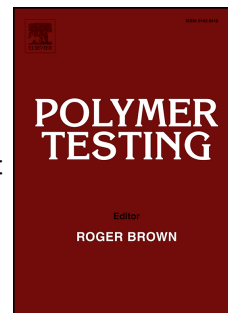


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Novel objective test method for the abrasion and pilling behaviour of low basis weight spunbond polypropylene nonwovens

Karsten Leucker, Janosch Amtmann, Dirk W. Schubert



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Test Method

Novel objective test method for the abrasion and pilling behaviour of low basis weight spunbond polypropylene nonwovensKarsten Leucker¹, Janosch Amtmann¹, Dirk W. Schubert^{1,2}¹*Friedrich-Alexander University Erlangen-Nürnberg (FAU), Institute of Polymer Materials, Martensstraße 7, 91058 Erlangen, Germany*²*Bavarian Polymer Institute (BPI), Keylab „Advanced Fiber Technologies“, Dr-Mack-Str. 77, 90762 Fürth, Germany***Abstract**

It has been demonstrated that none of the existing testing methods for abrasion resistance is suitable for the testing of low basis weight (areal weight) polypropylene nonwovens in the range of 15 g/m² to 25 g/m². Thus, a novel test method has been developed in which the samples are scanned after certain intervals of abrasion cycles on the Martindale abrasion tester using a standard flatbed scanner. From the greyscale images generated, the total pill area and the number of pills can be determined automatically using a simple image evaluation procedure that was optimized in this study. It was possible to objectively determine the influence of pressure, basis weight, test speed and number of test cycles, as well as the influence of aging of the silicone rubber abradant, which is typically used as an abradant to imitate the contact of nonwovens with human skin.

Keywords: polypropylene; spunbond; nonwoven; abrasion; pilling; Martindale

1. Introduction

Polypropylene spunbond nonwovens with low basis weights (areal weights) of about 8 – 30 g/m² that are point-bonded by thermal calendering are commonly used in the hygiene industry, e.g. in diapers [1]. In use, abrasion or pilling can cause a decrease in mechanical properties as well as a change in appearance, combined with unwanted loss of material pills. In contrast to staple fibre nonwovens, spunbond materials consist of filaments of infinite length and are, therefore, less prone to abrasion by loss of material. However, during the production process the nonwovens need to be cut into the desired shape, and

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