



# An efficient process for producing economical and eco-friendly cotton-based textile composites for mobile industry

A.P. S. Sawhney, M. Reynolds, B. Condon, R. Slopek and D. Hui\*

*Southern Regional Research Center, Agricultural Research Service, USDA.  
New Orleans, LA 70124, USA.*

*\* University of New Orleans, Mechanical Engineering Department.*

## Abstract

A modern high-tech process of entangling loosely-held fibrous materials into an integrated durable fabric using extremely fine, high pressure water jets has been successfully applied to produce fabrics containing 100% greige (scour/bleach-less) cotton fibers. This research investigation has demonstrated that greige cotton, which is rarely utilized in nonwoven fabrics of today, can indeed be efficiently, sustainably and ecologically used by the nonwovens industry that is rapidly growing, worldwide. This article briefly describes the technology behind the hydro-entangling system and covers some of the process and product metrics involved in producing cotton-containing substrates for ultimate utilization and conversion into nonwoven composites for numerous possible end-use applications, including the textile technical products for the huge mobile industry comprised of automobiles, airlines, trains and shipping.

**Key words:** *Ginned greige cotton processing, Needle-punch, Hydro-entanglement system, Nonwovens, SEM images of processed cotton fibers*

## 1. Introduction

Mobile Industry, especially the automotive, utilizes enormous quantities of textile fabrics and composites made of fibrous matrixes bonded with diverse binding, reinforcing and/or special chemical agents and processing technologies. Today, most of textile fibrous materials and substrates used in these fabrics and composites are made with thermoplastic synthetic fibers, such as polypropylene, polyethylene, polyester, nylon, etc., using thermal bonding

systems such as spun-bonding, melt-blown, and the like. However, the current *green revolution* and the global emphasis on the life cycle, sustainability, disposability and biodegradability of end-use products are pushing the products' producers and consumers alike toward natural and environmentally-benign raw-materials and production-processes.

Although cotton has been a fiber of choice for apparel for centuries and continues to be so today, its use in technical fabrics and composites has been very limited, mainly due to its unfavorable (raw material) cost, its