

Industrial Buildings and Plant Layout

adequate shielding of the bright light source

- “Rough service” and “vibration service” lamps are special types that find considerable application in industry. Rough service lamps (in sizes from 25 to 500 watts) are made with extra filament supports to withstand mechanical shocks. One of the principal applications is for use on extension cords. Vibration service lamps (in sizes from 25 to 150 watts) are made with a flexible filament support for use where vibration would cause early failure of general-service lamps. Vibration and shock frequently accompany each other, sometimes only experiment will determine the better lamp for the purpose. Lower-voltage lamps, generally operated from transformers, are much more resistant to both shock and vibration than standard-voltage types. Shock- and vibration-absorbing socket mounts, utilizing a coiled spring or other flexible material to dampen vibration, have been employed where general-service lamps are used under conditions of severe vibration.

- “Extended-service” lamps are designed to produce approximately two to three times the normal rated life. Available for both regular and high voltage circuits in almost all wattage ratings, they are recommended for use where the cost of lamp replacement is high and cost of power is low. Otherwise their reduced efficacy makes it more economical to use a lamp of standard design.

- “Thermal shock resistant” or “special-service” lamps are available in various wattages and bulb shapes. They are recommended for use in applications where moisture may fall on the hot bulb.

- Quartz-iodine lamps employing iodine to keep the tubular envelope free from blackening have extremely good lumen maintenance in the order of 97 per cent over a life of 2000 hours or more. These lamps are made in a variety of sizes from less than 50 watts to 1500 watts. The small linear shape of the lamps enables the luminaire to provide excellent beam control in the plane perpendicular to the lamp axis. Quartz incandescent lamps resist thermal shock.

- “Standard-voltage general-lighting” lamps are designed for use on nominal 120-volt circuits. Lamps designed for 115, 125, and 130 volts are available.

- “High-voltage general-lighting” lamps for 230 and 250 volt circuits are available in wattages from 100 to 1500. Some types are available in 260, 277, and 300 volt design. High-voltage lamps necessarily have filaments that are less rugged, require more supports and are considerably less efficient than those of equal wattage 120 volt lamps.

- “Infrared” lamps are available in various types and sizes up to 1000 watts. These lamps are used in baking, drying, and heat processing, as well as for therapeutic purposes. They also have fire protection value: a great amount of heat can be exchanged without flame. Such lamps cannot be used in hazardous location applications.

Fluorescent lamps. The fluorescent lamp is an electric discharge source in which light is produced predominantly by the fluorescence of phosphors activated by ultraviolet energy from a low-pressure mercury arc. The lamp requires a ballast to limit the current and in many instances to transform the supply voltage to a suitable level. Lamp performance is influenced by the character of the ballast and luminaire, line voltage, ambient temperature, burning hours per start, and air movement.

Fluorescent lamps vary in efficiency from approximately 30 to 80 lumens per watt, for lamps of standard cool-white color, depending on bulb size and shape (Lamps range in size from 6 to 96 in. long). This does not include power losses in the ballast, typically in the order of 20 per cent. While most fluorescent lamps are of conventional tubular design, there are some special types such as circular reflectorized, jacketed and panel-shaped.

Fluorescent lamps are available in many different shades of white and in a number of colors. “Standard cool-white” is most popular for industrial lighting because of its cool appearance, even though it is not quite as efficient as “standard warm-white.” “Daylight” and “white” are also used considerably for industrial lighting.