Plastics and Composites
Performance : Cost & Weight

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Outline

• What are the key mechanical properties for plastics and composites?
• Which polymer gives the best performance: cost & weight?
• How can fillers be used to improve these properties even further?
• Are nano-composites cost competitive?
• How does the future look?
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Cost of Material (Euros / litre)
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Cost of Material (Euros / litre)

Impact Strength (kJ/m$^2$)
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Cost of Composite (Euros / litre)

- Glass Fibre
- Mineral Fibre
- Mica
- Talc
- CaCO₃
- Wood Fibre
- Wollastonite
- Nanoclay

Modulus (GPa)

- 0.60 0.70 0.80 0.90 1.00 1.10 1.20 1.30 1.40

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Conclusion

- The key mechanical design properties are modulus, yield strength, impact strength and HDT.
- PP is the best matrix in terms of performance : cost.
- For household appliances, cost is most important, whereas for the automotive industry material density is also a factor.
- Fillers can enhance the properties of PP to give composites of even better performance : cost & performance : weight.
- Nano clay is not yet cost competitive with glass fibre, but better surface finish and flame retardance could offset that.
- In the future we can expect to see continued growth in the composites market. All fillers will continue to have a place and nano-composites will emerge as the cost decreases.