

**Performance of virgin and recycled natural fibers for technical nonwoven applications**

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Natural fibers are generating an increasing interest for various technical nonwoven applications. Indeed, they represent an easily available, low cost, low weight, and environmentally friendly alternative to synthetic materials. Some of them are also available in large quantities as recycled materials, which further reduces the cost. However, most technical applications require well defined properties. This paper presents the results of a comparative study of the physical, thermal and mechanical properties of a list of virgin and recycled natural fibers: Flax, hemp, jute, kenaf, and sisal. Diameters between 40 and 150  $\mu\text{m}$  were measured depending on the fiber type and origin. Fiber length ranged from 50 mm for recycled jute to 200 mm for recycled sisal. With one exception, more than 80% of the fibers were longer than 40 mm, the criterion for nonwoven processing by needle punching. A lower than 350°C degradation temperature was recorded with one source of recycled jute, which may be attributed to the presence of contaminants resulting from its previous use. Finally, the highest breaking force values were recorded for virgin hemp and recycled sisal while the largest elongation at break was obtained for virgin sisal. These results provide some useful information that can be used as a guide for the selection of natural fibers based on the technical requirements of the application. They also show that recycled fibers may be an interesting alternative as long as there is no contamination resulting from their former use.

**Biography**

Patricia I Dolez is a Researcher at CTT Group in St-Hyacinthe, Quebec, Canada. She holds an Engineering Degree in Materials Science and a PhD in Physics. She has expertise in materials science, textiles, polymers, and composites, and has authored more than 80 papers in refereed journals and conference proceedings as well as several book chapters. She is the Editor of a book "Nanoengineering: Global Approaches to Health & Safety Issues" published in 2015 by Elsevier. She is especially interested in the application of smart textiles, nanotechnologies, natural fibres, and recycled materials in geosynthetics, building materials, and protective clothing.

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