Methodology for characterisation of glass fibre composite architecture

The present study outlines a methodology for microstructural characterisation of fibre reinforced composites containing circular fibres. Digital micrographs of polished cross-sections are used as input to a numerical image processing tool that determines spatial mapping and radii detection of the fibres. The information is used for different analyses to investigate and characterise the fibre architecture. As an example, the methodology is applied to glass fibre reinforced composites with varying fibre contents. The different fibre volume fractions (FVFs) affect the number of contact points per fibre, the communal fibre distance and the local FVF. The fibre diameter distribution and packing pattern remain somewhat similar for the considered materials. The methodology is a step towards a better understanding of the composite microstructure and can be used to evaluate the interconnection between fibre architecture and composite properties.

General information
Publication status: Published
Organisations: Department of Wind Energy, Composites Mechanics and Materials Mechanics, LM Wind Power
Contributors: Hansen, J. Z., Larsen, J., Østergaard, R., Brøndsted, P.
Pages: 187-193
Publication date: 2012
Peer-reviewed: Yes

Publication information
Journal: Plastics, Rubber & Composites
Volume: 41
Issue number: 4/5
ISSN (Print): 1465-8011
Ratings:
BFI (2012): BFI-level 1
Scopus rating (2012): CiteScore 0.71 SJR 0.371 SNIP 0.658
Web of Science (2012): Impact factor 0.631
ISI indexed (2012): ISI indexed yes
Original language: English
Keywords: Glass fibres, Scanning electron microscopy, Composite microstructure, Microstructural characterisation
Electronic versions:
Methodology_for_Characterisation_of_Glass_Fibre.pdf
DOIs:
10.1179/1743289811Y.0000000067

Research output: Contribution to journal › Journal article – Annual report year: 2012 › Research › peer-review