can last more than 20 times longer than other lamps. The lamp life listed on a package is the average rated lamp life. Actual lamp life will vary and can be influenced by the lamp’s operating temperature, starting method, operating cycle, and operation on dimmers.

**Cost:** The purchase price of lamps should be considered, along with the energy cost of operating the lamp and the frequency of lamp replacements.

**Where to Buy:** Some lamps are commonly available in supermarkets, discount department stores, or hardware stores. Others must be purchased through electrical suppliers or lighting stores. Many energy-efficient lamps are offered through mail-order catalogs and electric utility promotions.

## Use

**Installation:** Lamps are designed for a particular type of socket and may not always be interchangeable with other lamps. Some lamps require ballasts or transformers. Due to the differences in size, performance under different temperatures, light output, and light distribution, some lamps are preferable for certain installations.

**Luminaires:** Proper performance of a lamp depends upon its use in a compatible luminaire.

**Controls:** Some lamps are more easily dimmed or switched than others. See the Controls chapter for more information.

**Cautions:** Lamps in certain applications can present problems such as noise, fire hazards, lamp failure due to temperature or moisture, or interference with electrical devices.

For more  
information  
refer to

**Designs:** Most lamp types are used in several of the designs in this book. Refer to the listed designs to see an application of the particular lamp type.

**Other Lamps:** Several lamp options may exist for an application. Consider the other suggested lamps for possible improvements in energy efficiency or light quality. Lamps are listed in the order in which they appear in this chapter.