VAMAS

Polymer Composites
Technical Work Area 5

An opportunity to get involved in International Standardization

Introduction

The Polymer Composites Technical Work Area (TWA) was formed as a recognition of the need to characterise and predict the mechanical behaviour of polymer composites under representative processing and service conditions. The original work programme employed round robin testing studies in two project areas:

- Mode I - Delaminational crack growth under both static and dynamic loading
- Fatigue test methods

Recent Projects

- Mode II - Measurement of fracture toughness
- Mechanical properties for fibre-matrix interface

Current Projects

- Multiaxial mechanical properties

Multiaxial properties of polymer composites is an on-going activity. There are several methods of creating multiaxial loads, including the use of:

(i) axial forces and pressure (internal/external)
(ii) tube specimens
(iii) biaxial plate
(iv) cruciform type biaxial configurations
(v) full rig systems (combinations of axial/bending/twisting loads).

Currently there is no standard protocol in place. The task of this project will be to encompass and consolidate proposed methods into a single procedure for each loading mode.

Standardization

- Mode I data supported the drafting of ISO 15024[1] for static tests.
- Results from the fatigue project supported ISO 13003[2] and in particular formed the two technical annexes.
- New Work Item (NWI) proposal for Mode II Fracture Energy based on "four-point end notched flexure test" has been submitted to ISO TC61/SC13 Secretariat.


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- A Technical Trend Assessment (TTA) is to be produced on the "Fibre Fragmentation Test" used for measuring the fibre-matrix interfacial strength. TTAs are joint VAMAS-ISO publications.

Future Activities

Projects to be considered for future work include:

- thermal analysis (DSC, DMA, TMA),
- processing properties (permeability),
- in-plane tension and compression (improved coupon specimens),
- through-thickness properties,
- adhesion testing,
- damage tolerance,
- structural element tests,
- long-term durability,
- design database data,
- ultrasonics for NDE
- elastic property measurements.

Ideas for new TWA5 activities are always welcome.

References

1. ISO 15024:2001 - Fibre-reinforced plastic composites - Determination of mode I interlaminar fracture toughness, G_{IC}, for unidirectionally reinforced materials.

2. ISO 13003:2003 - Fibre-reinforced plastics - Determination of fatigue properties under cyclic loading conditions.

For more information on participation or to propose new project ideas please contact:

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