

**CARDING OF MICROFIBERS**

Yoon J. Hwang, William Oxenham and Abdelfattah M. Seyam
Nonwovens Cooperative Research Center
North Carolina State University

Abstract

Microfibers, used alone or in blends, have created considerable interest in the apparel industry because of their potentially greater comfort and functionality. Additionally, their lower diameter, greater surface area and flexibility offer many applications in areas of nonwovens such as filtration, man-made leather, protective clothing, and wipes. Unfortunately the properties of microfibers that make them attractive for the above applications are also the same properties that lead to difficulties in processing.

The paper is an account of systematic experimental investigation into the processing of microfibers on a flat card. The effects of fiber and carding parameters on web quality were determined by assessing the nep content and fiber length after carding. Statistical analyses of the data indicate that all the main parameters studied have an influence on web quality. Furthermore it is shown that there is a strong correlation between the incidents of neps and the increase in short fiber content during carding. An additional observation is that the generation of neps was not uniform across the width of the card and appeared to be influenced by variation in the fiber loading on the doffer across the card.

KEYWORDS: carding, flat card, card setting, neps, microfibers, fiber length, short fiber content, fiber loading

Introduction

Generally, microfiber is defined as a fiber of less than 1.0 denier. In the early 1930's, man-made fibers of less than 1.0 dpf were produced even though they did not have properties that were then considered suitable for conventional textile applications [6]. More recently, fine man-made fibers were developed with the intent to simulate silk, cotton, and wool. Microfibers less than half size of the finest silk are now available commercially and furthermore microfibers

as small as 0.001 dpf are produced by Toray of Japan [5]. U.S. fiber producers have decided not to manufacture microfibers of lower denier than 0.5 due to the difficulties involved in converting finer fibers to yarns and fabrics.

The card is designed to process fibers into slivers for manufacturing yarns, and it is one of the primary processes in the production of webs for nonwoven fabrics. The carded webs are produced using conventional carding machines. A carding machine