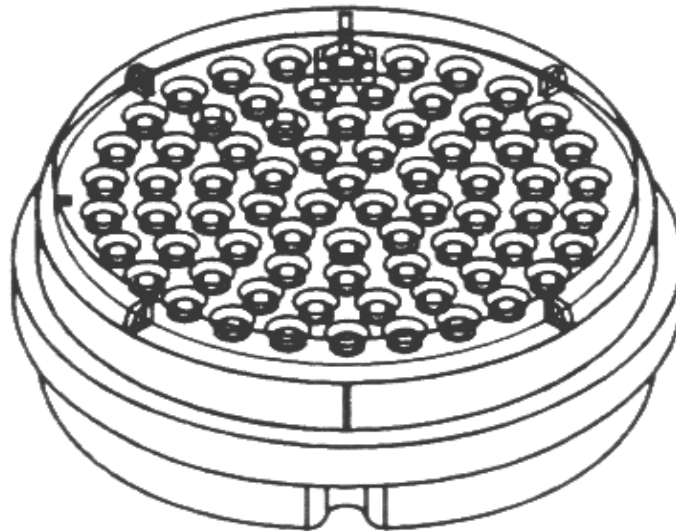


What is an LED and how does it work?



LED traffic signal head

A light-emitting diode (LED) is a semiconductor device that uses solid-state electronics to create light. An LED light source (or diode) consists of a layer of electron rich material separated – by a junction – from a layer of electron deficient material. Both sit on a semiconductor base. Power applied in the junction excites the electrons, which in turn emit photons of light. The color composition of the light depends on the chemical composition of the layers.

These diodes are then packaged in a form suitable for use in traffic signals. A single diode may be combined with a reflector (to focus the light) and a clear protective epoxy lens. Anywhere from 18 to 300 or more of these "lamps" can be packaged in an array for use in a signal head (shown above).

In contrast, incandescent lamps produce only white light, which must be filtered for use in traffic signals. Incandescent lamps also produce a considerable amount of light outside the visible spectrum, which is emitted in the signal head as heat. All of the above factors make incandescent lamps an inefficient method of producing light for traffic signals.

The above material was excerpted from *A Market Transformation Opportunity Assessment for LED Traffic Signals* by Margaret Suozzo of ACEEE (1998).