



HIGH PERFORMANCE PEEK™ POLYMERS

Requirements for sensor applications

The technology for sensors has become more challenging than ever before due to increasingly harsher environments, such as:

- Automotive – Higher temperature requirements
- Industry – Aggressive chemicals and abrasive substances
- Aerospace – light weight plus excellent fire, smoke and toxicity performance
- Medical – Hot steam and sterilization capabilities
- Electronics – Miniaturization
- Food processing – FDA and 3A sanitary compatibility

Key features of VICTREX® PEEK™ polymer

- High temperature resistance – has a heat resistance up to 350 degree celsius
- Excellent mechanical properties – significantly stronger impact strength and weldline strength compared with other materials
- Dielectric properties – low dielectric constant and dissipation factor at various frequency range at room temperature and elevated temperature
- Wear resistance – outstanding wear resistance coupled with a low coefficient of friction
- Compliance with RoHS – inherently flame retardant
No addition of RoHS – restricted ingredients in the manufacturing process
- Ease of processing – processing flexibility makes it ideal for use in a wide variety of applications
- Chemical resistance – excellent resistance, particularly at elevated temperature conditions, makes the material suitable for applications in the oil and gas industry
- FDA compliance – an important feature that is required for food processing and healthcare related applications

Applications

VICOTE® coated, conductive level probes in the food processing industry. Using the VICOTE coating based on VICTREX PEEK polymer the probe rod is electrically isolated from the container wall as well as from its own process attachment. The special geometry of the VICTREX PEEK polymer isolating body allows for hygienic



sealing of the sensor rod without any dead space. With this solution, it is of particular importance that the material has excellent temperature capabilities and very low creep. Here, VICTREX PEEK polymer is the optimum material, especially also due to its very good chemical resistance and FDA compliance.

During the surface coating of the probe rod, Teflon coatings such as PFA and PTFE are often used. Initially, such coatings seem to be equal to that of the VICOTE with regard to chemical resistance and FDA compliant usability. However, these coatings have merely the mechanical strength of VICTREX PEEK polymers. In the many applications within the food-processing industry however, there are abrasive components in the medium which, when used continuously, can erode softer coatings such as PFA. The VICOTE coating reveals an enormous advantage here and provides for longer service life as well as increased safety of the coating against mechanical damages when installing the probe.

VICTREX® PEEK™ polymers - the high performance material solutions for Sensor Applications

Downhole Sensor for Oil & Gas Industry

The sensor, measuring 10mm long by 3mm in diameter, was developed to withstand the hostile environment of deep drilling operations. Deep drilling equipment must be capable of operating under pressure of up to 1400 bars and have the ability to withstand the most extreme mechanical forces.

VICTREX PEEK polymer offers a unique combination of mechanical and tribological properties at the elevated temperatures found in deep drilling operations. Additional characteristics of VICTREX PEEK polymer include high rigidity and dimensional stability at high temperatures and a UL94 V-0 fire rating. It is inherently halogenfree and demonstrates very low levels of outgassing, extractable ions and wear debris.



Downhole Sensor

EGR Sensor Connectors & Oxygen Sensors

Exhaust gas recirculation (EGR) systems are installed in cars to reduce NOx emission. EGR thermal sensors are part of the system to provide accurate high temperature output in the fastest responding immersion package. The key requirements for the connector of this sensing module include high temperature (300°F and up), dimensional stability and chemical resistance to automotive fuels and solvents. The superior thermal resistance, high dimensional stability over various temperature ranges and chemical resistance of VICTREX PEEK polymer make it an ideal material candidate for this application.

Furthermore, VICTREX PEEK polymer was also used as the material in the oxygen sensor guide in the automotive exhaust system. The key merit of using PEEK is its very low outgassing as the impurities generated from VICTREX PEEK polymer will prevent the sensor from reading the correct oxygen content measured.



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