

Characterisation, Dimensioning and Manufacture of Bio-Composites

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INTRODUCTION

This report has been submitted to the Department of Wind Energy at the Technical University of Denmark in partial fulfillment of the requirement for the special course “Characterization, Dimensioning and Production of Bio-Composites” at special course at DTU RISØ.

In the report the focus is on the rheological properties of bio-resin and the structural properties of the nature fiber reinforced (NFRP) composites. And the parameters around the process of making a high performance part for the automotive industry in comparison to a similar part made of carbon fiber.

Through flow and viscosity experiments it was found that the generation Entropy Resins bio-resin is comparable to HT2 epoxy system available from R-G. Furthermore studies of the bio-resins temperature related properties reveals that higher than room temperature infusion conditions provide a noticeable boost to its flow performance with regards to vacuum infusion.

Both a flow and finite element model is used to evaluate whether the final design is. The flow model developed can also be used to determine the maximum infusion length.

Lastly a prototype bio-wheel was constructed in flax fiber and balsa wood, with the characterized bio-resin. Which has no end-of-life issues and has a much small environmental impact than the CFRP-version.