AMETEK®
TEST & CALIBRATION INSTRUMENTS

Case Story

# Strong Composites for Aerospace and Marine Industries

*▶ 100 kN and 50 kN dual column universal materials testing machines from Lloyd Instruments are being used by UK manufacturer Aim Composites Ltd to test the mechanical and physical properties of their composite materials, which are used extensively in the aerospace, marine, bus and railway industries.*

Mechanical testing is an important part of Aim Composites' process control function and is used to ensure that the components have been cured properly and have reached their mechanical strength requirements.

Most of the composite components consist of a honeycomb core sandwiched between outer skins. Different skin-core combinations give different levels and directions of stiffness and are chosen to meet the requirements of the particular application. Some solid laminate components are also manufactured.

## Different Test Types

Tests include peel tests to evaluate the skin to core bond strength, long beam compression to evaluate skin properties and short beam shear tests for the core properties. Tensile strength and interlaminar shear strength tests are carried out for solid laminate components, while overlap shear tests are used to evaluate aluminium / aluminium bond strength.

## Overlap Shear Testing

Tensile testing and overlap shear measurements are performed using a Lloyd Instruments EZ50 50 kN dual column universal materials testing machine. Overlap shear testing is used to test the shear strength of bonds produced when two sections of aluminium/aluminium composite materials are joined using an epoxy adhesive.

Two pieces of the aluminium skin are bonded together and cured, with the degree of overlap on the bond such that the test will evaluate the shear strength of the adhesive and not the material itself.

The ends of the bonded samples are placed in the grips of the EZ50 and pulled at a fixed speed until failure. This test provides information on adhesive strengths, surface preparation parameters and adhesive environmental durability.

## International Standards

Tests are carried out in accordance to international standards (EN, BS, ASTM). For the aerospace industry, tests are carried out in accordance to ISO and ASTM standards to criteria established by many of the world's leading airframe manufacturers.

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materials testing