

# **TX-100 Manufacturing Final Project Report**

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## **Abstract**

This report details the work completed under the TX-100 blade manufacturing portion of the Carbon-Hybrid Blade Developments: Standard and Twist-Coupled Prototype project. The TX-100 blade is a 9 meter prototype blade designed with bend-twist coupling to augment the mitigation of peak loads during normal turbine operation. This structural coupling was achieved by locating off axis carbon fiber in the outboard portion of the blade skins. The report will present the tooling selection, blade production, blade instrumentation, blade shipping and adapter plate design and fabrication. The baseline blade used for this project was the ERS-100 (Revision D) wind turbine blade. The molds used for the production of the TX-100 were originally built for the production of the CX-100 blade. The same high pressure and low pressure skin molds were used to manufacture the TX-100 skins. In order to compensate for the difference in skin thickness between the CX-100 and the TX-100, however, a new TX-100 shear web plug and mold were required. Both the blade assembly fixture and the root stud insertion fixture used for the CX-100 blades could be utilized for the TX-100 blades. A production run of seven TX-100 prototype blades was undertaken at TPI Composites during the month of October, 2004. Of those seven blades, four were instrumented with strain gauges before final assembly. After production at the TPI Composites facility in Rhode Island, the blades were shipped to various test sites: two blades to the National Wind Technology Center at the National Renewable Energy Laboratory in Boulder, Colorado, two blades to Sandia National Laboratory in Albuquerque, New Mexico and three blades to the United States Department of Agriculture turbine field test facility in Bushland, Texas. An adapter plate was designed to allow the TX-100 blades to be installed on existing Micon 65/13M turbines at the USDA site. The conclusion of this program is the kick-off of the TX-100 blade testing at the three testing facilities.