

# INVESTIGATION OF THE THERMAL DECOMPOSITION AND FLAMMABILITY OF PEEK AND ITS CARBON AND GLASS-FIBRE COMPOSITES

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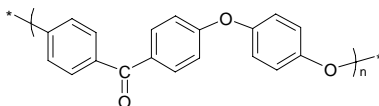
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Polyetheretherketone, (PEEK), is a semi-crystalline thermoplastic whose properties allow for the material to be successfully used a variety of applications such as in mechanical, chemical, aeronautical and nuclear industries. PEEK has a stable aromatic backbone, which makes up the bulk of the monomer unit, giving the polymer its excellent thermal properties.



PEEK has a continuous use temperature of 260°C, a melting point of 343°C and an anaerobic onset of decomposition temperature of 575°C. As a consequence of this high thermal stability, research into the flammability of PEEK and its compounds has, in the past, been limited.

The fire behaviour of PEEK-based materials has been investigated using industry standards and analytical techniques such as UL-94, Limiting Oxygen Index (LOI), Cone Calorimetry, Thermogravimetric Analysis (TGA) and Pyrolysis Combustion Flow Calorimetry (PCFC) in order to provide a detailed thermal and flammability profile of PEEK and its carbon and glass-fibre composites.

Samples of PEEK (Victrex PEEK 450G) and filled compounds containing 30% by weight carbon fibre (450CA30) and glass fibre (450GL30) have been studied using the techniques listed above. Differences in burning behaviour, in terms of scatter are noted in all techniques, with the fibre-filled composites showing enhanced thermal stability when compared to the unfilled polymer. The burning behaviour of PEEK and these two fibre-filled composites is very scenario dependent. This has been observed using a number of techniques and as a result, more is understood about the affects attributed to the presence of fillers in PEEK.