

The right material at the right place !

Using this philosophy can lead to many improvements not only in production costs and component performance but also in the ecological impact of the final product...



Each thermoplastic has its own properties and it is useful to know them in order to use the most of their specificities. Some, such as polysulfones (PSU and PPSU), can be used **at very high temperature** ranges because the biphenyl-sulfonyl group are really stable thanks to mesomerism. Thus, larger amounts of energy from heat or radiation can be absorbed by the molecular structure without causing any reactions (decomposition).

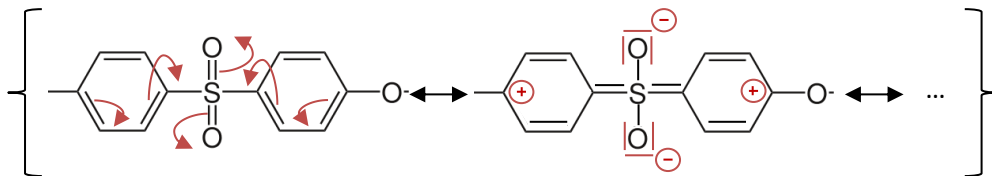


Figure 1: Explanation of the phenomenon of mesomerism in the biphenyl-sulfonyl group



Figure 2 : Liquid filling pumps made of PSU

They also have very interesting properties from a sterilization point of view because the components made with these polymers are very resistant to autoclaving. They can be **sterilized up to 1,000 times** without losing any of their properties. This property is mainly due to the polymer structure. Indeed, its sulfonyl group attracts the electrons present in the neighboring benzene rings. This electron deficiency explains the opposition of the polymer to all other electron losses and therefore its high resistance to oxidation (see figure 1). This is why we use it, for example, to make these liquid filling pumps for medical purposes.

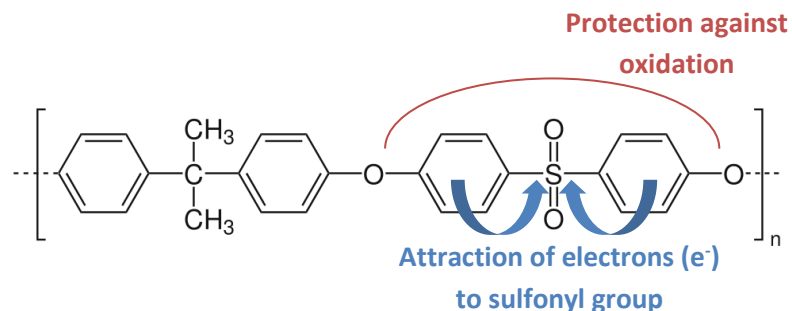


Figure 3 : Polysulfone oxidation protection mechanism

Always with a view to using the right component in the right place, overmoulding is an essential component to be taken into account. Indeed, some components only require extreme properties in certain places. By replacing the rest of the part with a cheaper, lighter and easier to produce component, the product can be improved.



Figure 4 : Aeronautical component with overmolded inserts

This is the case, for example, of components for the **aeronautics industry**. Inserts manufactured in collaboration with Dedecker Precision Mechanics are overmolded on trapdoors made of carbon fibers-filled resin based on aircraft wings.

This new component makes it possible to replace a 100% metallic component while keeping the same properties. Therefore, there is a direct impact on the final weight of the part.

In another case, the R&D engineers from Feronyl offer **more integrated designs**, combining all the complexities of the product. We can integrate composite parts for their physical properties and metals for the durability of the product's use. The whole is embedded in a thermoplastic envelope to ensure a high quality appearance but at a drastically reduced cost. In our example, the overmoulding of a carbon plate is considered, in order to meet the requirements while reducing the costs :

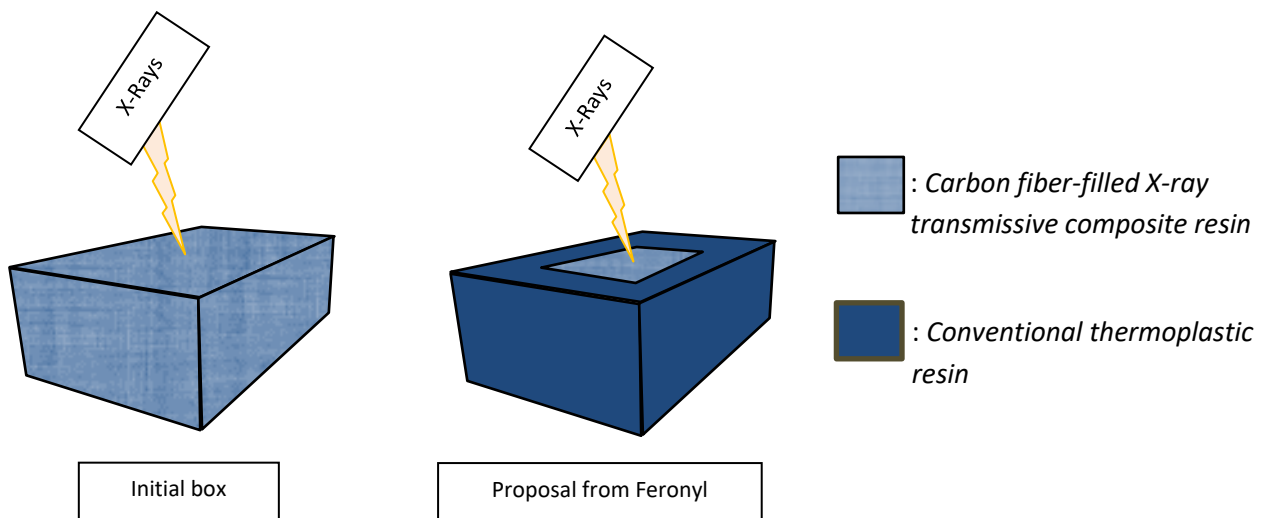


Figure 5 : Proposal for a new design reducing the final cost of the part

Indeed, carbon fiber composite resin is a relatively expensive and complicated material to form. It is therefore interesting to use it wisely. With this type of overmoulding, the desired properties of the parts are preserved while **reducing the price of the component by up to 5 times**.

Our co-engineering offers are therefore often an effective solution to reduce the cost of your products !

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Established in Mouscron (Belgium) since 1950, Feronyl is one of the SUB-ALLIANCE E.I.G. companies.

SUB-ALLIANCE is specialized in manufacturing of advanced mechanical systems, mainly composed of polymers, composites, metals and transmissions. The four business units can provide stand-alone manufacturing capabilities or join forces on common Research & Development projects.

The four business units are Feronyl, Dedecker Precision Mechanics DPM, Tecnolon Works and Grimonprez Transmissions Gears.