Influence of fiber type, fiber mat orientation, and process time on the properties of a wood fiber/polymer composite

A rapid press consolidation technique was used to produce composites from two types of air-laid wood fiber mat, incorporating either mechanically refined or bleached chemi-thermomechanically refined Norway Spruce [Picea abies (L.) Karst] and a bicomponent polymer fiber. The manufacturing technique involved pre-compression, contact heating to the process temperature under vacuum and then rapid transfer to the press for consolidation and cooling. Composites were tested to determine response to water or water vapor, porosity, fiber volume fraction and tensile properties. The composites absorbed water rapidly and showed changes in thickness with fluctuations in relative humidity. Porosity was higher in composites containing mechanically refined (MDF) fibers than in composites containing bleached chemi-thermomechanically refined (CTMP) fibers. Tensile test results suggested that fiber wetting by the polymer matrix had been maximized within a five-minute heating time. Results also indicated that had been maximized within a five-minute heating time. Results also indicated that porosity was not the key determinant of tensile properties in the composites.

General information
State: Published
Organisations: Risø National Laboratory for Sustainable Energy
Contributors: Plackett, D., Törgilsson, R., Løgstrup Andersen, T.
Pages: 1005-1018
Publication date: 2002
Peer-reviewed: Yes

Publication information
Journal: International Journal of Polymeric Materials
Volume: 51
Issue number: 11
ISSN (Print): 0091-4037
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 1.88 SJR 0.489 SNIP 0.593
Web of Science (2017): Impact factor 2.127
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 1.47 SJR 0.401 SNIP 0.545
Web of Science (2016): Impact factor 1.515
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): CiteScore 1.63 SJR 0.427 SNIP 0.718
Web of Science (2015): Impact factor 1.667
BFI (2014): BFI-level 1
Scopus rating (2014): CiteScore 2.78 SJR 0.79 SNIP 1.113
Web of Science (2014): Impact factor 3.568
BFI (2013): BFI-level 1
Scopus rating (2013): CiteScore 2.41 SJR 0.827 SNIP 1.167
Web of Science (2013): Impact factor 2.784
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): CiteScore 1.62 SJR 0.695 SNIP 1.038
Web of Science (2012): Impact factor 1.865
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): CiteScore 1.03 SJR 0.374 SNIP 0.854
Web of Science (2011): Impact factor 1.204
ISI indexed (2011): ISI indexed no
BFI (2010): BFI-level 1