

# Five Things Every Engineer Should Know About LED Indication

When selecting the right LED Indication for your application, choose a company that has an extensive line of solutions and options that will support your application requirements. LED Indication may appear simple; however, an inferior product could affect your reputation and go-to-market schedule.

## 1. All Light Pipes are not created equally.

A Light Pipe is characteristically defined as a solid transparent plastic rod or an optical fiber used for transmitting light. The two most common categories of LED Light Pipes are Rigid and Flexible Light Pipes.

**Rigid Light Pipes** are available in many configurations including vertical, right angle and multi-levels and are designed to move light shorter distances up to 3 inches. Overall, Rigid Light Pipes are an economical way to move light from an LED to the indication area on the front panel, when direct access is available.

**Flexible Light Pipes** consist of an adapter, which provides less light bleed, and a flexible optical fiber with a lens cap and are designed to move light greater distances. Flexible Light Pipes are priced higher than Rigid Light Pipes; however, they solve accessibility challenges for Engineers. They give engineers the flexibility to bypass components on the printed circuit board (PCB) that prevent a straight-line access to the indication area on the front panel.

## 2. Product selection is more than aesthetics.

Indication can be seen on the outside of your panel, so you should choose a manufacturer that offers a wide range of options. Lenses can be available in various diameters and in wide range of shapes including round, square, dome and flat. Choosing the correct product can be determined by environmental conditions like temperature fluctuations or high vibration environments. For example, factors like dust and moisture may require an IP67 Rated product.

## 3. Mounting options are critical.

There are various mounting options for light pipes depending on your application and manufacturing requirements.

**Press Fit** Rigid Light Pipes mount through the front panel leaving the lens exposed on the outside.

A press fit light pipe does not connect to the PCB. The light pipe hovers directly over a surface mount (SMD) LED, which channels light to the lens on the panel.

**Board Mount** Rigid Light Pipes have pegs on the bottom that fit snugly into holes on the PCB. The light pipe base fits over a separate SMD LED that is also attached to the board.

**Surface Mount** Flexible Light Pipes are mounted directly to the PCB and have a SMD LED built into the adapter. The optical fiber and lens can be either front mounted from the outside of the panel or rear mounted from the back.

**Through Hole** Flexible Light Pipes have lead on the bottom that fit through holes on the PCB. The optical fiber and lens can be either front mounted from the outside of the panel or rear mounted from the back.

*“Choosing the correct product can be determined by environmental conditions like temperature fluctuations high vibration environments.”*

#### 4. Understand your LED options.

Through hole LEDs are mounted by inserting leads through the PCB and soldering to provide a stronger connection between layers, which also can withstand some environmental stress conditions. Surface mount LED is technology designed to be smaller, brighter, and are mounted on the surface of the PCB. Both through hole and surface mount LEDs are available in a wide range of sizes, colors, luminosities and lower power wattage. Ultra violet and infrared LEDs have practical applications in security, sterilization, cleaning and herpetology applications.

**Sizes** Through Hole LEDs are sized in millimeters (1.8mm, 3mm, 5mm) and surface mount LED are based on industry standard sizes. For example, an 0402 package (SM0402) is based on approximate dimensions (length × width) at roughly 0.4mm long by 0.2mm wide.

**Colors** Through Hole and SMD LEDs are available in a wide range of single colors. Surface Mount LEDs have additional options, including white or single, bi-color and tri-color, in an array of color configurations.

**Intensity** Through Hole and Surface Mount LED light output (brightness intensity) is commonly measured in millicandelas (mcd) or lumens (lm). The higher the mcd or lm rating, the brighter the light intensity.

#### 5. How to reduce light bleed.

Light bleed occurs when light from the LED can be visible around the LED and light pipe area. This may or may not be a concern based on your application. When a Rigid Light Pipe hovers over the LED, it allows for a certain amount of light bleed at the base of the light pipe. A flexible light pipe is designed to provide less light bleed with a coated optical fiber and a light resistant black adapter.

A minimal light bleed solution that can maximize brightness is the [LPR & LPV Rigid Light Pipes](#). They are available in right angle and vertical configurations, in a wide range of sizes and style options. This offers engineers a cost-effective solution that is easy to install and provides zero light bleed at the adapter base.

Go to [bivar.com](http://bivar.com) for more information or contact us at [Sales@Bivar.com](mailto:Sales@Bivar.com) if you have any questions.

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