

## FBG as a Temperature Sensor

The key element to any industrial process i.e. temperature monitoring has become a major challenge. Fiber Bragg grating (FBG) sensor is suitable solution for performing measurements under extreme temperature conditions.

### ➤ Characteristics of FBG as a temperature sensor :

- It can accurately measure temperature upto a range of 650 °C .
- Temperature of multiple surfaces can be measured by connecting different FBG temperature sensors in series.
- Also it can be connected with strain sensor for temperature compensation.

### ➤ Operating Principle of FBG based temperature sensor :

Under Bragg condition, reflected wavelength is given by given equation,

$$\lambda_B = 2 \cdot \eta_{eff} \cdot \Lambda_G$$

where  $\lambda_B$  is called Bragg reflected wavelength,  $\eta_{eff}$  is called refractive index and  $\Lambda_G$  is called index modulation of grating.

The basic principle of FBG temperature sensing is the measurement of shift in peak of Bragg wavelength used to define the temperature of particular point. The interrogator is used to detect the reflected Bragg wavelength.



**Fig.** Offered FBG TS-01 temperature sensor

### ➤ Applications of FBG based temperature sensor :

- Steel Casting Industries.
- Process Industries.
- Oil & Gas Exploration Industries.
- Chemical Industries.
- Nuclear Powerplant Industries.