



Analysis of effluent filtrate in the hydro-entanglement process for producing cotton nonwovens: a progress report

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Abstract

A number of hydro-entangled cotton nonwoven fabrics were produced on commercial equipment, using UltraClean™ Cotton (T.J. Beall Company). Polypropylene “sock” filters were used in several production trials to clean effluent water for recycling in the hydro-entanglement process. After each trial run, the sock filter was removed to study residual constituents of the filtrate. However, in some trials, the filters had clogged up, thereby disrupting the water flow and interrupting the trials. This report briefly presents the chemical, microscopic and bacterial analyses of a classical effluent/filtrate obtained from a successfully completed trial that was conducted under specified process parameters and other conditions.

Key words: *Ultra-Clean™ greige cotton, Hydro-entanglement process, Process water recycling, Effluent filtrate and analysis of its various constituents, Nonwoven fabrics*

1. Introduction

Approximately 98% of the nonwoven products produced today use either synthetic fibers, such as polyester, polypropylene, polyethylene, etc., or regenerated fibers like rayon (s). Cotton thus far has been rarely used, mainly because of economic and certain technical reasons. However, because of the current “Green” movement and its strong impact worldwide, many traditional nonwovens producers now want to incorporate cotton into their products to drive their businesses. Among the few existing technologies that are available for commercial production

of nonwoven fabrics from staple fibers, the hydro-entanglement system is the most efficient and, hence, most popular today. However, unlike the manufactured fibers that are clean and consistent and mostly used in nonwovens today, cotton, being a natural agricultural commodity, is almost always somewhat contaminated with certain foreign matter (such as fine plant specks, dirt/trash, sugars, waxes, pectin, etc.) that, along with some extremely short fibers in the stock population, reportedly interferes with the hydro-entanglement process. Because of the extremely high water pressures, finely perforated jet strips, and precision pumps and machinery involved in an H-E process, the latter certainly requires a rather stringent and