

Lay of the Land in Lighting Today

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How many (fill in the group of your choice) does it take to change a light bulb? The answer in most variations of this popular joke form is: not many – unless we choose to add layers of social or political complexities to what is essentially a simple task.

Or is it such a simple task?

Whenever a light bulb burns out, most people might just replace it with an identical, or at least a similar, bulb. But is that really the best choice? Would a different type of bulb do the job better? And do it at less cost?

Like it or not, we live in an era of fast-changing technology, an age when even a light bulb isn't "just a light bulb" anymore. Check out any architectural/interior design magazine or lighting catalogue, and you'll find all sorts of exotic-sounding lighting options. In this article I offer a survey of the main categories of lamps now on the market and describe their general characteristics. Let's begin with a few definitions to make sure that we're all starting on the same page.

What most people call a light bulb is, to a lighting professional, a *luminary*, or more plainly, a *lamp*.



What most people call a lamp is a lamp holder or fixture. The amount of electricity consumed by a lamp is measured in *watts*.



The amount of light given off by a lamp is measured in *lumens*. The ratio of wattage to lumens is called *efficacy*. A high-*efficacy* lamp is energy-efficient in that it

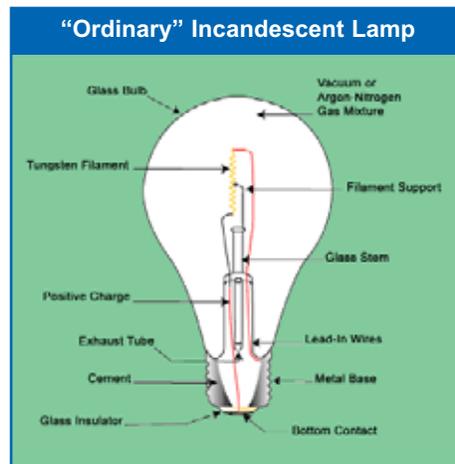
gives off a relatively larger amount of lumens for a given amount of electricity consumed.

There are three main categories of luminaries, or lamps:

1. Incandescent
2. Fluorescent
3. High Intensity Discharge (HID), including Sulphur Lamps
4. Light-Emitting Diode (LED)

Incandescent Lighting

The now-common, ordinary incandescent lamp – that which Thomas Edison wrought – consists of a metal (nowadays always tungsten) filament inside a glass envelope filled with an inert gas (probably argon, possibly krypton); an electrical current passing through the filament causes it to heat and glow. Though they are both familiar and widely available, standard incandescents are also lamps of relatively low efficacy.



A more energy-efficient form of incandescent lighting is the modern halogen (also called *quartz*) lamp. In construction this type uses halogen gas and requires a smaller and harder glass envelope made of quartz to withstand its higher operating heat levels. Halogens give off a "whiter"

Example of Halogen "Quartz" Lamp



light than standard incandescents, which have a "yellow-ish" cast. Since whiter lights render colors closer to the way we see them in daylight, halogens are said to produce "a better-quality light."

Fluorescent Lighting

A fluorescent lamp consists of a gas-filled glass envelope with an internal coating of phosphors that glows when ignited by filaments at both ends. Fluorescents are far more energy efficient than incandescents, and the lamp life of fluorescents is much, much longer. While the long, straight tube is still its most common form, fluorescents now come in many sizes and shapes, including compact fluorescent lamps with built-in ballast and a threaded base that can be screwed into standard lamp sockets.

Much has been achieved in recent years to generate a "better quality" light from fluorescents, most notably through a new

Examples of Compact Fluorescent Lamps



technology called *triphosphor* that produces a “whiter” light that many regard, at least, as good, if not better, than halogen.

High Intensity Discharge (HID)

High Intensity Discharge (or HID) lamps currently fall into three distinct groupings, with a fourth now emerging on the lighting horizon. The first of these groups consists of high- and low-pressure *sodium* lamps whose claims to fame include high efficacy and long-life. The quality of their light, however, leaves much to be desired. While they are commonly used in highway and parking-lot lighting, low-pressure sodium lamps give off that yellowish light in which it is very nearly impossible to recognize colors. High pressure sodiums produce a somewhat whiter light, especially the newest kind called *white sodium* which produces a light of sufficient quality to be usable in indoor lighting situations.

The second HID grouping is the *mercury vapor* lamp now used in roadway, industrial, and commercial applications. While long-lived, mercury vapor lamps are not as efficient as other HID types and, owing in part to government pressure, they probably will not be developed further.

The third HID type, *metal halide*, not only boasts good efficacy and long-life but also high quality light. When metal halide first came on the market, however, it suffered from a tendency to color shift with use. Now, however, advances in technol-

ogy have brought forth a new generation of metal halide for general use that outperform even halogen in efficacy, lamp life and light quality.

Sulphur Lamps

Finally, let me mention what is potentially the most exciting new HID type of them all: *sulphur lamps*. Notwithstanding their unappealing name, this cutting-edge lamp type may revolutionize the lighting industry. About the size of a quarter and sitting on a glass stem, each sulphur lamp is capable of producing the equivalent of a bank of stadium lights and will burn for about four years. Sulphur lamps (also called *solar reactor lamps*) have no filament and use a microwave ballast. At present the one significant drawback of the sulphur lamps are that they require special fixtures and are not easy replacements for other light types. However, sulphur might allow the optimum development of *fiber optic* lighting systems.

Light-Emitting Diodes (LEDs)

Light Emitting Diodes or LED's as they are more commonly known, although

Example of Metal Halide



Example of HID Lamp



Examples of LEDs



discovered in the 1960's are now just coming into use as an interior luminary.

For more detail see our article on LEDs.

I hope I've given you a sense of the “lay of the land” in lighting today. Please check our web site (www.RichArtCo.com) in the months ahead when we'll return to these and many other lighting topics. Thank you. See you again soon. ■

About the Author

Bill Joel received his B.A. from Brown University with creative design courses at the Rhode Island School of Design. He did further studies in interior and lighting design at the New York School of Design and Pratt Institute.

A professional member of AID-ASID from 1963 to 1993, Bill received a Fellowship from ASID in 1978. In 1992, he became one of the first Certified Interior Designers of the Commonwealth of Virginia. His work experience includes residential, commercial and institutional remodeling and new structures, as well as a number of feasibility studies, all with an emphasis on effective, energy-conscious, quality-lit environments. For more details, consult *Marquis Who's Who in America*. Bill has also served as a member of the FIDER Board of Visitors and Accreditation Committee, Foundation for Interior Design Education and Research; set and lighting designer for the Richmond Forum and Barksdale Theatre; and guest speaker on various radio and TV spots. Bill may be reached at Rich@RichArtCo.com.