



Properties of nonwoven fabrics made with UltraClean™ cotton

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Abstract

A number of hydro-entangled and needle-punched nonwoven fabrics have been successfully produced on commercial equipment, using UltraClean™ cotton (communications with Wildwood Gin Company, Greenwood, MS). The various processes involved in production of the nonwovens went smoothly without any significant difficulty. The cotton fibers and the nonwoven fabrics made thereof have been extensively tested under standard procedures and conditions. This paper presents the scientific information obtained from this collaborative study conducted with a super-clean virgin cotton to explore efficient utilization of cotton in modern nonwovens.

Key words: *Mechanically-cleaned greige cotton, Carding, Needle-punching, Hydro-entanglement, Nonwoven fabrics and their properties.*

1. Introduction

Although cotton's market share in the global nonwovens arena today is only in a low single digit, the nonwovens industry's fresh look and interest in cotton fiber is growing rapidly (Nonwovens-Industry, 2008). This is mainly due to the ongoing, serious global emphasis on a product's life cycle, i.e., on its sustainability, carbon footprint, and disposability issues. However, the nonwovens industry in the last few decades rapidly grew and it is now well established by profitably using mainly manufactured fibers (mostly thermoplastic synthetic fibers, such as polypropylene, polyester, polyethylene, etc.) that relatively are (or, at least were before the recent,

one-year-long oil-price crisis) readily, reliably and economically available to efficiently serve the existing or targeted nonwovens markets (Kirk-Othmer Encyclopedia of Chemical Technology, 2001). The major factors limiting use of cotton in nonwovens, thus far, seem to be the costs and uncompetitive operating economics; the complexities of reliable supply of cotton raw material and of subsequent thorough cleaning of greige cotton in the existing nonwovens manufacturing entities, most of which presently do not have the required cotton cleaning and carding equipment and expertise; and, to some extent, the lack of certain desired fiber properties for certain special function- and/or performance- specific applications. Traditional bales of virgin greige cotton vary in characteristics from crop to crop and contain a considerable