

# Composites



Graphene-Enhanced  
Tooling



*Creating Material Change*  
[www.haydale.com](http://www.haydale.com)  HaydaleGraphene

# Graphene-Enhanced Prepreg for Composite Tooling

Fibre-reinforced composites are gaining in use across a myriad of sectors from aerospace and automotive to sports and leisure. As production scales up, more efficient manufacturing remains a key focus.

Whichever tooling method industry uses there is often a trade-off. The disadvantage of aluminium and steel moulds is their high coefficient of thermal expansion (CTE) compared to composites, which can induce in-material stresses and affect tolerance. They are also expensive and heavy.

While the compensation of using lighter composite tools is typically less durability making them more vulnerable to wear and consequently their use in low volume production.

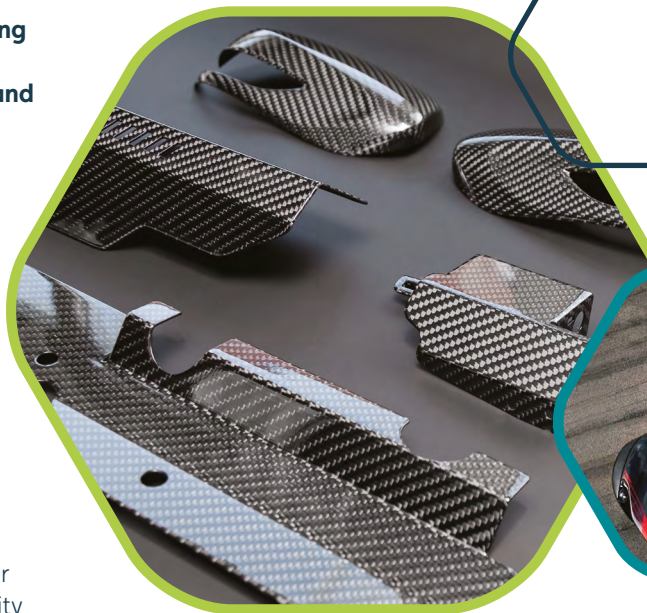
## Unlocking Quality Tooling for Composite Components

Haydale's graphene-enhanced epoxy prepreg tooling material is designed to deliver cost-efficient composite tooling with extended tooling life, improved surface quality and enhanced thermal conductivity.

Using HDPlas technology, functionalised graphene is added to high performing tooling epoxy resin and then pre-impregnated onto a suitable carbon fibre for tool manufacture.

The functionalised graphene is specifically designed to offer:

- Extended tooling life - from 250 parts to more than 500.
- Less frequent tool changes saving substantial costs for the producer and end user.
- Reduced tooling costs on volume and series production by up to three times.
- Better surface quality - the graphene acts like a lubricant adding a smoothness and gloss to the finished part.
- Improved homogenous cure - thermal conductivity reduces the differentials between hot spots and cold spots. Good for high tolerance components that are subjected to long, low temperature curing cycles.
- Tighter tolerance parts.



## Extended Tooling Life

Working with a UK Automotive Tier 1 composite parts manufacturer, the tooling prepreg has been on trial for two years, and they have been delighted with the performance they have seen, stating:

**// We have been producing duplicate parts with both our standard and the nano-enhanced version and can say with confidence that the Haydale material has delivered in excess of 500 parts without any deterioration of the mould surface. Using the standard version we would expect approximately 250 pulls from a tool before it is replaced. //**

**Matt Bradney,**  
Director of Business Development,  
Prodrive Composites Ltd

## Ease of Use for Composite Tooling

Switching over to the graphene-enhanced prepreg requires no changes to standard processing for use in autoclave and out-of-autoclave (OOA) applications. The resin system is applicable to all standard carbon fibre reinforcements and is available in production quantities through a fully accredited and established UK supply chain, with global shipping available.





# Creating Material Change

Haydale has a range of customisable preregs for a wide range of applications in the automotive and aerospace tooling market. Contact us for bespoke solutions to meet your specific requirements.

Haydale is here to help with end-to-end support from sourcing the correct material for your specific application to creating a commercialised product.



## About Haydale

For carbon fibre applications, Haydale offers reliable, proven solutions using functionalised preregs. From aerospace and automotive to space and sports goods such as bike frames and racing boats, Haydale has developed a suite of graphene-enhanced carbon fibre preregs.

By adding graphene nanomaterials, our prepreg systems can increase impact resistance and compression after impact performance of carbon fibre reinforced epoxy components.

Produced in the UK, our range of graphene-enhanced composite preregs are manufactured using an environmentally friendlier, sustainable plasma process that functionalises an array of nanomaterials.

Using Haydale's functionalisation process allows for large performance gains in mechanical, electrical and thermal properties.

Haydale is ISO 9001:2015 and ISO 14001:2015 certified. Our functionalised materials are produced to stringent quality control procedures, managed by an experienced team offering a dedicated end-to-end support service from consultancy through to materials development and application.

## Working with Haydale

This is just a selection of our products and applications. Contact our sales team today for more information on formulations available for your specific application or product. Our experts are here to help.



If you are interested in our range of graphene-enhanced prepregs to improve your manufacturing processes, then get in touch with us today to find out more.

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