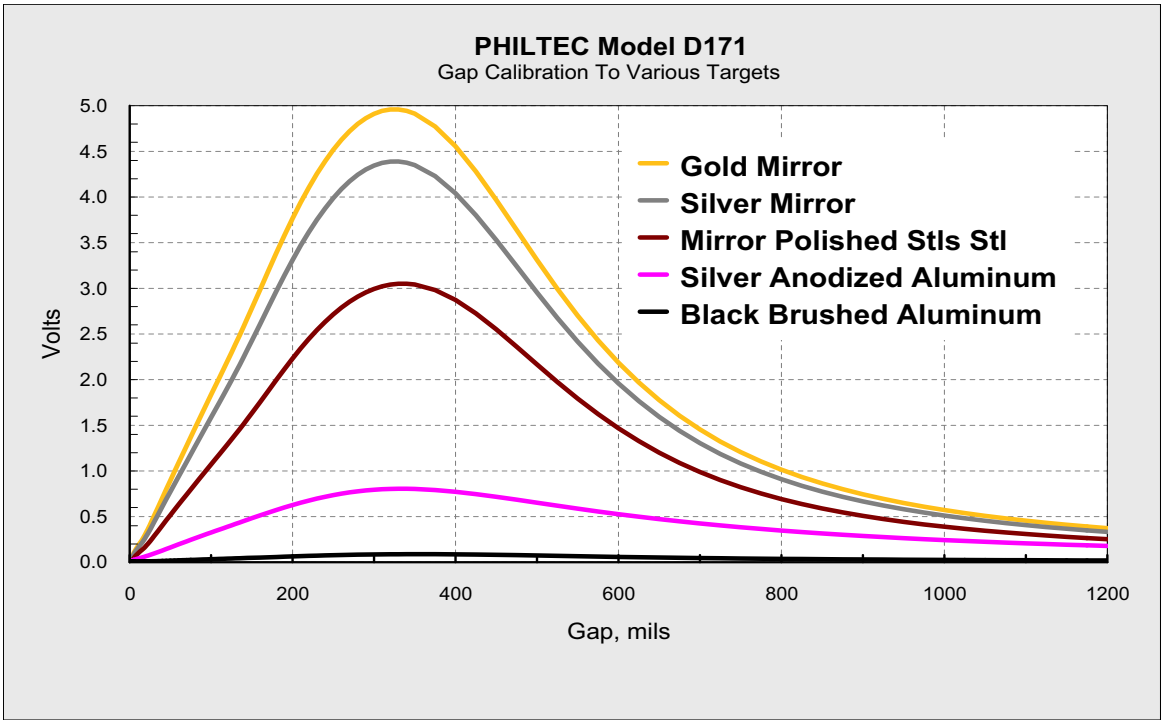
Philtec Application Note Vol. 6, No. 24

July 2004

# Reflectance Dependent (D) Sensors

With **REFLECTANCE DEPENDENT** fiberoptic sensors, the output is proportional to the distance between the sensor tip and target surface **AS WELL AS** the reflectivity of the target.




| TARGET | % REFLECTANCE |
|---|---|
| Gold Mirror | 100 |
| Mirror Polished Aluminum | 85 - 90 |
| Mirror Polished Stls Steel | 60 - 70 |
| Brushed Aluminum | 40 - 50 |
| Copper Clad PC Board | 45 |
| Matte Finish Aluminum | 30 - 35 |
| Anodized Aluminum | 20 - 25 |
| Silver Paint, Glossy | 15 - 20 |
| Inkjet Paper, Bright White | 8 |
| Fiberglass, Glossy | 7 |
| Black Plastic, Glossy | 6 |
| Black Matte Finish | 3 |
| Flat Black Rubber | 1 |

## REFLECTANCE DEPENDENCE

The effect of changing target reflectance is to shift the output voltage higher or lower. With Philtec's D model sensors, a gain adjustment is provided to scale (calibrate) the sensor to the present target surface. This is accomplished by setting the peak voltage level to full scale: 5.0 volts. The factory supplied calibration can then be applied to perform precision linear displacement measurements on most materials.

The reflectivity of some common materials are shown in the table.

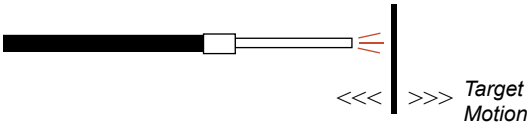
Philtec Application Note Vol. 6, No. 24

July 2004

# APPLICATIONS FOR D TYPE SENSORS

| | | | |
|---|---|---|---|
| Actuator Stroke<br>Bearing Vibration<br>Diaphragm Deflection<br>Displacement In Fluids<br>Impact & Shock Studies | Parts Positioning<br>Piezoelectric Crystal Vibration<br>Piston Registration (TDC)<br>Piston Stroke<br>Read/Write Head Tracking | Scratch Detection<br>Servo-Control<br>Solenoid Travel<br>Structural Deformation<br>Surface Finish Evaluation | Tachometry<br>Turbine Blade Vibration<br>Ultrasonic Vibration<br>Vacuum Process Control<br>Valve Dynamics & Stroke |

**Recommended for applications where the target moves parallel to the axis of the sensor...**



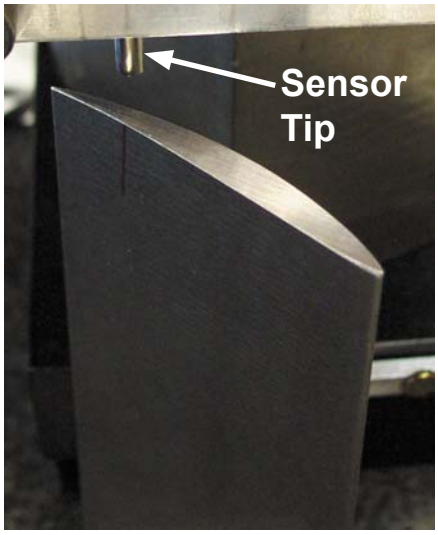

### *Single Axis Motion*

Applications for Philtec's D models are usually limited to targets having a reciprocating or vibratory motion parallel to the axis of the sensor. With that single-axis motion, the target reflectivity remains constant, and accurate distance measurements can be made.

### *Speed Sensing Applications (Tachometry)*

*Standard Machinery*

Reflectance Dependent sensors can also be used to measure rotor speeds, turbine blade rate and turbine blade flutter. They generate a fast rising pulse in response to one of two conditions:
a) a sharp change in reflectance (i.e., black to shiny) or
b) the passage of the edge of a part such as a narrow turbine blade.




*Micro-Turbomachinery*

MEMS Researchers (micro-electromechanical systems) in leading universities use Philtec sensors in their experiments. The smallest model, the D6, has been popular in this field. These sensors have been provided with bandwidths of 1 MHz and higher.