

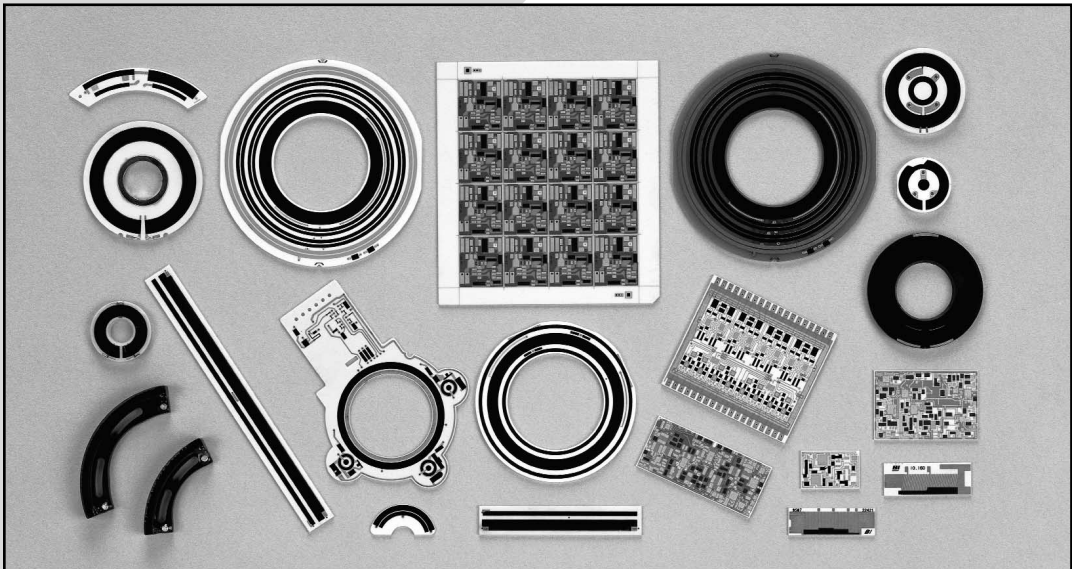
## SCREENED SUBSTRATES

### SPECIAL POTENTIOMETER ELEMENTS

BI Technologies has developed a portfolio of resistor element technologies to meet customer requirements. These include the application of high temperature ceramics and highly stable conductive plastic materials to produce elements of exceptional quality and precision.

### THERMOSET PLASTIC SUBSTRATES

- May be molded to produce a complete finished part with excellent dimensional accuracy and a high quality surface finish.
- Are typically used when the application requires a thick substrate or when indentations or recesses are deep.



The following is a summary of the element technologies that can be used in various potentiometer applications.

### SUBSTRATE MATERIALS

Substrates can be manufactured from either high quality thermoset plastics or from electronic quality ceramics.

- May be used to produce through holes or blind holes.
- May be used to produce transverse holes.
- Will accommodate supplemental machining operations.
- Will accommodate either insert molded or subsequently attached terminals.

### CERAMIC SUBSTRATES

- Will permit high service or operating temperatures.
- Exhibit high thermal conductivity.
- May be pressed and fired to shape or may be laser machined to shape from prefired alumina sheets.

Pressed and fired substrates have the following qualities:

- Produce a part of good dimensional and surface quality.
- Accommodate supplemental laser machining.
- Can be fired with features above or below the substrate surface.
- Accommodate the creation of accurate through holes and blind holes.
- Accommodate the creation of holes with internal features.

Laser machined substrates have the following qualities:

- Accommodate the creation of irregularly shaped substrates.
- Holes may be located and drilled with high accuracy.
- Internal cutouts can be achieved.

#### **RESISTIVE AND CONDUCTIVE FILM MATERIALS**

The resistive and conductive films applied to the substrate may be either conductive plastic or cermet materials. The following discussion highlights some of the features and advantages of these two classes of materials.

#### **CONDUCTIVE PLASTIC FILM MATERIALS**

- Highly versatile and may be used on either plastic or ceramic substrates.
- Excellent for long potentiometer life due to a smooth surface.
- Can be used to obtain a wide range of resistances.
- Good choice when low cost is important.

#### **CERMET FILM MATERIALS**

- Will withstand high service temperatures.
- Exhibit good stability in high power dissipation applications.
- Can be used to obtain a wide range of resistances.

#### **SCREEN PRINTING AND ADJUSTING THE ELEMENT**

The application of the film materials to the substrate is accomplished by a precision Screen Printing process. After printing, the element may be trimmed to meet customer requirements for precise value, best linearity, or other special characteristics. Some of the special functions that BI Technologies can produce by means of precision Screen Printing and Trimming are:

- Linear and Continuous Non-linear functions.
- Two or more Sloped functions.
- Stepped functions.
- Sine, Cosine, and Special Logarithmic functions.
- Multiple Tracks.
- Special Taps for Voltage or Current.
- Multiple film Screening.
- Optimum Linearity.
- Accurate Resistance value.

#### **OTHER STEPS IN ELEMENT FABRICATION MAY INCLUDE:**

- Shaping of the substrate to meet mechanical requirements.
- Attachment of special terminals.

BI Technologies has over 30 years of experience in providing solutions to tough customer problems. Please don't hesitate to call our applications engineering group for assistance in developing a special substrate to meet your requirements.